

4c-622.05
M6

1885 51
CA



STATE LIBRARY.

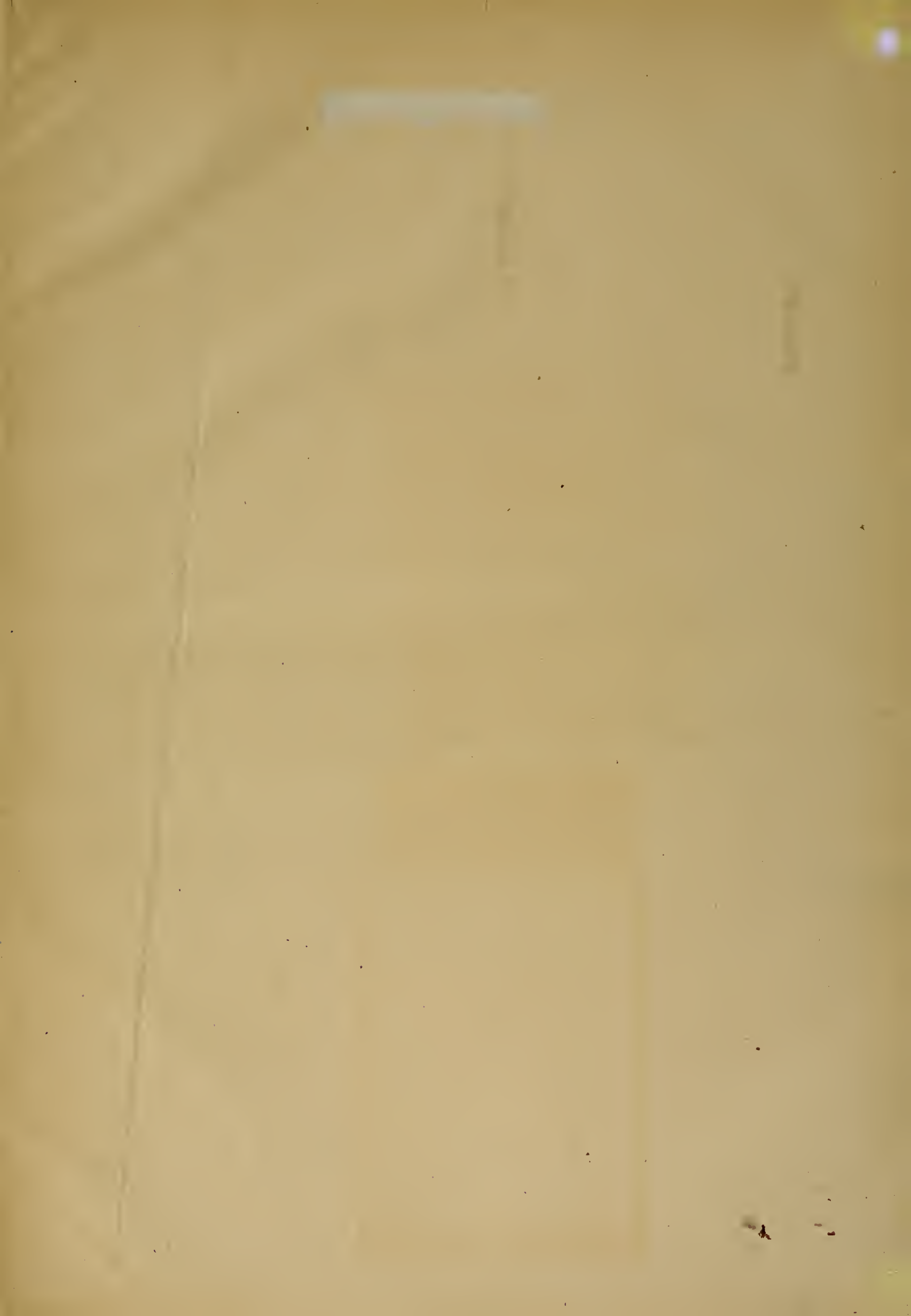


When, from whom, and how this volume was obtained,
with the price paid, if any, may be found opposite
the above number in the Register of Books,
which is always open to inspection.

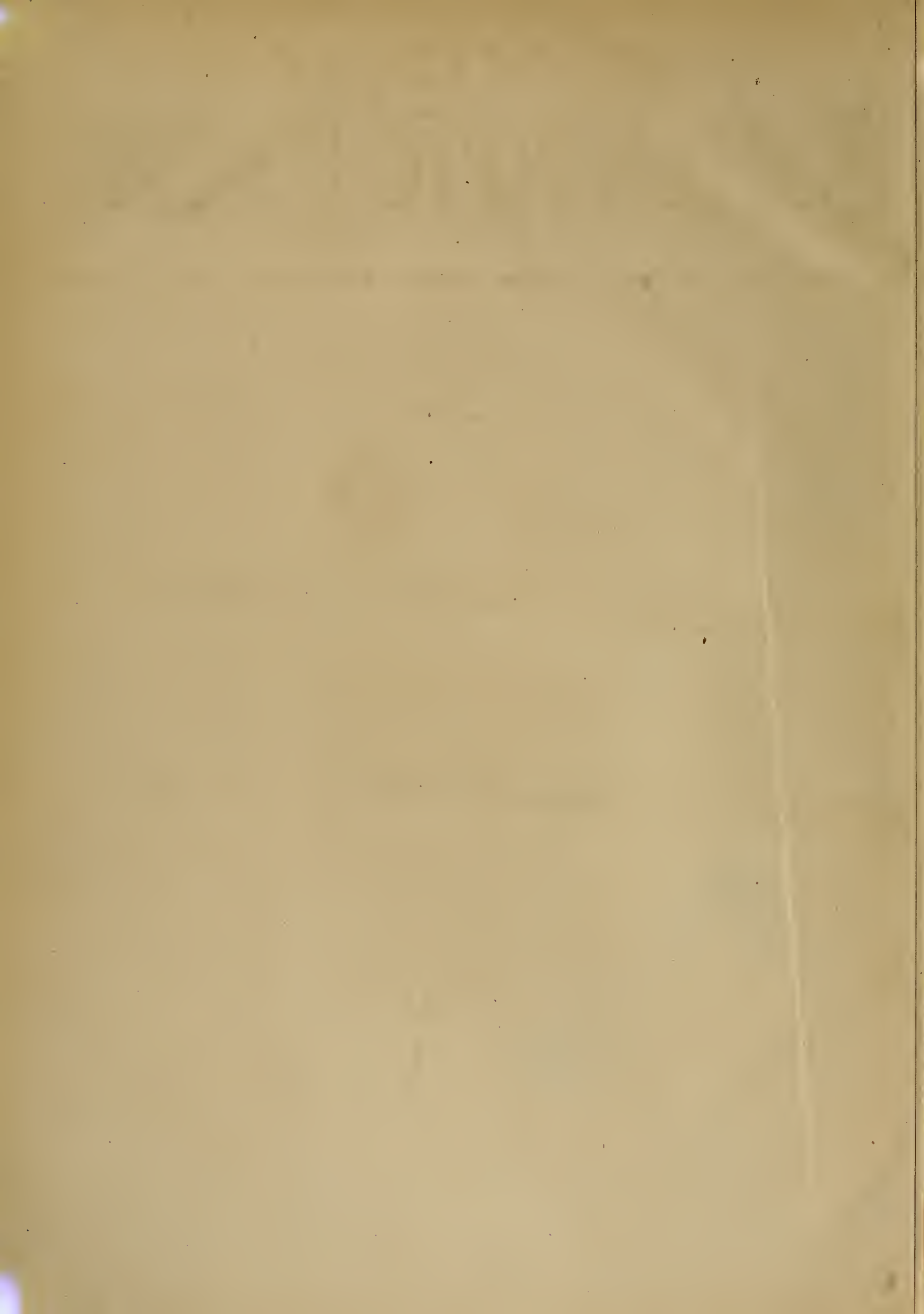
Extract from the Political Code.

SECTION 2296. Books may be taken from the Library
by the MEMBERS OF THE LEGISLATURE, DURING THE SESSIONS
THEREOF, and by other State officers at any time.
SEC. 2298. The Controller, if notified by the Librarian
that any officer has failed to return books taken by him
within the time prescribed by the Rules, and after demand
made, must not draw his warrant for the salary of such
officer until the return is made, or three times the value
of the books, or of any injuries thereto, has been paid to
the Librarian.
SEC. 2299. Every person who injures or fails to return
any book taken is liable to the Librarian in three times
the value thereof.
No person shall take or detain from the General Library
more than two volumes at any one time, or for a longer
period than two weeks. BOOKS OF REFERENCE SHALL NOT
BE TAKEN FROM THE LIBRARY AT ANY TIME.—[Extract from
the Rules.]

43 The Foregoing Regulations will be strictly enforced. 63







MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JULY 4, 1885.

VOLUME LI.
Number 1.

Hanksite.

A New Anhydrous Sulphate Carbonate from San Bernardino County.

In the very complete and attractive exhibit of California minerals brought to the World's Industrial and Cotton Centennial Exposition at New Orleans, by Henry G. Hanks, State Mineralogist of California, were several species of unusual interest. Among these was the new borate, Colemanite, with its large and lustrous crystals so much resembling the finest of the Bergen Hill datolites; the new vanadium mica, Roscoelite, mixed as it is mechanically with much native gold between its folia; horax crystals, clear and bright, of unusual size; stibnite in superb crystals almost equalling the late discoveries in this species in Japan, and many others equally noteworthy.

Wm. Earl Hidden read before a recent meeting of the New York Academy of Sciences a paper on one of the minerals exhibited, and as it is of local as well as general interest, we reproduce the paper:

"Of particular interest to the writer was a small lot of apparently hexagonal crystals, to which had been given the name of 'Thenardite.' Now as Thenardite is asserted in the text books to be orthorhombic, I was prompted to measure the angles of these crystals. Their seeming non-conformity in shape pointed to the possibility of their being new—in angle, or type of form, especially. The results confirmed my first suspicions of their true hexagonal character, though my measurements were only approximate, being made with a hand goniometer."

Since the hexagonal character of the mineral, which seemed so evident, might possibly be due to complex twinning of orthorhombic individuals, it seemed advisable to have this question decided on the basis of an optical examination; and for this purpose three of the best crystals were kindly given by Prof. Hanks, and sent by me to Dr. Edward S. Dana for that exact crystallographic definition needed in this case, and which he always so ably and generously gives to science. The crystals sent being quite clear, Dr. Dana was, in a few days, enabled to report them "as uniaxial (double refraction negative), and that normally," and thus their positive difference from Thenardite was proven beyond question. They were true hexagonal crystals. Believing now the mineral to be either a dimorphous form of sodium sulphate, or possibly an entirely new species, an analysis seemed necessary. Accordingly I placed sufficient material in the hands of Mr. James B. Mackintosh, E. M., for that purpose, and he has kindly done the work. His results showed the mineral to contain the following substances:

SO ₃	45.89
CO ₂	5.42
Cl.....	2.36
%Na ₂ O.....	46.34

Corresponding to

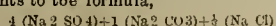
Na ₂ SO ₄	81.45
Na ₂ CO ₃	13.06
Na Cl.....	3.80
Na ₂ O (excess).....	1.08
	99.48

\$All bases calculated as soda. Lime and magnesia were not present.

These results give the following molecular ratios for

Na ₂ SO ₄	57.3	(3.95)
Na ₂ CO ₃	14.5	(1.00)
Na Cl.....	6.65	(.46)
Na ₂ O.....	1.74	(.12)

Or closely in the ratio of 4 : 1 : $\frac{1}{2}$: $\frac{1}{4}$. This all points to the formula,



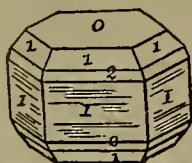
as representing the composition of the crystals under examination. Or, neglecting the sodium chloride as non-essential, the formula could be given thus:—



which is probably the true one.

The observed excess of soda is either due to

Fig. 1.



CRYSTALS OF HANKSITE.

errors of analysis, as only a small quantity was used, or it may have been combined with boracic acid, as borax is very abundant at the locality.

The interesting anomaly of a sulphate and carbonate being in chemical combination re-

from several localities in the far West, groups of crystals that were hexagonal (tabular) in appearance, very impure in composition, and to which the name of Aragonite has been attached.

The crystals here analyzed were found with aalt, thenardite, tincal, etc., at the works of

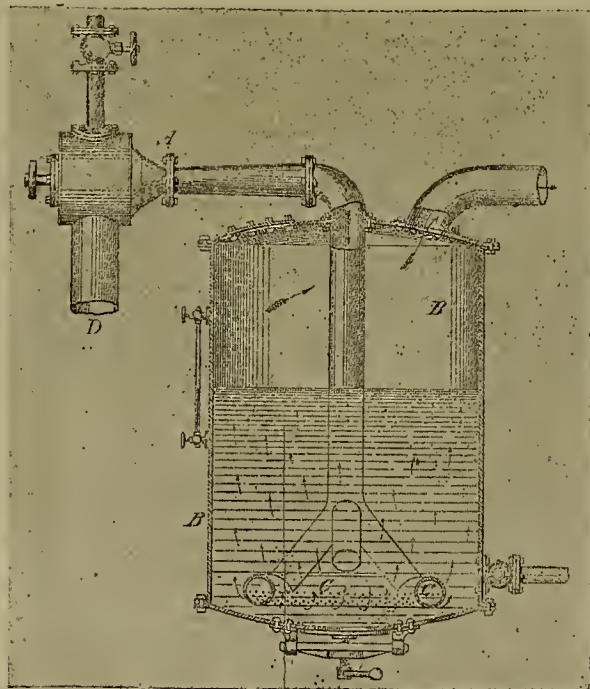
Fig. 2.



GROUPED CRYSTALS.

the San Bernardino Borax Co., in San Bernardino county, California.

The density of this new California mineral is 2.562. Its hardness, 3–3.5. It is readily soluble in water. Effervesces with acids. It affords, when dissolved in water, an abundant



ROESSLER'S APPARATUS FOR MAKING SULPHURIC ACID.

minds us of the rare sulphate carbonate of lead, Leadhillite, to which this alone bears relation as a natural species.

The angles I obtained were as follows:—

O on 1 = 90°	O on 1 = 126° 30'
I on 1 = 120°	O on 2 = 113° 30'

Accordingly the value of the vertical axis is 1.17085. Cleavage parallel to O nearly perfect, but difficult to obtain.

Crystals striated horizontally. They are commonly terminated at both ends of the prism, and are very symmetrical in shape. They average, as thus far seen, about one centimeter in length and thickness, with O and I as predominating planes.

Sometimes the crystals are confusedly grouped (see Fig. 1), as from a common centre, much like the Aragonite from a noted European locality. For some late years mineralogists have received

precipitate of barium sulphate when barium chloride is added to the solution. On addition of silver nitrate, to a fresh solution, chloride of silver is precipitated, showing that chlorine is also present. Gentle ignition develops no appreciable loss in the weight of the mineral.

The crystals are transparent to semi-opaque, with a white waxy color inclining to yellow. Surfaces very highly polished or very smooth.

The definite formula deduced from Mr. Mackintosh's analysis, taken together with the form, warrants me in announcing these crystals as a new mineral species. I therefore propose for it the name of Hanksite, after Prof. Henry G. Hanks, of California, than whom no man has done more to give to the world a correct knowledge of the minerals of the great States of our Pacific Coast.

Sulphuric Acid and Sulphate of Copper.

By the discharge into the air of sulphurous and sulphuric acid vapors, or the process of parting bullion by sulphuric acid, a nuisance is created. During certain experiments and researches by Dr. Heinrich Roessler, chief of the German gold and silver parting establishment at Frankfurt-on-the-Main, for the sole purpose of abating such a nuisance, certain results were achieved which have an important bearing not only on this process, but are of value in the manufacture of sulphuric acid and sulphate of copper from sulphurous gases derived from any source. Roessler's method is now in successful operation at several places abroad, including the Royal mints of Kremuetz and Munich.

Mr. Arthur F. Wendt, of New York, has described the Roessler process of manufacturing sulphuric acid and sulphate of copper before the American Institute of Mining Engineers. The process, briefly described, is the introduction of sulphurous gases, mixed with an acid steam in a finely divided state, into a solution of blue vitriol. The salt acts as the carrier of the oxygen of the air, continuously converting sulphurous into sulphuric acid. It replaces the nitric acid of the lead chambers.

Laboratory experiments readily show the reactions occurring. If sulphurous acid is allowed to pass through a hot and not too acid solution of blue vitriol in such manner as to keep the liquid in violent ebullition, it will rapidly change the bright blue color of the solution to a dirty green. An addition of water to the green liquid will precipitate metallic copper. Salt will precipitate such chloride of copper. These reactions are proofs of the reduction of a portion of the sulphate of copper by the sulphurous acid into a sulphate of the suboxide, which remains dissolved in the hot solution of blue vitriol. To the presence of the suboxide is due the change in color.

If, now, air is blown into the dirty green solution, the bright blue color is gradually restored, owing to the re-oxidation of the green sulphate of the suboxide in the blue sulphate of the pro-oxide, the blue vitriol of commerce. The reactions of reduction and oxidation go on indefinitely and practically simultaneously in the apparatus devised by Dr. Roessler.

A sketch of the apparatus is here shown. A leaden tank (B), some eight or nine feet in diameter, carries a 6 inch lead pipe (A), branching at the bottom and supporting a ring (C), with numerous small holes drilled on the lower side. A Korting steam injector draws the gases containing the sulphurous acid from the flue (D), and forces them through the blue vitriol, which partly fills the tank or converter.

From 80 to 90 per cent of the sulphurous acid is converted into sulphuric acid, and any free sulphuric acid that may be present in the gases forced through the converter is completely absorbed by being brought into intimate contact with the water. The acid generated in the converter reaches a strength of 15° to 20° B.

By preference, the converter is now employed in Europe to manufacture blue vitriol. Sulphurous acid gas generated in metallurgical or other commercial operations invariably contains a small percentage of sulphuric acid, formed either by oxidation of sulphurous acid by the oxygen of the air, or carried along mechanically, as is the case with gases derived

(Concluded on page 5.)

Mineral Products of the United States.

The Yield in 1884.

The second report on "The Mineral Resources of the United States," by Albert Williams, Jr., Chief of the Division of Mining Statistics and Technology, United States Geological Survey, is now in press and will be issued shortly. This report is for the calendar years 1883 and 1884, and contains detailed statistics for these periods, and also for preceding years, together with much descriptive and technical matter. The following are the totals of the production of the more important mineral substances in 1884:

Coal.—The only statistics in which the trade is interested are those relating to the amount of coal which is mined for and reaches the market. There is besides a local and colliery consumption which is usually disregarded in statistics, and which ranges from five to six and a half per cent of the total shipments. Of what may be called the commercial product the quantities in 1884 were as follows: Pennsylvania anthracite, 30,718,293 long tons; bituminous and brown coal, lignite, and small lots of anthracite mined elsewhere than in Pennsylvania, 66,875,772 long tons; total, 97,594,065 long tons. The spot value of the commercial product was: Pennsylvania anthracite, \$61,436,586; bituminous and all other coals, \$70,219,561; total, \$131,656,147. Including the local consumption, etc., the total product in 1884 may be stated at 106,906,295 long tons; namely, 33,175,756 long tons of Pennsylvania anthracite and 73,730,539 long tons of bituminous and all other coals; and the value at the mines was: Pennsylvania anthracite, \$66,351,512; bituminous and all other coals, \$77,417,066; total, \$143,768,578. The total production (that is, including colliery and local consumption) of anthracite was 1,160,713 long tons less than in 1883, while its value was \$10,905,543 less, the disproportionate decline in value being due to a fall of 25 cents per ton in spot price (\$2.25 to \$2). The total bituminous coal production increased 5,199,039 long tons over that of 1883; but its value was \$4,820,734 less, the average valuation at the collieries having fallen from \$1.20 to \$1.05. The total output of the coals showed a net gain in tonnage of 4,038,326 long tons and a decline in value of \$15,726,277.

Coke.—There were 4,873,805 tons of coke made in 1884, worth \$7,242,878 at the ovens. This production consumed 7,951,974 short tons of coal. The amount of coke made was 590,916 tons less than in 1883, and the value was \$878,729 less.

Petroleum.—The production of crude petroleum in 1884 was 24,089,758 barrels of 42 barrels each, of which the Pennsylvania and New York oil fields produced 23,622,758. The total value, at an average spot price of 85 cents, was \$20,476,204. As compared with 1883 the production was 689,529 barrels greater; but the total value was \$3,263,958 less, the average spot price having fallen from \$1.10, or 25 cents per barrel.

Natural gas.—The estimated value of the natural gas used in the United States in 1884 was \$1,460,000, as against \$475,000 in 1883. The value is computed from that of the coal superseded by natural gas.

Iron.—The principal statistics for 1884 are as follows: Iron ore mined, 8,200,000 long tons; value at mine, \$22,550,000. Domestic iron ore consumed, 7,718,129 long tons; value at mine, \$21,224,854. Imported iron ore consumed, 487,820 long tons; total iron ore consumed, 8,125,949 long tons. Pig iron made, 4,097,868 long tons, a decrease of 497,642 tons as compared with 1883; value at furnace, \$73,761,624, or \$18,148,576 less than in 1883. Total spot value of all iron and steel in the first stage of manufacture, excluding all duplications, \$107,000,000, a decline of \$35,000,000 from 1883. Fuel consumed in all iron and steel works, including blast furnaces, 1,973,305 long tons of anthracite, 4,226,986 long tons of bituminous coal, 3,833,170 long tons of coke, and 62,110,660 bushels of charcoal, besides a notable quantity of natural gas. Limestone used as flux, 3,401,930 long tons; value at quarry, \$1,700,965.

Gold and silver.—The mint authorities estimate the production in 1884 at \$30,800,000 gold and \$48,800,000 silver (coining rates); total, \$79,600,000. This was an increase of \$800,000 gold and \$2,600,000 silver, as compared with 1883. The gold production was equivalent to 1,489,949 troy ounces; and the silver to 37,744,605 troy ounces.

Copper.—The production in 1884, including 2,858,754 pounds made from imported pyrites, was 145,221,934 pounds, worth \$17,789,687, at an average price of 12½ cents per pound in New York City. The amount was 28,070,139 pounds greater than this production of 1883; but the value was \$275,120 less than that for 1883, owing to the decline in price. In 1884 4,224,000 pounds of bluestone (sulphate of copper, "blue vitriol") were made; worth, at 4.3 cents per pound, \$181,632.

Lead.—Production, 139,897 short tons. Total value, at an average price of \$75.32 per ton on the Atlantic sea board, \$10,537,042. The production was 4,060 tons less than that of 1883, while the decrease in value was \$1,785,677. The production of white lead (carbonate) is estimated at about 65,000 short tons, worth at 4½ cents per pound, \$6,337,500, almost all of which was made from pig lead. The produc-

tion of litharge and red lead has not been ascertained.

Zinc.—Production of metallic zinc, 38,544 short tons; worth, at an average price of 4.44 cents per pound in New York city, \$3,422,707. The output was 1,672 tons greater than in 1883, and the value increased \$111,601. Besides the spelter and sheet zinc, about 13,000 short tons of zinc white (oxide) were made directly from the ore, the total value of which, at 3½ cents per pound, was \$910,000.

Quicksilver.—Production, 31,913 flasks (of 76½ pounds net=2,441,344 pounds), or 14,812 flasks less than in 1883. Total value, at an average price of \$29.34 per flask at San Francisco, \$936,327, a decline of \$317,305 as compared with the total value of the product of the previous year. During the year 600,000 pounds of quicksilver vermilion were made, worth \$288,000.

Nickel.—Production of nickel contained in copper-nickel alloy, 64,550 pounds, worth, at 75 cents per pound, \$48,412; an increase of 5,750 pounds, but a decline of \$4,508 in total value, owing to the falling off in price.

Cobalt.—The amount of cobalt oxide made in 1884 was about 2,000 pounds, as against 1,096 pounds made in 1883. Its value, at \$2.55 per pound, was \$5,100. The value of cobalt ore and matte cannot be ascertained, as it is chiefly dependent on the nickel contents.

Manganese.—The output of manganese ore in 1884 was about 10,000 long tons, or 2,000 tons more than in 1883. The total value, at \$12 per ton at the mines, was \$120,000, or about the same as in 1883, the average price having declined \$3 per ton.

Chromium.—This production of chrome iron ore, all from California, was about 2,000 long tons, or about two-thirds as much as in 1883. At an average value of \$17.50 per ton at San Francisco, the total value was \$35,000.

Tin.—A little tin ore was taken out in the course of development work in Dakota, Wyoming, Virginia and Alabama, but the only metallic tin made was a few hundred pounds from ore of the Black Hills (Dakota), mines made in sample tests at New York City pending the building of reduction works at the mines.

Platinum.—The amount mined in 1884 was about 150 troy ounces, worth, crude, \$3 per ounce.

Aluminum.—The amount made in the United States in 1884 was 1,800 troy ounces, an increase of 800 ounces over the production of 1883. At 75 cents per ounce the total value was \$1,350.

Building stone.—It is estimated that the value of the building stone quarried in 1884 was \$19,000,000, as against \$20,000,000 in 1883; the decline being due partly to dullness of trade and partly to the increased use of other structural materials.

Brick and tile.—The output was about the same as in 1883, but as manufacturers cut down expenses still further, meeting a lower market, the total value is estimated at \$30,000,000 as against \$34,000,000 in 1883.

Lime.—There were 37,000,000 barrels (of 200 pounds) made in 1884, the average value per barrel at the kilns being not over 50 cents, or \$18,500,000. The production was about 5,000,000 barrels greater than in 1883, but owing to the fall in price the total value was about \$700,000 less.

Cement.—About 100,000 barrels (of 400 pounds) of artificial Portland cement were made, or 10,000 more than in 1883; the total value, at \$2.10 per barrel, being \$210,000. The production of cement from natural cement rock was 3,900,000 barrels (of 300 pounds), or 200,000 barrels less than in 1883; worth, at 90 cents per barrel, \$3,510,000. The total production of all kinds of cement was about 4,000,000 barrels, valued at \$3,720,000.

Precious stones.—The estimated value of American precious stones sold as specimens and souvenirs in 1884 was \$54,325, and the value of the stones sold to be cut into gems was \$28,650; total, \$82,975. About \$140,000 worth of gold quartz was saved as specimens or made into jewelry and ornaments.

Buhrstones.—The value of the buhrstones yearly made in the United States is about \$300,000.

Grindstones.—Dealers estimate the value of the grindstones made in 1884, at \$570,000.

Phosphates.—The production of washed phosphate rock in South Carolina during the year ending May 31, 1884, was 431,779 long tons, worth \$2,374,784, or 53,399 tons more than in the previous year, with an increase of \$104,504 in value. The average spot price, \$5.50 per ton, was 50 cents less than in the preceding year. The recent discoveries of phosphate rock in the adjoining States of North Carolina, Alabama, and Florida will probably lead to a still further increase in production. Of manufactured fertilizers, 967,000 short tons, worth \$26,110,000, were made in the year ending April 30, 1884, and 1,023,500 short tons, worth \$27,640,000, were made in the year ending April 30, 1885.

Marls.—In New Jersey about 875,000 tons, worth \$437,500 at the pits, were dug in 1884. In addition, small quantities were produced for local use in some of the Southern States. The production is declining, owing to competition with fertilizers made from phosphatic rock, etc.

Gypsum.—In the Atlantic States, from Maine to Virginia, 65,000 long tons of land plaster and 60,000 tons of stucco, total 125,000 tons, were made in 1884, of which nearly all was from Nova Scotia gypsum. The statistics for Michigan have not been reported, but the produc-

tion did not vary greatly from that in 1883, in which year it was 60,082 short tons of land plaster and 159,100 barrels (of 300 pounds) of stucco. In Ohio 4,217 short tons of land plaster and 20,307 barrels of stucco were produced. There was also a small production in other parts of the country; but the total amount of domestic gypsum used is not known.

Salt.—The production in 1884 was 6,514,937 barrels of 280 pounds (equivalent to 1,824,182,360 pounds, or 32,574,655 bushels, or 912,091 short tons, according to the unit used). The total value, computed on average wholesale prices at the point of production, was \$4,197,734. The apparent output was 322,706 barrels greater than in 1883, while the value was \$13,308 less; but the production figures do not include a considerable stock on hand in the Onondaga district, not officially reported because not inspected.

Bromine.—The production is estimated at 281,100 pounds, all from the Ohio and West Virginia salt district; worth, at 24 cents per pound, \$67,464.

Borax.—Production about 7,000,000 pounds, or 500,000 pounds more than in 1883. The total value, however, was less than that of the product of 1883, being about \$490,000 at San Francisco rates, as against \$585,000 in 1883.

Sulphur.—No exact statistics. This production was only about 500 tons, worth about \$12,000.

Pyrites.—About 35,000 long tons were mined in the United States, worth about \$175,000 at the mines. Some 33,500 tons of imported pyrites were also burned, making a total consumption of 68,500 tons.

Barytes.—Full statistics not received. The production is estimated to have been about 25,000 tons; worth, at \$4 per ton, unground, at the point of production, \$100,000.

Mica.—The production of merchantable sheet mica, not including mica waste, was 147,410 pounds, valued at \$368,525.

Feldspar.—The production was 10,900 long tons, or 3,200 tons less than in 1883. Its value at the quarries was \$55,112.

Asbestos.—The amount mined was about 1,000 short tons, worth about \$30,000.

Graphite.—Production nominal, the supply being drawn from the stock accumulated in 1883.

Asphaltum.—The annual production is about 3,000 tons, having a spot value of \$10,500.

Alum.—About 38,000,000 pounds were made in the United States in 1884, or 3,000,000 pounds more than in 1883. At an average spot value of one and seven-eighths cents per pound, the product was worth \$712,500.

Copperas.—The amount made in 1884 was 15,500,000 pounds, worth, at 60 cents per hundredweight, \$93,000.

Mineral waters.—The sales of natural mineral waters in 1884 amounted to 68,720,936 gallons, valued at \$1,665,490, an apparent increase of 21,431,193 gallons and \$236,007 upon the figures for 1883. While the sales are undoubtedly increasing it is possible that the excess in the reported quantity and value of the waters sold in 1884 as compared with 1883 may be partly due to the greater fullness of the returns for 1884. Besides the waters bottled and placed on the market there is a large local consumption, not included in the foregoing figures.

REDUCTION WORKS.—Custom reduction works are badly needed in Belmont so that chloriders could get their ore worked at a reasonable figure. No chlorider can pay \$35 a ton for milling, \$20 freight and 20 per cent discount on silver out of \$100 ore when it is only worked up to 80 per cent of its assay value. The chlorider is the worst handicapped man in the United States. All things considered, it is no surprise that so little chloriding is done when the inducements offered are so thin. Can any man mine and live when he can only get \$5 out of \$100 rock. Would it not prove a profitable investment for the business men of Nye county to form a joint stock company for the purpose of reducing custom ores and fix things so that a miner could have ore that would work \$100, reduced at a rate that would leave him sufficient to live on. We never will have a prosperous county till something of this kind is done. It is poor policy to help crush our only industry by making exorbitant charges for milling and supplies and then lay back and bellyache that the paying of \$4 a day is the cause of closing down of the mines and reduction works. Would there be any more mines working were the wages 50 cents per day less. We think not. Inducements will have to be held out to men to mine before we can hope for more prosperous times, and we will have to stir ourselves to help make them instead of sitting Micawher like waiting for something to turn up. Custom reduction works are needed, and the sooner our mining men see that this want is attended to the sooner will the complaint of hard times cease to be heard. We must have reduction works at home to handle custom ores at reasonable rates ere we can hope for a prosperous permanent camp.—Belmont Courier.

ACCORDING to the Assessor of Storey county, Yellow Jacket, for the quarter ending March 31, 1885, yielded 15,412 tons of ore which milled \$15.20 per ton; Kentucky, 2,755 tons, milling at \$15.32 and yielding \$41,535.87 in bullion; Crown Point, 19,990 tons, milling \$12.88 and yielding \$302,837.47, and Belcher 12,315 tons, milling at \$12.54 and yielding \$154,021.30.

Helena District.

A Promising Montana Region.

A reporter of the *Helena Independent* has been visiting the mines of Helena District, and from his report we make the following extracts:

Men are seen working on the various prominent lodes, while many are seen scattered about the hills in the vicinity, with picks, shovels and other mining tools, endeavoring to make new discoveries. From present indications, we do not consider that we are amiss in estimating that in less than three months the new lode will have a population of fully 500. It is a beautiful location, and its surroundings are magnificent. Helena is in plain sight and the view obtained of the valley and mountains surrounding is simply grand. It is but about two miles from the railroad track, and that in a short time a branch will be run right to the mines is beyond question.

The first mine visited was the celebrated Helena mine, the one that has given this district the fame that it now possesses. This lode has two shafts sunk upon it, one an incline following down the lode to a depth of 106 feet, and the other is vertical and a depth of 117 feet has been attained. The two shafts are 150 feet apart and a drift is now being run from the incline to the vertical shaft with a view of having good air in the mine as soon as they are connected. The drift has already been run 70 feet in length. In the drift a solid body of ore from eight to nine feet is shown up that is proving to be immensely rich. In the incline shaft ore was found in large paying quantities from the top to the bottom. A level has also been run south 30 feet that shows up the same class of ore that is shown in this north drift. Notwithstanding that this mine has already shipped large quantities of high grade ores there is now on the dump and being prepared for shipment over 200 tons of ore that will yield thousands of dollars. A large amount of lower grade ore is also on the dump and will be held until reduction works can be erected, when, it is said, it will all pay handsomely.

Forty-two men are now regularly employed in working, both day and night, and development is progressing very rapidly. Ores are hoisted by a "whip," operated by horses. It is the intention of the company within a short time to put in steam hoisting works.

The next place visited was the Christmas Gift lode, the property of Mr. J. H. Sperling. It is an extension of the Helena, and although its development is not so extensive as that of the Helena, its showing is fully as good. Twelve openings have been made upon the lode. It is the intention of the owner to follow the ledge on an incline to a depth of 80 feet, and then to commence the running of levels. Something wonderful and very unusual is the fact that the sinking of this shaft has produced ore that has brought him in considerably more money than the expense of sinking it, which is considerable, taking into consideration that miners do not usually expect to be recompensed for sinking, anything near what it costs. Considerable ore is on the dump and Mr. Sperling informed us that he is now making preparations for the shipment of two carloads of the higher grade ores to the Wickes smelter. A large quantity of the lower grade will be brought to this city for the purpose of being worked by the Esler concentrator.

The Grass Valley lode, owned by La Rue, Blackburn, Patterson and others, was early in the spring handed to Messrs. Ray and Cleveland, and recently rebonded to Mr. C. D. McClure, a prominent mining man and one of the owners of the celebrated Granite Mountain lode, who we are really informed, will in a short time take up the bond. The ore is proving to be very rich and the indications are that this mine is just as rich as any other in the vicinity.

The Good Luck lode owned by Mr. J. H. Sperling, but recently bonded by Mr. J. W. Rasket, of the Helena Mining and Reduction Works, is a lode that was located some eight or ten years ago and abandoned. It was relocated in February last by Mr. Sperling, and a shaft 75 feet was immediately sunk upon it, and some first-class ore was thrown in sight. There is no doubt but that the bond will be lifted. The Syndicate lode is another owned by Mr. Sperling, and bonded to Mr. Rasket. The main shaft is 46 feet deep, and shows a 6-foot body of ore that will pay well. Three other shafts of a less depth are upon the lode, and show prospects equally as good.

Mines in every direction were pointed out and we were informed that many locations within a radius of over five miles have recently been made.

These ores in this district seem to bear principally silver, gold and galena, most of which is free milling ore. It is of a gray and yellow carbonate character and very easily taken out. The class of ore obtained indicates that there is plenty more where it came from, as do the mines of Colorado, which are taking out the same kind of stuff.

These mines are desirably located and easily accessible, either for a good wagon road or for a railroad; also for the erection of a mill, concentrators, reduction works, smelters, etc. With so much good ore in sight and the necessary facilities for speedy returns, we don't see why this should not be made one of the most prominent mining camps in the west.

THERE are 3,800,000 tons of tailings in Storey county, Nev., that will assay \$4.50 per ton, representing a total value of \$17,000,000.

MECHANICAL PROGRESS.

"Burnt Iron."

Of the many problems relating to iron which, it appears to me, require further investigation, says Dr. John Percy, is the old one of "burnt iron." It would be superfluous and impertinent to obtrude any definition of that expression. Every blacksmith, as well as every forge and mill man, has good reason to regret his practical acquaintance with it, and the trouble in dealing with it. The cause which produces it is well known—over-heating—but not the precise nature of the change which is thereby effected.

Although much has been written and published on the subject of this change, yet I venture to submit that it has not been satisfactorily elucidated, diverse opinions being still held regarding it. It is believed, on the one hand, to be exclusively physical, and to consist of a larger development of crystalline structure; and, on the other hand, to be physico-chemical, and to consist of such structural modification, accompanied with the partial, if not complete, abstraction of carbon, or of the absorption of oxygen. It should be borne in mind that I am not now speaking of "burnt steel," the theory of the production of which seems to have been well established. Malleable iron, I may remind you, even of the most fibrous character, may be made to acquire a largely crystalline structure—by which I mean converted into crystals individually of large size—either by fusion, by heating it only for a very short time to a high temperature approaching, yet sensibly below, its melting point, or by long-continued exposure to a much lower temperature.

The second of these conditions is that which usually causes the "burning" of iron; and zinc also when rolled out into sheet, and heated only for a second or two to a temperature bordering on its melting point, furnishes an excellent illustration of a similar change of structure. Before heating, it may be bent backwards and forwards several times without breaking, and the act of bending is not accompanied with the slightest sound; but, after heating and cooling, whether rapidly or slowly, it makes no difference, it is so brittle that it breaks instantly, and the act of bending is accompanied with a very audible harsh grating sound. The fracture in this case is largely crystalline comparatively speaking, and indicates clearly that the heating of the sheet, though only momentarily, has sufficed to enable the molecules of the metal to rearrange themselves in the manner which I have stated.

I have noticed that quite recently these facts relating to zinc have been described as novel, whereas they have been long known, and I certainly published them more than twenty years ago; but they were probably well known, if not actually published, long previously. Now, I apprehend that, with respect to modification of structure, what takes place in the "burning" of iron (which has a high melting point) at a high temperature, takes place equally at a low temperature in the case of zinc, which has a comparatively low melting point. Moreover, as "burnt iron" may be what is called "coaxing" he forged, so the brittle "burnt zinc" may, when heated to a temperature at which the cast metal becomes malleable and ductile, be again passed through the rolls without cracking.

With respect to the chemical changes which have been alleged to occur in the "burning" of iron, I take the liberty of expressing my own opinion, which is that the experimental evidence hitherto published on the subject cannot be regarded as conclusive. It is for this reason that I have ventured to bring it before you, in the hope that it may attract attention from some of the many skillful chemical analysts at our iron and steel works, and induce them to attempt the solution of it. The point which I would particularly suggest for their investigation is the alleged absorption of oxygen by iron at a high temperature, with, of course, the formation of oxide and its solution in, or diffusion through, the mass. Here, obviously, there could be no case of occlusion of oxygen, unless the temperature were high enough to cause the dissociation of oxide of iron. The effervescence, following the addition of spiegeleisen to molten decarburized pig iron, has been adduced as proof of the existence of oxygen in some state or other in the metallic bath; and experiments on the small scale have seemed to indicate that molten malleable iron may, like molten copper, dissolve some of its own oxide. But what is now wanted is conclusive evidence on such interesting points, evidence founded on the sure basis of accurate observation and careful experiment.

Some persons may, however, possibly ask to what useful practical results is the investigation of such questions likely to lead? The answer is that many an apparently sterile fact in science has been unexpectedly found to admit of practical application, with the result of benefiting the world and enriching not the man who discovered the fact, but the man who was fortunate enough to apply it.

Who can tell that it may not so happen with respect to the investigation of "burnt iron," though I must confess, it seems very improbable. The effect produced on iron by frequently reheating it to a high temperature, say a welding heat, is, if I mistake not, generally considered to have been long ago conclusively demonstrated. By such treatment iron is said to be

injured in quality; by which, I apprehend, is chiefly meant reduced in tensile strength. Now, I received some years ago, from my friend Col. Dyer, of the Royal Artillery, a report of a series of experiments which were made under his direction at the Arsenal, Woolwich, and which do not confirm the prevailing opinion on this subject. The report contains full and precise details of these experiments which might be communicated to the institute in a paper but not fittingly in a presidential address. Suffice it to say, the result showed that iron might be heated four times, for about three hours each time, to a welding heat, being allowed to cool without hammering after each heating, without injuring its quality in the least degree. The special object of these experiments was to ascertain whether the internal portion of the large gun forgings would be likely to be injured by repeated reheatings to a welding heat, though well-hammered each time on the exterior.

Soldering in the Machine Shop.

The American *Machinist* gives some hints on soldering in the machine shop, from which we condense: Soldering in a machine shop is very different from such work as usually done in a tin shop. The soldering irons, or "coppers" as they should be called, are generally more or less out of order—a stout, dirty point, covered with dross and ashes. Then his work is not usually well prepared, and the result is too often too much solder, no solder, a streak of rosin and a patch of dirt. The "coppers" should be taken to a vise and filed into shape generally about 60°, but for special jobs the angle may be raised.

The forge is a poor place in which to heat the "coppers," especially unless charcoal is used. The sulphur from soft coal will take the tin from your "coppers" faster than you can put it on. Care must be taken in getting just the right heat. Rubbing on a wet rag will remove the ashes, and an experienced tinker will tell him when the heat is right.

Make a machinist understand that soldering is nothing but welding, and he will do twice as well at it. He would not expect to make a good job welding a 2" shaft without flux, and with a 1-16" of rust between the pieces, yet he often tries to make solder run over dirty, rusty tin without any flux but grease and ashes.

See that the parts are clean and bright. If tin or brass, use rosin; if copper, sal-ammoniac; if iron use muriate of zinc, made by putting strips of sheet zinc into muriatic or hydrochloric acid until it will cut (dissolve) no more. The zinc is deposited upon the iron, forming, as far as soldering is concerned, a surface of zinc to work upon, and rosin should be used to protect the hot solder from the air. Large pieces of metal should be warmed before trying to solder them. Cast iron can be tinned by the acid and soldered perfectly.

The machinist finds that with our clean, well-tinned irons and bright working surfaces he can draw the solder just where he wants it. It will follow the hot copper just as iron filings follow a magnet, and the work looks smooth, bright and clean. No lumps there; no alternate lumps of solder and patches of dirt are there to spoil his work.

Tallow is the proper flux for lead, but rosin can be used and will do a good job. Another point to look sharp after is the quality of the solder. Don't try to use poor lead, although the Chinese tea-lead contains so much tin that it will work very well. Good solder should be made of two parts tin and one part pure lead. Plumbers' solder for wiping up joints works best when reversed, viz., one part tin to two of lead.

Soldering Block Tin.

Did a poor machinist ever so far forget himself as to try to solder a block tin or Britannia teapot which had a hole melted through the side thereof, then that machinist got himself into business right off. Tin melts at 446 degrees, Fahr., and his solder melts 340 degrees. His soldering copper is anywhere from 400 to 300 degrees, and while he is trying to patch up one side of the hole, he melts half an inch from the other side. He does this two or three times; the teapot goes under the stairs, and the machinist takes a double chew of tobacco to soothe his rising temper.

The next time he tries the job he will fill the teapot with damp molding-sand, smooth it off the shape of the pot, mix two parts of bismuth with his solder, and it will melt at 236 degrees; and he can use an iron much cooler than is required with the common solder. The hole can be melted full of solder, smoothed off, furnished, and Mr. Machinist can dig out the sand, show the job to "the boys," and carry it home in triumph.

A NEW STEEL-MAKING PROCESS is about to be tried by the proprietors of rolling mills throughout the Mahoning Valley, Pa., who are alleged to be quietly engaged in securing estimates as to the probable cost of adopting steel plants. A gentleman, whose name is withheld, asserts that he has invented a process for making steel that lays all others in the shade, as the cost is a mere trifle. Mr. George Summers, of Summers Bros. & Co., at Struthers, after an investigation, has decided to erect a building near his mill, where the inventor will make practical demonstration of his invention. Should it prove what is claimed for it, the process will, it is believed, at once be introduced in all the mills.

SCIENTIFIC PROGRESS.

An Interview with Edison—A New Force.

A New York interviewer recently paid a visit to the work shop of Mr. Edison, and among other things gives the following: Perhaps the most interesting thing he had to say was respecting his exploration for a "new force." At present he calls it simply x y z. He does not pretend to know what it is. He says that there are many phenomena which are not explained by any force yet recognized, and it is these which he is going to investigate. Vibrations of matter at the rate of 30,000 a second produce the highest sound we can hear. Between these and the vibrations which, at the rate of millions per second, cause the sensation of heat, there is a large gap; and between these and the vibrations which give the sensation of color there is another gap. These gaps, Edison believes, are filled by vibrations as yet unmeasured, which constitute the new, or unnamed, force he is in search of.

Projected Machines.

He brought out from a drawer sundry loose sheets on which he had sketched a number of machines he had projected, which respond to some influence still undefined. "I jot these down as they occur to me," he said, "and when I get enough of them together I shall have the machines made and try to generalize my observations."

Think of it! A man in this skeptical century who dares believe in a discovery beyond all discoveries. Here is a student of nature who is not afraid to have the spirit of a Galileo or a Kepler or an Isaac Newton. "What do you think of the nature of matter?" I asked. The answer was prompt: "I do not believe that matter is inert, acted upon by an outside force. To me it seems that every atom is possessed of a certain amount of primitive intelligence. Look at the thousand ways in which atoms of hydrogen combine with those of other elements, forming the most diverse substances. Do you mean to say that they do this without intelligence? When they get together in certain forms they make animals of the lower orders. Finally, they combine in man, who represents the total intelligence of all the atoms."

"But where does this intelligence come from originally?"

"From some greater power than ourselves." "Do you then believe in an intelligent Creator, a personal God?" was the next question. "Certainly," said Mr. Edison. "The existence of such a God, in my mind, can almost be proved from chemistry."

A Philosopher.

Lucretius thought that all atoms were moved by feelings of love or hate—that we call attraction or repulsion. Edison's idea is far more subtle, since he allows the atoms only a germ of intelligence. It also seems to be quite in keeping with the doctrine of evolution, while it contains nothing that is not in harmony with the idealism of the Platonists. And so we discover down on Avenue B, in the prosaic city of New York, a philosopher who believes in a personal God, and is at the same time the foremost exponent of applied science. Curious that he should be at work here, night after night, in the midst of a million of people, only a few hundred of whom know how he is employed during the nocturnal hours! As a usual thing he works until 5 or 6 in the morning, his supper basket remaining untouched beside him, and it is often 9 o'clock of the next day before he leaves the bench of the laboratory. "I can't think out anything," he says, "except when I'm experimenting. I have a library of 6,000 scientific works, but somehow I can't find what I want in books. How do I make calculations? Well, I don't know, exactly. I can't do it on paper. I have to be moving around."

So there he goes, moving around, thinking and working with his hands, in the big sombre building, while the city is asleep. He is the controlling power of several large factories, a millionaire, a man of business, a marvellous inventor; yet he is as simple and happy as a child, when, in an old seersucker dressing-gown, he can manipulate at will and without interruption the mysterious forces and properties of Nature.

ATMOSPHERIC ELECTRICITY.—Professor Palmieri, of the Vesuvian Observatory, has recently published some observations of interest on atmospheric electricity, which are quite interesting. In clear weather the atmospheric electricity is usually positive; if negative a downfall of rain may be inferred to be going on at some little distance. There is a maximum of atmospheric electricity at 9 A. M., another soon after sunset, which often continues during a great part of the night. A minimum takes place before daybreak, and another in the afternoon. This periodicity is, however, disturbed by atmospheric movements. When the maxima, a very pronounced cloudy weather often follows. If the sky becomes overcast, the electric indications grow stronger, and if at the time of the evening maximum the relative moisture increases with a heavy dew, maxima of special duration and intensity may be expected. The assumption that atmospheric electricity becomes stronger with altitude is not borne out by the Vesuvian observations. Lower potentials are generally observed on hot summer days; in spring

and autumn the indications are stronger; in winter they are uncertain. On cloudy days the potential is less intense, but positive; during rain the potential increases. A rain zone is positive, but surrounded by a negative zone, which again is surrounded by a zone of positive electricity. According to Palmieri, there is no thunder and lightning without rain.

Animal and Vegetable Fibers.

Between the fibers of vegetable and animal origin there is one great chemical difference.

The basis of all vegetable cells is cellulose, a substance which, when perfectly pure, consists of carbon, hydrogen and oxygen, in the proportions indicated by the formula $C_6H_{10}O_5$, and which possesses great chemical inertness, having very little affinity for other bodies, and which can scarcely be acted upon by any reagents, except strong acids and alkalis.

The basis of all animal fibers is gelatine or some albuminoid body allied to it. We never find a trace of cellulose in the animal kingdom. While our albuminoid molecule contains the same substances in its composition as the molecule of cellulose, it also contains two others—nitrogen and sulphur.

This substance or its congeners forms the solid walls of the animal cells which build up the fibers; and whether the materials we have to work upon be the secretion from a worm, such as silk, or the hairs of a goat, or the wool of a sheep, it is the material basis which forms the largest portion of the solid structure. Gelatine has a higher specific gravity than cellulose, and hence animal substances sink in water, while vegetable substances swim. As a rule, the ultimate vegetable cells are larger than the animal cells, and hence there are a larger number of the latter in the same space, and the tenacity of gelatine is also greater than that of cellulose, so that animal substances and fibers are as a rule stronger than vegetable fibers.

Most of the animal fibers are too minute to be examined with the naked eye, except in their general aspect. Hence, we require the use of a powerful microscope when we wish to notice their structure more closely, and especially when we are examining the differences between the various fibers in detail.—Dr. Bowman.

PRIZE FOR A NEW TREATMENT OF COPPER.—The French "Société d'Encouragement pour l'Industrie Nationale," at its general meeting on December 26, 1884, offered a prize of 1,000 francs for the discovery of a "new alloy useful in the arts." This prize has been awarded to M. P. Manhes, now so well known for his successful application of the Bessemer process in the metallurgy of copper, on account of his discovery of the value of an alloy of copper and manganese for improving the quality of commercial copper. It is stated that copper always contains more or less suboxide of copper irregularly disseminated throughout its mass, and that in consequence of this it loses some of its tenacity. M. Manhes prepares an alloy of 75 per cent copper and 25 per cent manganese, and adds it in small quantities to the molten copper after refining, and just before casting, stirring the bath of metal at the same time. The manganese of the alloy is stated to immediately combine with the oxygen of the dissolved cuprous oxide, forming a manganiferous slag, which is easily removed. The operation is cheap, and very much improves the quality of the copper so treated. Also several of the principal alloys of copper, bronze, gun metal, and brass are of superior quality when prepared with copper purified in this manner. It is stated, too, that a series of experiments have proved that copper so treated is much better suited for sheathing ships' bottoms than ordinary copper, as it is more slowly acted upon by the sea water. On these grounds the committee of the society have awarded the prize to M. Manhes.

DRAWING WIRE FROM FLUID STEEL.—The *Manufacturers' Gazette* says: Wires and bars are now produced direct from fluid steel, by pressing it out through dies in a manner similar to the production of lead pipes from lead. An iron vessel, lined with refractory material, is provided with a manhole and a cover at the top, and securely closed. At the bottom opposite the manhole there is a castiron outlet pipe, through which passes a steel tube with water circulating around it like a "tuyere," by which the steel pipe or die can be cooled. The inner end of the steel tube is lined with fire clay, where the very hot fluid steel meets it. The tube is plugged up by a steel stopper, and the liquid steel is filled into the vessel with liquid carbon dioxide above it. The stopper being withdrawn the liquid steel is forced out by pressure of the carbon dioxide in a red hot rod or wire, which goes from the vessel into the rolling mill while still hot, and is there finished off. We may also add that steel is now produced direct from the ore by a new process of a French engineer. The ore in a powdered condition is submitted to the action of carbonic oxide gas at a high temperature in a cupola or blast furnace, where it is reduced by the incandescent gas to pure iron or steel.

AN ELECTRIC AUTOMATIC WEIGHER.—A patent has recently been allowed E. H. Arnet, of Boston, for an electric scale which automatically records and weighs consecutively the weights and numbers of objects weighed.



A. T. DEWEY. W. B. EWER.
DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... 25 50 80 85.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00
Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG

SAN FRANCISCO:

Saturday Morning, July 4, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Sulphuric Acid and Sulphate of Copper, 1. Passing Events; Industrial Exhibition; Local Marine Work; A Sectional Water-Jacket Furnace; Local Notes; American Pumps Abroad, 4. Sierra Notes; The Washington Medals; Rock Crusher for Small Mines, 5.
ILLUSTRATIONS.—Fig. 1—Crystals of Hanksite; Grouped Crystals; Roessler's Apparatus for Making Sulphuric Acid, 1. Gold Medal Presented by Congress to General Washington, 5.
MECHANICAL PROGRESS.—"Burnt Iron," Soldering in the Machine Shop; A New Steel-Making Process, 3.
SCIENTIFIC PROGRESS.—An Interview with Edison—A New Force; Atmospheric Electricity; Animal and Vegetable Fibers; Prize for a New Treatment of Copper; Drawing Wire from Fluid Steel; An Electric Automatic Weigher, 3.
ENGINEERING NOTES.—Do Large Steamers Pay; Pneumatic Tubes; A Shoal Water Alarm; From the Black Sea to the Caspian; Spans of Telegraph Wire; Bad Engineering, 7.
USEFUL INFORMATION.—A New Solvent; How to Judge of Coal; Fir Leaf Wool; Timber for Wine Tanks; Utilization of Bones; Making Barrel Staves; Thirty Carloads of Strawberries, 7.
GOOD HEALTH.—Resisting Electric Shocks; Curing Rheumatism with Celery; The Approach of Age; Death from Infected Wood; Attention to Details, 7.
MISCELLANEOUS.—Mineral Products of the United States; Helena District, 2. The Gravel Channels of Ancient Rivers; The Copper Mines at Clifton; Where the Ore Comes From; Gumption; Early Day Mining for Gold, 6.
MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon and Utah, 8-9.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends and Bullion Shipments, 12.

Business Announcements.

The "Tidings"—H. S. Spalding, Grass Valley.
German Savings and Loan Society—S. F.
See Advertising Columns.

Passing Events.

The Fourth of July week is a short business one. The wholesale merchants of the city agreed to take both Friday and Saturday, so that the greater business of the city closed on Thursday night, and will re-open on Monday morning. The banks closed on Friday at noon. This long respite will send all city people who can escape into the quiet of the country. For those who remain and for those from the country who come to hear the noise of the city for a change, there will be quite a demonstration in honor of the day. In the morning there will be the usual parade of military, civic and trade organizations with the department of the *grotesques* or *horribles* well developed. In the afternoon there will be the unveiling of the Garfield monument at Golden Gate Park. During the day there will be sailing and rowing contests upon the bay. In the evening the literary exercises will be held in the Mechanics' Institute Pavilion. Fireworks will be released from Telegraph Hill and Central Park at eight o'clock in the evening.

The change in the rates of postage went into effect on the 1st inst. Hereafter letters weighing one ounce or a fraction of an ounce will go for two cents. Heretofore the limit for a single rate has been half an ounce. The change does not diminish the denomination of the stamps, but it doubles the weight it will carry.

On the 1st inst. the reduction of force on the railroad lines began. This threw many persons out of employment.

In the mining situation there is little change to note. Men are everywhere at work. California mines are now attracting more attention than for some time past.

Industrial Exhibition.

There seems to be a strong feeling growing up in Europe against industrial exhibitions. It is considered that all are not gainers by these shows, and that the result may be sometimes absolute loss. The committee of the Association of German Iron and Steel Manufacturers having taken this view of the subject thought it good to invite the opinions of its members concerning the proposed industrial exhibition in Berlin in 1888, and for this purpose issued a circular letter. The replies received show that a very large majority are opposed to the scheme.

This seems a step backward in modern investigation. The international exhibitions given in this country and Europe attract hundreds of thousands of visitors, who have an opportunity to examine appliances of all sorts they never saw before. They have been able to compare similar machines of different makers and judge for themselves which was best. It would seem that this result was a good one for the manufacturers of the best article. But they seem to believe the contrary to be the case. That is, they argue that having a perfect machine or appliance any one with a poorer one may copy portions of their machine which are not patentable, and thus improve the poor one, to the detriment of the maker of the good one. This is one of the main arguments used.

In certain classes or branches of manufacture this idea prevails somewhat extensively. Even in our own city, where there are very large foundries and machine shops, our local displays in the machinery line have for some years been poor at the annual fairs; whereas when these fairs were organized the display was always large. Aside from the attendant expense, the manufacturers claim that they are able to advertise their machinery products better in the technical or trade journals, being thus able to reach their special customers. For after all industrial exhibitions are only advertising schemes on a large scale. If the exhibitors did not expect some benefit they would not come in and make displays. For many things these fairs are of great benefit, but it seems that many makers of machinery both here and abroad have concluded they do not gain enough to compensate for time, trouble and expensive exhibiting. This determination seems one of the rather curious results of perhaps too frequent expositions.

Local Marine Work.

The great necessity of a place especially adapted for marine repair work has long been recognized here, but until the Union Iron Works fitted up their ship-building plant at the Potrero, there were no special facilities at this port. Steamers were hauled alongside wharves, at long distances from the foundries and considerable delay and expense were entailed in carrying on the work. Now, however, a vessel can be taken alongside the dock close to the works where there is every facility for making repairs. A powerful crane is conveniently arranged to take out and put in machinery and boilers, and in the shops are all necessary tools for doing any kind of work. It is the intention before long to build a marine railway so that vessels may be taken out of the water when necessary. The railway will be built close to the launching ways, where iron and steel vessels are built. When this and the plate mill are added to the plant it will be as well equipped for marine work as any in the United States.

As we mentioned at the time, a steel steamship was completed at their works not long since, and has proved herself a superior vessel, in every way satisfactory to her owners. The Union Iron Works are now engaged in making extensive repairs on the Pacific Mail Company's large steamship Granada. The vessel is to be thoroughly overhauled, and has been taken to the works for the purpose. Changes will be made in the saloon, new boilers put in, and she will be equipped with a steam steering gear—something she has not had heretofore. The alterations will require five or six weeks to complete, but the work will be done as rapidly as possible. Except to keep her in ordinary repair, she has not been released from active duty since 1873.

The question of a division of Colusa county is being discussed among the newspapers of that section.

Local Notes.

The coal and iron industry in this city is still in an unsatisfactory condition, as has been the case for some months. Iron is dull all over the country. As far as the local trade is concerned all the foundries are very slack, some of them doing scarcely anything. Coal supplies are heavy, the coast collieries now being able to supply Pacific Coast wants regardless of foreign mines.

The Union Iron Works have so far not succeeded in raising the sunken ship, Earl of Dalhousie, for which they have a contract.

The burning of the Hackstet dredger, in Oakland harbor, will not delay the work of making the approach to the canal which is to be cut into San Leandro bay, as the Von Schmidt dredger has started in to complete this contract. The Von Schmidt dredger has been more successful than any dredger heretofore built on this coast in working in the soft mud of the Brooklyn basin. It is about to start in cutting off this neck of land in front of East Oakland, which forms the west side of the basin. A large area has already been dredged. The mud is deposited on the adjoining marshes, and a large amount of marsh land has been reclaimed by being raised several feet.

Mining companies having their offices in this city paid in dividends in June \$202,500, as against \$204,716 in the same month last year. The powder manufacturing companies paid \$90,000 in dividends, as against \$22,760 in June of last year.

Competition in through overland passenger rates cannot be looked for until the completion of the Canada Pacific, which, it is now promised, will be some time in October next. Even then San Franciscans will have to transport themselves to Puget Sound before they can begin to take advantage of the Canada Pacific rates, no matter how low they may be.

An immense amount of money has accumulated in the sub-treasury of this city. The aggregate is now \$90,070,360. The distribution of this money is in gold and silver coin and greenbacks. In the first vault there are \$40,000,000 gold in \$20,000 sacks, and \$1,000,000 in greenbacks. In the lower vaults are kept the silver dollars. Vault No. 1 has 3,168 cubic feet of coined silver, vault No. 2 encloses a pile of money 36 feet long, 9 feet wide and eight feet high. One cell has stowed away \$22,037,000 in \$20 gold pieces, and in the other cell there are \$8,000,700 in silver coin. The other vaults contain silver dollars and halves to the amount of \$6,600,000. The contents of these six vaults would raise a mound of coin four feet wide, four feet high and 448 feet long, representing over 500 tons of precious metal. The utmost precautions are observed to secure this treasure. The vault doors are so constructed as to defy the ravages of fire or the efforts of a regiment of thieves, and electrical wires run all through the building so that it would be impossible for a burglar to work without his tapping one of these wires and raising an alarm. Every half hour watchmen pass the vault doors, and must also every half hour ring up the district telegraph to show that they are on the alert.

American Pumps Abroad.

The English papers have not yet got over grumbling at what they call the unfortunate decision of their Government in ordering American (Worthington) pumps for Suakim. The direct loss by the home engineering industry was at first the only thing considered. But now it seems they have found that the impression on the continent is that the American pumps were chosen, because superior to English, and the effect is to greatly discredit English makers of all classes of mining machinery.

Perhaps this continental impression concerning the pumps, at least, is perfectly correct. The steam pumps made in the United States are now the best in the world. We have had plenty of experience, and hundreds of improvements of more or less value have been made and patented. Pumping has had to be done in this country under all sorts of circumstances, and the machinery has been made in perfect adaptation to the work to be done. Our large pump manufacturers lose no chance of improving and perfecting their engines, and are not content to let well enough alone, but want to do better still. Perhaps this is one of the secrets of their

success. At all events they have been successful and the American steam pump is now sent all over the world.

A Sectional Water-jacket Furnace.

Mr. Edward Probert, of this city, has invented a blast furnace with such an arrangement and construction of tuyeres as enables him to largely increase the capacity of the furnace. The peculiar water-jacket which surrounds the region of fusion he calls a hydro-cycle, and it consists of a circular series of independent and separately removable calls suitably joined. This new furnace Mr. Probert has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency.

The special objects or advantages which are claimed for the furnace are its large smelting capacity, the facility with which it can be repaired even while in operation, and the facility, generally, with which the entire operation may be carried on. The first of these advantages arises from overcoming certain disadvantages in the ordinary furnaces. It is well known that on the construction of pressure blast furnaces of the common type, the diameter should never exceed twice the "throw" of the blast—that is, twice the distance to which the blast penetrates the charge, or, say, from 30 to 40 inches.

This necessity limits the smelting capacity so that the daily production rarely exceeds from 20 to 30 tons. Mr. Probert considers that his invention renders it possible to increase the diameter of the furnace, and therefore its productive or smelting capacity, more than two-fold without materially increasing the cost of construction, while the running expenses are reduced.

The second advantage arises from the peculiar construction of the hydro-cycle, the elements or independent cells of which are so fitted to place and united as to render it possible for each to be cleaned while in place, or taken out for repairs while the furnace is in actual operation, with the least difficulty and in a short time. The last advantage results from the general construction.

By projecting a tuyere through the lining of the furnace and into its region of fusion, it is possible to increase the diameter of the furnace; but in order to maintain such an inwardly-projecting tuyere it must be either of material refractory enough to withstand the heat or must be a water-tuyere. With a long water-tuyere, such as Mr. Probert prefers, and with so much weight on its inner end, it becomes essential to provide a firm support on the body of the furnace through which it passes. As, however, the water-jackets withstand the action of the heat there remains a firm support for the tuyere, an important feature in the furnace.

The novelty to be noted about the upper part of the furnace is the wind chamber, which, instead of being made of thin, galvanized iron or zinc, as is usual, and serving merely for the distribution of the blast, is made of iron plate or short sheet iron or cast iron, and converted into a hollow girder, in section a right-angled triangle, which, encircling the shell beneath a flange, receives its weight and transfers it to cast iron pillars on which it rests. By thus making the girder triangular instead of rectangular sufficient strength is obtained with less material.

The water which is supplied to the tuyeres and hydro-cycle becomes hoiling hot and usually leaves deposits on the inner surface, which tends to cause the iron to burn out, and hence the importance of leaving the water cells open at the top, so the deposit may be readily removed.

The furnace is circular in form and even feet in diameter, and is capable of smelting from 50 to 60 tons of ore daily; but the principle by which the capacity is increased is applicable to the construction of a still larger furnace. For retaining the diameter of seven feet (which has been found the most advantageous in practice), all that is necessary is to separate the two semi-circles into which the plane of the hydro-cycle may be supposed to be divided by a space, say equal to the semi-diameter of the furnace, or three or one-half feet, and then to introduce into the openings on either side a pair of additional cells of rectangular shape (not curvilinear) when the furnace will be converted into an oblong one with circular heads or ends capable of smelting from 80 to 100 tons daily, which is the capacity of one now in actual use, and which has even exceeded the highest production named.

Sulphuric Acid and Sulphate of Copper.

Continued from page 1.

from parting bullion. It is only necessary to fill the converter with water, in reduce copper, as "cement" or otherwise, into the apparatus, and turn on the injector, and the reaction begins. At first only the sulphuric gases are absorbed, and dilute acid results, which at once dissolves copper and makes blue vitriol, and then this salt acts on the sulphurous acid, as above described. Thus it becomes possible to produce a solution of blue vitriol, which gradually becomes concentrated to 35° B. in the converter. When this stage of concentration has been reached the solution can be drawn off and replaced by a fresh charge of water. This blue vitriol may be crystallized and sold as such, or the metallic copper may be recovered by a dynamo machine, or precipitated by other means.

The importance of Dr. Roessler's process for parting establishments, Government mines and other chemical and metallurgical works and factories located in large cities cannot be overestimated. By the use of the converter, at a very small first cost and trifling expenditure for space, the means are provided of profitably utilizing gases which have hitherto been discharged into the air, to the damage of the public health and surrounding vegetation.

Many copper mines and other sulphuret mines, distant from railroads, will find in this process a ready means of obtaining a supply of sulphuric acid without erecting and operating expensive lead chambers.

In parting works a marked advantage of the process is the entire freedom from acid fumes of the rooms in which the parting kettles are used, and the consequent good health of the operators.

In connection with this description of Dr. Roessler's process, it may be of interest to give an account of the many unsuccessful experiments made to abate the evil of escaping acid fumes. To obtain reliable data in the experiments, the gases operated on were analyzed by measuring the volume required to decolorize a standard potassium permanganate solution, and then determining the SO_2 in this solution by precipitation with a base. Computation will readily determine the amount of SO_2 due to the SO_2 , and the difference will give the SO_3 present as such. In this manner the average of one cubic meter of gas from parting kettles was found to contain 100 grams SO_2 and 20 grams SO_3 , or four per cent, by volume, of sulphurous acid gas.

I would here call attention to the fact that to make the manufacture of acid in lead chambers a commercial success, at least eight per cent of sulphurous acid should be present in the gases. It is one of the advantages of Dr. Roessler's process that even a fraction of one per cent of sulphurous acid can be utilized at a profit.

Dr. Roessler recognized almost at the beginning, the fact that the sulphuric fumes create the main annoyance. Sulphurous gases are considerably lighter, and are, to a large extent, diffused by the air before they fall to the ground and create annoyance.

His first experiments were made entirely with this fact in view, and consisted in passing the gases through a layer of incandescent coke. The sulphuric acid was, it is true, reduced to sulphurous acid, but in ascending the chimney of the works, a portion, at least, was reconverted, and eventually the annoyance of stoppage of the draught led to the final abandonment of the system.

Dr. Roessler next turned his attention to absorption of the gases by water. A large tower, 65 feet high and 9 feet square, was filled with coke, and a plentiful shower of water passed over it. A long conduit, connecting the tower with the parting-kettles, was also filled with numerous jets of water. However, notwithstanding the fact that the temperature of the gases was reduced by two-thirds, and a large outlay for water incurred, the system absorbed only one-half of the sulphuric acid and less than one quarter of the sulphurous. This system, by the way (although in a cruder and less complete form), is that used by the United States assay offices in New York and San Francisco. How incomplete is its operation, everybody living within several blocks of these works can bear testimony.

Subsequent experiments led to the abandoning of the coke filling of the lead-tower and its replacement by an extremely fine spray of

water, created by jets of water under heavy pressure impinging on platinum plates. The success of this system was somewhat greater. Three-quarters of the sulphuric acid was absorbed, but only one quarter of the sulphurous could be caught.

Finally, and quite accidentally, Dr. Roessler's present system, as described, was hit upon. It has been eminently successful, and where used has completely stopped the nearly too well-founded complaints of discharging the noxious gases into the air, and has converted a source of annoyance and expense into a source of profit.

Sierra Notes.

The mines in various parts of Sierra county are doing very well just now, some of them producing large amounts. We saw at the office of the Miners' Association this week a fine nugget from the Ruby gravel mine, between Forest City and Downieville. The nugget weighed 32

The Washington Medals.

Hardly any subject could be more appropriate to the celebration of the national holiday, and at the same time furnish information which the younger generation know little of, than that which we have chosen for illustration on this page—the Washington medals. The engraving on this page shows the gold medal presented to George Washington by Congress on the evacuation of Boston; also, Fig. 1, the arms of the Washington family, and, Fig. 2, the seal used by General Washington.

This gold medal commemorative of the evacuation of Boston became the property of George Steptoe Washington, the son of Samuel Washington, who was the General's elder brother. The next owner of the medal was Dr. Samuel Walter Washington, eldest son of George Steptoe Washington. On the decease of the doctor at Hasewood, Virginia, in 1831, his widow became possessed of the relic. She is still living.



GOLD MEDAL PRESENTED BY CONGRESS TO GENERAL WASHINGTON.

ounces in gold. It is rather a peculiar piece, some of the gold being crystallized. The gold looks, moreover, as if it had formed around or on the quartz (which is not homogeneous). In fact, it looks like some sort of electrical deposition on the body of the quartz. Some portion of the gold has the appearance of having been beaten or hammered. The nugget is very handsome.

From a private letter we learn that the Bald Mountain Extension claim cleaned up last Sunday 123 ounces, making the total for the past two weeks, 203 ounces, or \$3,775.80. The clean-up of the Bald Mountain claim was 78 ounces last week. From an upraise in the Bald Mountain Extension ground recently, from five carloads of gravel over eight ounces of gold was washed. It is generally conceded that this claim is one of the bonanzas of the coast.

The statement recently published by a contemporary that the Standard Oil Company had absorbed the Continental Oil and Transportation Company, the Pacific Coast Oil Company and all the minor corporations dealing in crude and refined petroleum on this coast is denied by Manager Tilford of the Branch Standard Oil Company in this city, as is also the statement of the Branch Standard, Continental and Pacific companies will incorporate as one company.

She had given it to her only son, George Lafayette Washington, who had married the daughter of her brother, the Rev. John B. Clemson, of Claymont, Delaware. On the recent decease of George Lafayette Washington, the medal became the property of his widow, Mrs. Ann Bull Washington, from whom with proper certificates and vouchers, by the generous co-operation of fifty citizens of Boston, it has now been secured to the permanent ownership of the city of Boston, with which it has been so gratefully identified, and has been deposited in the public library.

Thus it appears that the medal has been transmitted through the descendants, in successive generations, of General Washington's elder brother. They have fully appreciated its intrinsic and symbolic value, and have anxiously taken care for its safety under the risks and perils which have attended its preservation. It is, itself, a most beautiful and perfect specimen of workmanship of the die and mint, and is without a blemish or any perceptible wear of its sharp outlines. During our civil war its then owner, George Lafayette Washington, was residing eleven miles from Harper's Ferry, on the main route to Winchester, where the helligents held alternate possession. The medal, in its original case of green seal skin,

lined with velvet, was enveloped in cotton, and, deposited in a box, was hurried in this dry cellar of a venerable mansion where General Washington usually spent many months of the genial portion of the year. The original case, which fell into decay by this exposure, accompanies the medal in its present repository.

The medal, of which the engraving gives a *fac simile*, was the only gold medal given by Congress to General Washington. Between the dates of March 25, 1776, when this gift was bestowed by a resolve of Congress, and the year 1786, by votes of the same body, a series of 10 more gold medals was struck at the Paris mint, commemorative of the great events and the great men of the War of the Revolution. All the "Washington Medals" are now in Boston.

Rock Crusher for Small Mines.

A rock crusher and breaker has been invented, the greater part of which, being of plain timbers, is adapted to be constructed and used with advantage at small mines and out-of-the-way places where it would not be advisable to transport more expensive and elaborate machinery. It has been patented through the MINING AND SCIENTIFIC PRESS Patent Agency by Cornelius W. Huson, of Weaverville, Trinity county, who has assigned a half interest to Wm. F. Jenkins, of the same place.

Mudsills made of plain timbers are laid parallel, and cross-sills of a similar nature are mounted on them. The middle one of the cross-sills has the head bolted to its center. This head consists of a metal piece, the face of which is concave longitudinally, and its sides provided with upwardly-extending flanges.

The metal die also has a convex face, and both head and die are provided with suitable shoes. The convex face of the die is made on a curve having a shorter radius than that of the curve on which the concave face of the head is formed. So that when the die is at rest on the head it hears on its center, its ends being separated from the ends of the head by reason of a divergence in the curves of the faces. There are thus left or formed spaces at each end between the head and die.

The die has a width just sufficient to permit it to lie snugly between the side flanges of the head, and it is provided with upwardly-extending flanges, by which it is bolted to the block, the flanges being let in to lie flush with the sides of the block. This block is bolted to a long timber or beam, which is raised high enough to permit the interposition of screens at the ends of the head and die without interfering with them when said beam is rocked. In the center of the beam is bolted solidly an upright, or standard, from the top of which extend solid braces to the ends of the beam; and other braces make the whole frame rigid. This frame thus looks something like a pump-bob.

A water-wheel, or other source of power, is suitably connected with the top of this triangular frame. Upon the ends of the beam of this frame are boxes in which rock may be placed, serving as counterbalance or weights. The rock beam is suitably guided so it cannot get out of line.

Extending sidewise from the rock beam are journals which lie loosely on hearings on the side beams. These journals do not mount the rock beam, which has its pivoted action in the head, but simply act as safeguards against any tendency of said beam to slip in its hearing on the die. In the side beams are made feed hoppers or apertures which slope downwardly and inwardly, and terminate just at the top of the side flanges of the head and near their ends, whereby the rock is adapted to be delivered by falling over the flanges directly into the sides of the end spaces between the head and die. Discharge chutes are outside the screens, and emerge through spaces between the cross-sills. Through the pitman the standard is rocked, thus rocking the beam and die. The rock being fed in between the die and head is then crushed. Passing thence through the screens it runs into and is discharged by the chute. It will be seen that the whole machine is simple in construction and inexpensive, being adapted for use anywhere. There is very little iron in its construction.

FINAL preparations are now making at Philadelphia for an expedition to Vigo, Spain, in search of the Spanish treasure galleons sunk in the bay in 1702.

The Gravel Channels of Ancient Rivers.

The ancient gravel channels of California were formed, it is believed, during the Pliocene period, and extend from Mariposa county in the south to Siskiyou county in the north, having an aggregate length of about 350 miles. The auriferous area has been estimated to be 200 square miles. These channels are from 200 to 400 feet wide on the bottom, and sometimes as much as 2,000 feet wide on the surface. They are filled with gravel from depths of 20 to 400 feet. The deposit at the bottom consists of boulders, cobbles, gravel and sand firmly cemented together. This bottom deposit is commonly known as the "blue lead" from its color, and varies in thickness from 20 to 120 feet. Above the "blue gravel" is found the "top gravel," consisting of sand and occasional boulders, with sometimes layers of pipe-clay. Near the surface is found red soil, varying from a few feet to 20 feet in thickness. Gold is distributed very uniformly through the entire mass of gravel, being most abundant near the bed-rock. These ancient channels are sinuous in their course, and have many branches and tributaries. Their grades vary from 20 to 300 feet per mile—sometimes confined within narrow banks, and again assuming lacustrine proportions. They undoubtedly carried more water than do the present rivers of California. The fact of the material being coarser and larger at the bottom is due to the great velocity of the rivers where confined in narrow channels. As the filling increased, the transporting power of the streams became less from the diminished depth of the water, and hence the latter deposit was of firm material.

The principal gravel mines of California are situated in the counties of Yuba, Sierra, Placer and Nevada, in the region drained by the Feather, Yuba and Bear rivers. It has been estimated from careful canvass of this industry that there are on the drainage system of these rivers 300 mines or tracts of mining lands which have been worked within the past three years, though not, perhaps, simultaneously, by the method distinctively known as "hydraulic mining," besides numerous "drifts," "rivers" and placer mines, which are dependent upon water washing. The magnitude of these mines, whether hydraulic or drift, depends on the width and length of the channel.

The San Juan Ridge at North Bloomfield has a channel about 200 feet wide on the bottom and 800 feet wide at the surface. The company own about 19,000 linear feet of the channel, which has been continuously worked since 1853—the top dirt having been removed in early times. The value of that channel has been demonstrated to be about \$850 per linear foot, say \$4,500,000 per mile. To reach the deep or bottom gravel, they drove a tunnel 11,874 feet in length, which was not completed until 1874. Since that time the company has worked 3,500 feet of the main channel, leaving 15,500 feet to be worked, which it is estimated will produce about \$13,000,000. The company's outlet tunnel also commands about one and one-half miles of channel, which it may be estimated will produce \$8,000,000, or, say, a total of \$21,000,000, based on estimates of past production covering a period of about 20 years.

The mines of the Milton Company have a length of about 17,500 feet, which, it is estimated, will yield at the rate of \$5,500,000 per mile. The tunnels of this company command about two miles more of channel. The contents of this area of unworked ground will not fall short of \$20,000,000.

The channel on which the Bloomfield and Milton Companies are operating has been opened in so many places that its position has been accurately determined and its contents approximately ascertained. Within the limits of the San Juan Ridge alone, in the county of Nevada, it is known that there remains to be abstracted about \$90,000,000. In other portions of the county the position of the gravel channels is not at present so well known. It is, however, known that they exist for many miles in length, and the gross yield will vary between \$4,000,000 and \$6,000,000 per mile.—W. A. Skidmore, in *Mint Directors' Report*.

FIRST BRICK.—The first brick from the mining enterprise recently inaugurated near Hiko was brought in town Thursday morning by George Warren. Its value is \$1,684.89. This brick was the result of an eight day run of the little one-pan prospecting mill, and the result shows for itself. The mine is reported looking excellent, showing a very liberal quantity of good ore. The ore, thus far, has improved as work on it advanced. Mr. Warren says, as the developments in the mine warrant it, and the test has proven all that the most sanguine could hope, that if arrangements for leasing the mill at Hiko cannot be agreed upon, he will then proceed to erect a 15 or 20-stamp mill. The company is called the Howell-Warren Lytle S. M. Company.—*Pioche Record*.

THE *Cœur d'Alene* mines are in a bad fix this year through litigation. All the best properties in the camp have been enjoined on technicalities in connection with the use of water and dumping ground, and there is a great stagnation in consequence.

The Copper Mines at Clifton.

A Very Narrow Gauge Railroad.

From an extended article in the *Deming (N. M.) Tribune*, describing the mines of the Arizona Copper Mining Company, we make the following extracts: The property now includes the following claims: Coronado Lode, Crown Reef, Copper Crown, Matilda, Horse Shoe, Boulder, Copper Queen, Copper King, Thomson, Worfold, Goodsight, Vicksburg, Sherman, Humboldt, Joy, Yavapai, Detroit, Michigan, Ballyrat, Bartlett, Basset, Clifton, Longfellow, Modoc, Emma, Nora, Arthur, Princess Alice, Cornell, William Grant, Bendigo, Copper Pride, Fairview, Lolo, Cap Bonanza, Lucky Friday, Libbie Annie, Libbie Grant, Oriental, White Hawk, Black Hawk, Southern Cross, Fraction or Dark Horse, C. L. Junction, Peak, Northern Cross, Pyramid, Troy, U. Extension of Clay Mine, Dora, Seven-Thirty, Regular, King, Ida, Arizona, Indiana, Richmond, Santa Fe and Iroquois.

There has been steady progress in the means of transportation for the ores from these mines. At first the ore was taken to the little smelter, on the creek, on the backs of burros; then a wagon road was constructed, after the furnaces had been erected at the river, and large amounts were hauled down in wagons; then, about six years ago, at the suggestion of Captain Davis, a twenty-inch narrow gauge road was laid up the canyon, first to the Longfellow mine, and afterward extended to the others. The grade is generally about four per cent, or two hundred feet to the mile, but in several places it is as much as five, and in one or two places six per cent. The first engine was a little four-ton fello, which is now in use on the upper road from the Longfellow around to the Detroit Company's mines. This was substituted by one weighing eight tons, and a third one of twelve tons was afterward put on. It is really surprising to see the loads which these powerful little machines take up the steep grades, and to note the ease with which they are handled. They stop and start at any point and gain headway rapidly, although the average speed is but eight miles per hour. The cars are wholly of iron, and carry a load of three or four tons. Although the track is so narrow, the cars seem to ride just as steadily as on a broad gauge road. Not an accident has ever occurred to kill or wound a person since the road has been in operation, and this is no doubt largely due to the care exercised by Mr. Arbnockle, the engineer, who has been running the trains ever since the road was built. Although there is but comparatively little load up the grade, except for the Morenci works, the engines are competent to take up eight or ten loaded cars, or fifteen to twenty empty.

The Inclines.

The ore from the several mines is moved down to the main track of the road we have described by means of inclines of varying degrees of pitch, the loaded car going down as the empty car goes up. The incline at the Longfellow is 2,200 feet long, 600 feet through a tunnel, and the elevation gained is 780 feet; at the Metcalf the incline is 1,100 feet long with 500 feet elevation; at the Coronado the incline is 3,320 feet, and the elevation 1,100 feet with a maximum grade of 68 per cent; at the Queen the length is 900 feet. At the Longfellow the four-ton cars are used the same as on the main line, two coming down together, and one loaded and one empty going up. The speed is regulated by powerful brakes at the head of the incline, the cables passing several times around large drums to which the brakes are fitted.

The Smelters.

The plant now consists of three Fraser and Chalmers furnaces, each of 60 tons, and two Pacific Iron Works smelters of 40 tons capacity. As previously stated the water power of the river is utilized, and three turbine wheels are employed of different capacities, according to the work upon them. The principal one drives the Baker blowers, five in number, three number sevens and two smaller ones; another drives the crushers, and still another the pumps. To insure against a scarcity of water or injury to the wheels there is a fine Corliss engine with ample hoiler capacity to be used as a substitute in cases of necessity. Benches have been cut in the hillside, which is nearly perpendicular in rear of the works, for the ore bins and chutes so that the ore, fluxes and fuels are unloaded from the cars by dumping directly into the bins at the proper level, and these are transferred to their appropriate places by tramways from the chutes to the bins emptying upon the charging floor.

The water is taken from the river about one mile above the works, and is brought through a flume eight feet wide by four feet in depth. Close by the smelting works a substantial building accommodates the machine shops and repair shops of the company, not yet fully in operation. Recently the entire charge of the machinery has been placed with Mr. W. C. Boylan, who for two years past has been master mechanic of the Arizona and New Mexico railroad. He is a very competent machinist and has tried his hand successfully at invention. One of his inventions is a steam attachment to clear the locomotive ash box while the train is in motion; another is an equalizer attached to car brakes to prevent the wheels from sliding.

Only two furnaces were in operation at the time of our visit, although three have been in

blast most of the time. The production for the preceding week had averaged 13 tons of 98 per cent copper per day.

The total production of the mines was given me as nearly as possible by Mr. Russell, as follows: Under the former ownership between 45,000 and 50,000 tons of ore had been taken out, yielding 7,500 tons, or 15,000,000 pounds of black copper. The production by the present company, to May 1st, has been 9,000,000 pounds. The present rate of production is between six and seven million pounds annually, which is not quite half the capacity of the works, if they were in full blast. At the present low price of copper, although it is possible to manufacture the copper at a profit, it is not a sufficient inducement to work up the higher grades of ore, and as we have before noted the object is to make it pay its way and to develop the ore bodies so that the production may be increased when the price shall justify.

Where the Ore Comes From.

Men and Wages at Butte, Montana.

From an article in the *Inter-Mountain* we take the following:

The Colorado smelter gets its ore from the Cagnon, Star West, Self Riser, Clear Grit and a number of manganese prospects west of Butte. Its capacity is about 60 tons daily. A large ore surplus is on hand. It employs 200 men. The monthly pay roll averages \$50,000, inclusive of money paid to wood-choppers and for supplies, but not for ore.

The Parrot smelter works no custom ore, and is kept supplied from the Parrot mine, which is producing 350 tons of ore daily. The company employs 350 men, and its monthly pay roll averages \$50,000 for labor at the mine and smelter and local supplies.

The Montana smelter is running on ore from the Colusa, West Colusa and Montana Parrot. The employees number 300. The company pays out monthly \$40,000. Capacity of works, 250 tons daily.

The Bell smelter is running one stack, treating 30 tons of ore daily, employs 60 men and pays out for labor about \$6,000 per month. The company is handling Bell ore exclusively. The total local expenses of the company are \$18,000 per month.

The Silver Mills.

The Lexington stamps are all dropping now on ore from the company's mine, which is producing 60 tons daily. The company employs 250 men, and its monthly pay roll and local supply bills amount to \$60,000.

The Moulton mill is working 20 stamps on Moulton ore and 20 on custom ore from half a dozen different prospects. The ore bins are full to overflowing. The company employs 125 men and pays out monthly \$25,000 for local expenses.

The Alice mill is doing steady work daily on 60 tons of Alice ore, 40 tons from the Magna Charta and some from a surface prospect on the Valdimere. The company gives employment to 300 men, and disburses monthly between \$50,000 and \$60,000 in this city for labor and other local purposes.

The Silver Bow mill is working 30 stamps on ore from the Poser and La Plata and is also doing some custom work. The company employs directly and indirectly 100 men, and is paying out for wages and supplies \$25,000 per month.

The Anaconda.

The Anaconda smelter in the Deer Lodge valley of course gets its entire product from the company's mine, amounting to 600 tons daily. The mine gives employment to 325 men, whose wages alone amount to \$35,000 per month. The total monthly disbursements of the company in this district average \$60,000, in addition to which \$50,000 per month is disbursed for wages alone at Anaconda. The expenses of the company at the mine and smelter may be safely estimated at upwards of \$200,000 a month, including payments for wood.

Other Disbursements.

The Clark Colusa, Neptune and other private properties of W. A. Clark cost not less than \$15,000 per month for the 150 men he employs. The Bluebird employs 35 men, and Mr. Van Zant's total expenses cannot be less than \$10,000 for wages and supplies. The Rising Star, Clear Grit, Mountain View, Goldsmith, None Such, Silver Safe, Springfield, Elm Orlu, Little Darling and other private properties afford employment altogether to between 325 and 350 men, whose wages amount to \$30,000. Mining supplies will swell the amount to \$40,000 paid out in this district.

WOULD LIKE TO SEE IT.—Of late there has been a great deal of speculation in the outside papers about a new mill which is to be erected at or near Candelaria. When W. J. Sutherland and party were here there was some talk of a speedy completion of the Princess mill. Not a lick has yet been struck and no immediate prospect of it, though all concerned think the plan and proposition a good one. This has been the song of the Princess company for the past two years or more. It has also been said the Victor company intended putting up a mill, if the rock sent to Belleville for reduction netted above a certain figure, but the mill machinery don't begin to arrive.—*Candelaria True Fissure*.

DURING May 5,656,000 feet of lumber were exported from Puget Sound.

Gumption.

Mr. Edward Atkinson, of Boston, recently addressed the members of the Golden Branch Society, of Phillips' Exeter Academy, upon "What Advantage Does an American Boy Possess?" Mr. Atkinson urged that the young men who are so soon to become the workers and controllers in the business of life should be careful not to become one-sided, and not to lose the "gumption" which every Yankee boy ought to possess, and which does not form a part of the curriculum of the school or college, but is developed or lost in that part of the process of education which is outside the books and independent of the teacher. Gumption is that power of applying the work of the hand and brain together under the quick application of the will, which makes a boy or man ready for any emergency, and enables him to decide at a glance, or with a single thought, the right way of doing something. In the old time, although the organization or the schools was not as perfect as it is to-day, and although the teachers were perhaps not as competent as those of modern time, while the variety of instruction was far less, there was a no less number of able and capable men among the graduates of schools and colleges in proportion to the whole number of pupils than there is to-day. The necessity which was imposed on the rich and poor alike to do some part of the work of life with their own hands, while they were attempting developing their mental powers, worked in the direction of that readiness and versatility which we call gumption.

It is obvious to men who have been engaged from very early years in the active work of life, and have been charged with the duty of selecting men to fill important places, that the number of school or college graduates who have been adequately prepared to apply their instruction to immediate use constitutes a painfully small proportion of the whole number. It may be admitted that the only true result of school and college training is to enable a young man to know when and how to begin the real education which must form part of his life, and which will not end except with life, but it ought not to happen that the method of preparation is so ill-advised that it disqualifies the graduate in a measure for the work which he must do. The address throughout was an argument in favor of students endeavoring to acquire not only that knowledge that will enable them to design, but the gumption which facilitates the ready application of knowledge to the execution of design in whatever work may demand their attention.

Early Day Mining for Gold.

In his address at the recent reunion of the residents of Tuolumne county, Mr. W. W. Stetson said:

Nothing raises the spirits like good luck or prosperity. I thought the scenery was the grandest in the world when I carried home at night a pan containing six hundred dollars in gold dust. And what a God-forsaken country it looked when the claim paid only a dollar a day!

California is estimated to have produced nineteen hundred millions of gold, and it is fair to presume that Tuolumne county has contributed two hundred and fifty millions of that amount. The section of country lying between Sonora and Columbia, and embracing the camps and towns of Gold Springs, Yankee Hill, Brown's Flat, Springfield and Shaw's Flat, is said to have been the richest placer mining district in the State of California. An old river channel leading from this section into Table Mountain contained gravel of remarkable richness. The deposits or pockets found in Bald Mountain have proved the richest of anything of their kind in the world.

In the early days, and before people were familiar with mining, it was laughable to observe the crude and awkward machinery that inexperienced miners invented and shipped out via Cape Horn to aid them in extracting the precious metal from the soil. One contrivance was a scow, with a scoop and tongs, to work deep places in the bottom of the rivers, after the manner of oyster tongs. The inventor thought to secure great chunks, while his envious competitors were panning out the fine gold in shallow water. I well remember, in 1849, in the Eastern States, making some peculiarly shaped square pans of Russia iron for an inventive genius. While lying in the shade on the banks of the Stanislaus river, years later, I found one of those identical pans, showing that the machine had really arrived at the mining region, and, like many other inventions, had failed to work.

DOCTORVILLE is the name of a new camp in the *Cœur d'Alene* mines. It is situated seven miles above Eagle, on the west fork of Eagle creek. A number of valuable mines have been opened in the vicinity of the new camp.

THE *Husbandman* says some Butte miners are developing several newly discovered leads in the Castle mountains, Meagher county, with a prospect of very profitable results.

SEVENTY-ONE loads of dirt, from the excavations at Helena, M. T., where the Union block is to be built, were sliced out last week, and yielded \$504 worth of gold dust.

ENGINEERING NOTES.

DO LARGE STEAMERS PAY?—"The chief reason why the European passenger steamship business has ceased to be profitable to some of the old established companies," wrote a shipping agent of long experience a short time since to the *New York Herald*, "is a very simple one. This idea of enormously large and very fast ships has been overdone. These new, fast boats do not pay, and never will, because their running expenses are too high, and they use so much coal that it leaves very little room for cargo. Take the *Etruria*, for instance, the big now Cunarder. She crosses the Atlantic in six days and a half, but she burns 350 tons of coal a day, and of course must carry at least 3,000 tons in her bunkers when she leaves her dock. This leaves room for only 400 tons of cargo, and at the very low prices for ocean freights which have prevailed for a long time past there is very little margin for profit. Now compare a steamer like the *Germanic* with the *Etruria*. The *Germanic* makes the run in seven days and a half, taking a day longer than boats like the *Etruria*. But she consumes only 100 tons of coal a day. And in place of 400 tons of cargo the *White Star* steamer can carry 2,200 tons. Don't you see the difference in the earning capacity of the two? I think the limit of speed consistent with economy was reached in what have now become the slower boats, of which the *Germanic* is a type, although, as far as I am concerned, I don't see why they are not fast enough for any body." "But vessels like the *Etruria* can carry more passengers, and is not the loss of cargo made up in this way?" "No, they can carry a few more passengers, but they can't get any higher rate for them, and the difference does not make up for the heavy increase in running expenses. You can put it down for a certainty that these new and very fast boats do not pay."

PNEUMATIC TUBES.—The French use the following method for removing obstacles from pneumatic tubes: The position of an obstruction is determined by simply firing a pistol into the tube. The resulting wave of compressed air traversing the tube strikes the impediment, and is then deflected back to its origin, where it strikes against a delicate diaphragm, its arrival being recorded electrically upon a very sensitive chronograph, on which also the instant of firing the pistol is also recorded. The wave of sound on reaching the diaphragm is recorded and then reflected back, a second time striking the obstacle and returning to the diaphragm. The operation being several times repeated, the exact position of the blocking matter is ascertained.

A SHOAL WATER ALARM.—In order to facilitate the navigation of the treacherous water of the Nile, Messrs. Yarrow have designed a permanent sounding apparatus which will notify the shoaling of the water some distance ahead. This is described as consisting of two poles about 50 feet long, at the end of which are suspended two vertical iron rods. One pole projects direct ahead from the port side, and the other from the starboard side. Attached to each of these two vertical iron rods is a wire rope which passes inboard, and is connected with the whistle on the boiler; and the gear is so arranged, that immediately this indicator touches a rock or sandbank it instantly causes the steam whistle to blow.

FROM THE BLACK SEA TO THE CASPIAN.—Russia is about to begin a second railroad between the Black sea and the Caspian, along the foot of the Caucasus on the north, while the existing railroad is south of the mountains. Like the other Russian railroads, it will be a five-foot gauge. The cost, with harbor improvements at Novorissk, is estimated at \$9,500,000 or \$55,000 per mile. The line will give an outlet to a productive grain country as well as petroleum. The latter does not depend upon it wholly, as there is now a pipe line sixty miles long leading from the wells to Novorissk. When built it will be possible to ride by rail all the way from the Atlantic to the Caspian sea.

SPANS OF TELEGRAPH WIRE.—The longest spans of over-head telegraph wire in the world have recently been put up by the French authorities in Cochín, China. These are erected across the river Mekong, posts 160 feet high having been placed on each side of the river, at a spot where the width is 2,560 feet, and from these delicious bronze wires—one .04-inch, and the other .055-inch in diameter—are suspended across the stream. Over a tributary of the river another similar connection has been made, 1,670 feet span and more than 114 feet above flood water. The former of these is a span of 0.46 of a mile.

BAD ENGINEERING.—The recently constructed cable road in Philadelphia has thus far proven a failure. The road is constructed through 12 miles of the principal streets of the city, and has cost the projectors \$600,000, but it is estimated that \$1,250,000 more will be required to correct mistakes. When the iron conduits through which the cable passes were laid, iron rods were run through the stringers and bolted to the top of the conduits just below the slot where the grip passes down to the cable under the street. Every change of temperature has been found to affect the width of the slot and hinder the passage of the grip.

USEFUL INFORMATION.

A New Solvent.

What is said to be a valuable preparation in which petroleum forms the chief ingredient has recently been patented in England. The invention relates to the production from petroleum of a substitute for bisulphide of carbon which can be used for extracting oils and autbracine, for dissolving gums, rosins, and analogous substances, for water-proofing, and for vulcanizing india-rubber in conjunction with chloride of sulphur or other vulcanizing agents. To obtain the improved substitute, which is called "vulcoline," the distillate or fraction from petroleum which passes over between the temperatures of 100 degrees and 212 degrees F. or thereabout (the fraction known as spirit or naphtha) is taken and treated in the following manner: To every 100 gallons of petroleum are added from two three gallons of sulphuric acid, with constant agitation, continued as long as may be necessary, in a suitable vessel; it is then allowed to subside, and the liquor decanted from the sediment is run into a still with from one to two per cent of its weight of lime or other dehydrating medium, calcium carbonate or other alkaline carbonates, or oxides of metals capable of removing or destroying any sulpho-oils which may have been generated by the treatment with sulphuric acid. The distillation is conducted without injecting steam or water into the contents of the still. Sometimes before distilling the liquid is submitted to repeated treatment with fresh sulphuric acid until the acid ceases to be colored, or nearly so. As the distillate comes over, the receivers are exchanged as soon as the product which is coming over reaches a specific gravity from about 680 to 690, water being taken as 1,000. By these processes the portions of petroleum unsuited for a substitute for bisulphide of carbon are removed, and considerable economy is thereby effected, both in material and bulk of liquid to be operated on.

How to Judge of Coal.

There are thousands of consumers and coal dealers, says the *Mining Engineer*, who cannot judge of the value of coal. Such parties generally clamor for coal from one seam. The value of market coal, however, does not depend on the seam from which it comes, but rather on the locality and manner in which it is prepared. The more slate that is mixed with the coal, the greater the amount of ash, and the smaller the proportion of carbon. Thus, egg coal, which is usually well cleaned, contains only 4 or 6 per cent. of ash, and 88 or 90 per cent. of carbon, while buckwheat coal, which cannot be well cleaned, contains as high as 16 or 17 per cent. of ash, and only 75 or 77 per cent. of carbon.

It is true that certain coal as well as certain sizes can be cleaned more readily than others, but this depends upon the location and condition of the seams from whence the coal is taken, and not upon the name of the bed. A bed may be found in good condition in one place and not in another. The bed, or even the colliery, from which the coal is taken, therefore, is no criterion by which dealers and consumers should place a value on the fuel. Nor does the degree of luster indicate its value. Bony coal is not slate, but an excellent fuel. Each coal, however, is especially adapted for certain purposes.

The softer and more friable the coal, and freer from slate, the more readily will it burn. The harder the coal the better it is adapted for high heat and pressure. Free burning coals melt or clinker. A red ash coal makes less dust than a white ash. Consequently the Schuykill red ash coal is specially adapted for household purposes, as it burns very readily and makes little dust. Hard white ash coals are best adapted for steam and furnace use. The Lykens Valley coal commands a high price, because it burns with a large flame and soon evolves heat. It is in great demand wherever quick heat is required.

Fir Leaf Wool.

Fir wool is a textile fiber which in Saxony is manufactured out of the needles of the fir tree, the process being partly chemical and partly mechanical. For this purpose the needles are gathered in spring and summer, when they are young and green; old withered ones being unsuitable. They are taken into barns and there dried in a current of air. When dried, they are subjected to a settling and fermenting process similar to that in use for flax. This softens the woody parts and loosens them from the fiber, but the complete separation is only obtained after a lengthy boiling by steam. During this boiling a by-product is obtained in the shape of an oil (fir wood oil), which is gathered and sold to chemists as a remedy for rheumatism and gout, its properties being similar to turpentine. The complete separation of bast and fiber is produced exactly as with flax. The fiber is now passed through a milling machine similar to that in use for woolen cloth, and is then carded and spun like cotton. Generally the carded fiber is mixed with a certain proportion of cotton or wool, and thus a kind of merino yarn is produced, which is worked in the bosery frames into singlets, drawers and stockings, these fabrics being then sold as anti-

rhenmatics and as a preventive of gout. When examined under the microscope the fiber appears as a tube, and striped, as if covered by a fine network. Goods made with this fiber are sold to a considerable extent in Germany, though they are dearer than the ordinary merino goods.

TIMBER FOR WINE TANKS.—Prof. E. W. Hildgard says that redwood is doubtless superior to all except the sugar pine for wine tanks. In fact, the latter is the only pine or fir to be thought of in that connection, since otherwise the wine would speedily assume a turpentine flavor. Such might be acquired even from the knots of sugar pine, so that clear lumber of that kind should alone be used.

In all cases the boiling out of the sap will improve wood for tank or cask purposes; and should be done not with water only, but with a solution of soda, say a pound of sal-soda to 10 or 15 gallons. A good way is to fill the tank with the hot solution and let it stand, covered, for two days; then fill with clean water and let it soak out the sap and soda as long as convenient. No white wine should, however, be made in redwood, as it will yield up color for years, and will also show taste much more than red wines.

UTILIZATION OF BONES.—The value of ox bones is considerable. The four feet of an ordinary ox will make a pint of neatfoot oil. The thigh bone is the most valuable, being worth \$80 per ton for cutting into cloth brush handles. The fore leg bones are worth \$30 per ton, and are made into collar buttons, parasol handles and jewelry. The water in which the bones are boiled is reduced to glue, the dust which comes from from sawing the bones is food to cattle and poultry, and all bones that cannot be used as noted, or for boneblack used in refining sugar, are made into fertilizers, and help to enrich the soil.

MAKING BARREL STAVES.—Many people will be interested to know how the staves of barrels are made in their peculiar bending or curving shape. The lateral curve is made by cutting the staves from a log with a cylinder saw, which looks like a steel drum with teeth all around one end. The lengthwise curve is obtained when edging up the staves by feeding them on a traveling platform, which swings slightly against a smaller circular saw. The bevel edge on the heading is made by locking the boards on a revolving vise, fixed at an angle and running them over a perpendicular circular saw.—*Saw-mill Gazette*.

THIRTY CARLOADS OF STRAWBERRIES.—Thirty carloads of strawberries were shipped from Centralia, Ill., recently, each car containing 500 cases, making a total of 15,000 cases. This is the largest shipment ever sent out in one day, and twice as much as was shipped any one day last year. The amount paid to those employed in gathering the crop was over \$7,000 for the day's work alone. There will probably be in the neighborhood of 175 carloads shipped for the entire season.

GOOD HEALTH.

Resisting Electric Shocks.

Dr. A. L. Hummel recounts some curious cases of recovery from shocks which ought, according to all ideas upon the subject, to have proved fatal. One is that of an employee of the Brush Company, who, while still grasping the wire in his left hand, cut it with a pair of nippers held in the right. The current was at once established through his body and he was held to the wire at the top of a 30-foot pole for three minutes at least, by which time a ladder had been procured and he was released by a fellow-workman. During this time a current of 3,000 volts, or sufficient to run 50 arc lamps of 2,000 candle power each, had apparently passed through his body, yet he was able to reach the pavement with slight assistance, suffered little or no constitutional disturbances, save a slight rise in temperature, and was not confined to his bed. His punishment was limited to the charring of three fingers on the left hand, and a small but deeply-burnt hole in the palm of the right hand. The only treatment was that applied for simple burns. Another case was afforded by one of the workmen of the Bell Telephone Company, who having climbed a pole belonging to the Brush Company, in order to carry a wire over it, grasped the tie wire of the positive line with one hand, and that of the negative line with the other. Here he was held until an assistant ran five squares to the electric light station, when the circuit was broken and he was released. A rope had been attached to him and passed over the arm of the pole. This was held by another man and he was thus prevented from falling. Though unconscious for a while, he soon rallied, but his pulse never exceeded 86, nor his temperature 101°. The thumb of the left hand was burnt nearly off, as were also the index and middle fingers of the right hand. These were all amputated.

CURING RHEUMATISM WITH CELERY.—A German correspondent of an English paper writes as follows: I have had a severe attack of inflammatory rheumatism and was healed in two days' time by a soup made of the stalks

and roots of celery; therefore I desire to make this simple remedy known through the columns of your paper for the benefit of all suffering from gout or rheumatism of any form. I was induced to try it by seeing the following notice: Numerous cures of rheumatism by the use of celery have recently been announced in English papers. New discoveries—or what claim to be discoveries—of the healing virtues of plants are continually being made. One of the latest is that celery is a cure for rheumatism; indeed, it is asserted the disease is impossible if the vegetable is cooked and freely eaten. The fact that it is always put on the table raw prevents its therapeutic powers from being known. The celery should be cut into bits, boiled in water until soft, and the water drunk by the patient. Serve warm with pieces of toasted bread, and the painful ailment will soon yield. Such is the declaration of a physician who has again and again tried the experiment, and with uniform success. At least two-thirds of the cases named "heart disease" are ascribed to rheumatism and its agonizing ally, gout. Small pox, so much dreaded, is not half so destructive as rheumatism, which, it is maintained by many physicians, can be prevented by obeying nature's laws in diet. Here, in Germany, we boil the root and stalks, as the root is the principal part of it, and afterward eat it as a salad with oil and vinegar. I received such immediate benefit that I am anxious to let all the rheumatic sufferers know of it.

The Approach of Age.

The approach of age shows itself about the eyes. Lines come, faintly at first, then deeper, until the incipient crows' feet are indicated, developed and revealed. The woman who, looking in her glass, sees these fatal lines, diverging from the outer corner of her eyes, knows that she has reached an era in her life. She recognises it with a sigh if she be a vain, a lovely or a worldly woman; with a smile, perhaps, if she has children in whom she can live her own youth over again. But it can never be a gay smile; none of us, men or women, like to feel youth—that precious possession—slipping away from us. But we should never be seen on the lookout for crows' feet or gray hairs. Looking for them is sure to bring them, for thinking about them brings them. Tears form a part of the language of the eye, which is eloquent enough when sparingly used, and which should be sparingly used for other reasons than that of adding to their mute eloquence. Tears are a disfiguring expression of emotion, and those who get in the habit of weeping over every small vexation do much to acquire a careworn, miserable expression, and are sure to look old before their time. Excessive weeping has been known not only to injure but actually to destroy the sight. Few women look pretty or even interesting in tears, though it has long been a pleasant fiction in poetry and romance to suppose that they do. Many women, some men, most children, make most disfiguring and distorting grimaces while crying; and the lady who thinks she can work upon a man's feelings by a liberal display of tears, should carefully study a becoming mode of producing them before her looking-glass. Grimaces soften no heart, and tears, accompanied by the usual distortion, have a hardening effect if not a visible one.

In a prettily written work, now probably out of print, purporting to be the story of the life of one of Milton's wives, the author makes the poet say of his wife's eyes, after crying, that they resembled "the sun's clear shining after the rain," a very pretty natural object indeed, but during the rain itself the observer is not inclined to be complimentary.—*Whitehall Rev.*

DEATH FROM INFECTED WOOL.—A sad case of death from infected wool is reported from Neuttschein, in Moravia. Herr A. Perl, a woolen manufacturer of that place, became troubled on the 7th of January with a swelling on the upper lip, which he attributed to a cold that he had been suffering from. But the next day symptoms presented themselves which caused the physician in attendance to suspect with tolerable certainty that it was a case of diseased spleen—a frequent complaint among animals, though seldom met with in man. The physician's diagnosis was strengthened, when he was informed on making inquiries that Herr Perl had on the previous Sunday examined a sample of wool that he had received, by smelling at it several times. Shortly afterward the patient experienced a burning under the nose, and there remained no doubt that the sample of wool had come from a diseased sheep, and that he had been infected by it. This would happen the more easily as he had been suffering from a cold, and the poison would be readily taken into the circulation, through a slight injury of the mucous membrane. The disease was rapidly developed, and Herr Perl succumbed to it on the 9th of the month.

ATTENTION TO DETAILS.—The *Herald of Health* suggests that health, like success in life, is to be gained by paying attention to details. It is better to try to keep from catching cold than to be always trying to avoid infection. More can be done to check cholera by keeping houses clean than by using tons of disinfectants. Nature gives health. It is man's perversity in departing from Nature's teaching that leads to disease. Nature intended all to have fresh air, sufficient plain food, uncontaminated water and exercise. Let us accept Nature's bequest, if we prefer health to disease.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

POCKET.—Amador Ledger, June 27: We were shown last Saturday some very rich specimens from the St. Julian, taken from a small pocket in up-raising, not far from the surface. A gentleman named Oliver was in Amador City last week negotiating for the purchase of the Little Amador mine. A cave occurred last week in the south shaft of the Gover, which has caused the stoppage of the mill for the past week and laid off a number of miners. The cave is not serious, however, and everything is expected to be in good running order again in a few days. At the North California the tunnel is in a distance of 500 feet. Small bodies of quartz have been cut, but the main ledge is believed to be 250 feet beyond the present termination of the tunnel, and to reach this ledge is the object of the tunnel operations. A contract for 200 feet was let about six weeks ago which will give the tunnel a total length of 650 feet—from 50 to 100 feet short of the point where the ledge is believed to be. The surface croppings show an immense body of quartz 300 feet in width, which yields from \$3 to \$5 per ton at the mill, which will leave a margin of profit if extracted by means of a tunnel. The ore body in the upper Mammoth tunnel has widened considerably of late. There is now a large ledge of good ore. It is somewhat singular that this fine ledge should be within ten feet of the point where a prospect shaft sunk many years ago was abandoned. It was the same with the rich strike in other parts of the claim. They were met with only a few feet from where the former claimants had quit work. The small engine at the Mammoth mine has been moved to the Moore mine, and is being used in hoisting water. The water is very strong, and the work of lowering it proceeds slowly. At present the water level is below the first tunnel, at the depth of 130 feet from the surface. Mr. Nevills went through this level Wednesday morning, and found the shaft and tunnel in good condition, in fact almost uninjured. There is over 100 feet of water yet to be taken out. W. A. Nevills has bonded the Bright Quartz mine, in Schober's field, also 1000 feet along the ledge on Schober's ground. It is the intention to prospect the claim at once. The engine formerly on the Moore mine is to be placed in position on the claim. The bond runs for one year from the 1st of July next. The 20 stamp mill on the Amador Queen mine will be started to-day, Saturday.

Calaveras.

MORE RICH ROCK.—Calaveras Chronicle, June 29: Fortune is surely smiling upon our local banker, Mr. C. Schlund, in his mining operations, and the indications are that the Dame's countenance will soon be radiant with signs of encouragement and reward. Last Wednesday we were shown more exceedingly rich rock. At a depth of one hundred feet the quartz vein is fully two and one-half feet in width. The evidences are that the Tiger mine is not only rich but will be a permanent paying mining property. Mr. Schlund has recently purchased a small quartz crushing appliance for prospecting purposes, which is very effective in reducing the rock to a fine powder. It is easily worked with one hand by means of a lever, and is superior in every way to a mortar.

ANGEL'S CAMP.—Business of every character is improving, and the drowsiness that prevailed is being cast aside as wealth is taking the place of poverty. Capitalists are now investing their money in this section, and many rich mines in and about this vicinity that have been dormant for many years are now being developed by those who have the capital, and thus everything looks flattering. The once famous Big Mine, but more recently known as the Potter mine, has lately changed hands, and the new owners have commenced work in good earnest. A force of men are now grading for the new hoisting works, and it is the intention of the owners to sink the shaft 500 feet deeper. A large boarding house will soon be erected on the ground. The mine will give employment to at least fifty men when everything is in working order. It is said that our genial friend, Uncle Jim Tullock, has taken the contract for erecting the new works to be placed on the mine. The Compact Mills erected by him on the Lane and Cherokee mines, and which run like clock work, speaks well for the ability of our friend in that line.

Inyo.

MAXIM MILL.—Inyo Independent, June 26: Yesterday morning Harris & Rhine took possession of the Maxim mill, and placed Sam Gruher in charge as keeper. It is claimed that the sale of the property to William Stansfield last December was not based upon sufficient authority, the notice under which the judgment of sale was obtained not having been served upon parties who were representatives of the real owners. For the purchase money invested by Mr. Stansfield he will doubtless fall back upon the seller. This mill is a regular Pandora's box, every time it is opened some new trouble springs out. Under the management of Mr. Stansfield it gave promise of being a success for himself and a benefit to the country; it is deeply to be regretted that any hindrance should come in his way.

GAVILAN.—Last Thursday a run was started on fifty tons of ore from the Gavilan mine. This ore is from the same ledge as the Chulula, and is similar in character except carrying more sulphurets. One-fifth of the entire mass of this ore is sulphurets and as assayed by Professor Price, of San Francisco, the sulphurets contain \$29 per ton of gold and silver, nearly the whole value being gold. These sulphurets will be shipped to San Francisco for reduction. In the upper tunnel of the mine a strike of very rich ore was made on Friday of last week. These two mines give every evidence of developing into a valuable property, the amount of ore being immense and the facilities for working all that could be wished.

CHULULA.—A clean up was made last Monday from a run of 37½ tons of ore, the yield of bullion was 108 ounces worth \$14.50 per ounce. This

makes the ore worth, in round numbers, forty dollars per ton.

Mariposa.

PUSHING AHEAD.—Mariposa Herald, June 29: The work of development in the Buckingham mine is being pushed ahead by Superintendent Hall night and day, and the tunnel which will tap the vein at a depth of 200 feet and obviate the necessity of handling the ore more than one time will be completed by the 1st of September, if the ground continues favorable as at present. The mill will then be started and run regularly. B. M. Collins of Lewis District was in town last Wednesday, and from him we learn that the Green Mountain folks last Friday completed the tunnel that taps the vein at a depth of 500 feet and that very rich rock was found. It assayed \$11 in copper, \$40 in silver with traces of gold. The ledge is nine feet wide and the owners are much elated at the prospect.

Placer.

FOREST HILL.—Placer Herald, June 27: Late developments on the Forest Hill divide have given to that region a new life. Much prospecting is going on and in many of the older mines the working force is being increased. The May Flower cleaned up over 50 pounds of gold again on Monday. That portion of Placer county is now undoubtedly the liveliest mining region in California.

Plumas.

INDIAN VALLEY MINE.—Greenville Bulletin, June 27: The water is now out of the Indian valley mine, and a contract has been let for the new hoisting and pumping machinery; also a contract for placing it in position. The tunnel will connect with the shaft in a few days, where an excavation 3x18x10 feet will be made for the plant of the new hoisting works, which will be 400 feet under ground. An eight-inch pump will be put in to pump water from the 200-foot level. The water from the bottom of the shaft will be pumped into a tank at the 200-foot level; also the water from the Union, which is being tapped by a tunnel, 212 feet below its deepest workings, will be drained into the same tank and pumped from there into the drain tunnel above. This arrangement will enable them to handle the water easily, thus facilitating the sinking of the shaft.

Sierra.

THE BUTCHER RANCH MINE.—Sierra Tribune, June 26: At the above quartz mine, owned by Messrs. Van Slyke and Maxon, the wagon road leading from the mine to the mill is completed. Grading for the mill site is being prosecuted vigorously. Twelve carpenters are being busily engaged in framing timbers for the 10-stamp mill. Three 60-foot shafts have been sunk at different points on the vein and a drift run that connects each of these. The ledge varies from 5 to 12 feet in width and carries free gold in abundance. We understand that Peter Vuossavich, of Sierra City, will act as foreman at the mine.

ATTACHED.—Mt. Messenger, June 27: The Marguerite property has been attached by creditors in San Francisco for the sum of \$72,000. The property has cost a large sum of money in its development, and as the mine is valuable it will probably be redeemed. Chas. Hartling and Louis Garibaldi have put up an astra at the head of Coyoteville ravine, and commenced grinding the sand from the old Jas. Code quartz mill that prospects rich. After this sand is exhausted, quartz will be crushed that promises to yield large returns.

POKER FLAT ITEMS.—Your correspondent visited the Sierra Phoenix mine, owned by Chas. Southerland, J. E. Linsey and G. P. Dorland, whom he found with seven men busily engaged putting up a Huntington mill, about one-eighth of a mile above Empire Flat on Canyon Creek. The ledge lies between slate and serpentine rock. The mill is being constructed by Mr. Mathews, of San Francisco. J. Z. Hough is doing the carpenter work. There is about 2,000 tons of ore in sight. A good deal of rock-gold can be seen with the naked eye, which will average \$30 per ton with a cost of \$2 per ton for milling. In the main tunnel as high as 50 cents to the pan can be obtained. The ledge can be traced 1,750 feet on the surface, and is about seven and eight feet wide. The quartz is run through a chute, emptied into a car, brought to the mill, a distance of 70 feet and then thrown in the dump. A rock-breaker is attached to the mill. The mill will run from 10 to 12 tons per day. The cost of this mill will be about \$2,500. It is also run by a Pelton wheel three feet in diameter. The water is purchased this summer from Mr. Chas. Scott. It will give the mill about 250 feet pressure. The company expect to put up a 10-stamp mill in the near future, and will then bring the water from Canyon Creek, a distance of three-quarters of a mile. It is thought that this is one of the best ledges around Poker Flat. Copper plates are used.

Trinity.

LOOKING WELL.—Trinity Journal, June 29: We learn that the After-All mine, on Mule creek, in Minersville District, is looking remarkably well. Much paying quartz has been taken out and there is a good body in sight. Five men are employed at the mine.

DEADWOOD.—Most of the discoveries made are in abandoned mines, reopened by energetic men who make further developments and are rewarded with the glittering gold. Others are prospects found sometime in the past on the surface which were small, but being tapped to a good depth by tunnels have displayed large bodies of rich ore. Mr. William Blagrove and John E. Gibson, on the extension of the Black Bear, have struck their ledge with the lower tunnel and shows up a vein two feet in width which prospects over \$100 per ton. Nearly every piece of ore upon the dump shows free gold. Westlick and Cosgrove have also struck an immense thing. The lode is from 8 to 20 inches in width and prospects up into the hundreds. McDaniels has struck a small rich vein on the Enterprise location. He is hard at work and in a few weeks you will hear from him again. Mr. Stone has also struck a rich prospect. Mr. C. Blakemore has struck it as rich as ever in the Venetian mine, on Jennings gulch. Gibson and Wm. Leavett are taking it out in handfuls, from their small vein which has widened out to 10 inches. Bothsby & Hendricks, who have leased a mine from Mr. Denison came down with a spoonful of gold the other evening. The boys report having struck it rich.

Tuolumne.

BRIEF NOTES.—Union-Democrat, June 27: Long

& Hampton have been forced to temporarily shut down the Willaeta mine on account of lack of water. It will be started up again as soon as water can be had. The new hoisting and pumping machinery is being put rapidly in position at the Dead Horse mine. The last of the machinery arrived from Amador county last week. Some very high grade sulphurets are being taken from the Hyde mine. The vein is of good size, and improves with every new development. J. N. Gillis has been crushing some good rock in his astra near Tuttle town. The Sulphurets mine is working steadily with a large force. The mill is making steady runs, with satisfactory clean-ups. Gus. Wiedekind is doing well in his gravel claim at Pine Log. He was in town a few days ago, and exhibited a nugget weighing several ounces. We understand that San Francisco parties will soon begin to open up one or two mining properties at Sugar Pine.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, June 27: Sinking the winze from the floor of the 3,000 level to explore the ore body deeper was commenced at 11 A. M., day before yesterday. The first or commencement set of timbers were put in place and the winze is now down about seven feet, all in high grade ore. It is being made to follow the dip of the ore vein at an angle of about 65 degrees, and is being put down as a double winze, with two compartments, one 5½ and the other 4¼ feet in the clear. The sinking or hoisting will be done for the present with a hand winlass, or until an engine is required. The ore taken out in sinking the winze is raised to the surface and shipped to mill, and as to the grade of it, as before stated, car samples average from \$80 to \$100 per ton. Yesterday noon, in order to ascertain the merits of the report that the face or bottom of the winze was in porphyry, superintendent Keating, accompanied by superintendent Hamilton, of the Chollar, went down and personally took the samples from both ends and both sides of the winze, which were assayed at the assay offices of the respective companies—four assays each. Keating's went from \$116 to \$590 per ton, and Hamilton's from \$55 to \$321 per ton. It is fair to presume, however, that they selected better than the average of the ore in sight, and certainly a candle box full of it, which this reporter saw at the office of the Hale and Norcross Co. would go nearer \$1,000 per ton. According to these eight assays as well as others taken the regular Comstock proportion of the precious metals is maintained in the ore thus far taken out of these lower grade levels—three-fifths silver to two-fifths gold. Meanwhile, the chambering out for the surface machinery and hoisting frame of this winze is proceeded with.

CHOLLAR.—Nothing is being done on the 300 level at present. Superintendent Hamilton deeming it advisable to suspend operations at that point until the new section of the big hydraulic pump is placed in proper position. This will take about six or eight weeks. Its foundations are already prepared and everything else in readiness for receiving it when it arrives, and it will be placed where it belongs and put into active working operation as soon as practicable. When this is done, it will simply be the other half of the big pump already in and working, practically doubling the present drainage capacity of the pump.

CON. CALIFORNIA AND VIRGINIA.—The repairs to the C. and C. shaft being completed, ore extraction from the 1,750 level, on company account, goes ahead as before, yielding about 90 tons per day. The quality of the ore shows considerable improvement, average assays being over \$25 per ton. About 100 tons per day come from the old bonanza section above the 1,300 level under the Jones' contract; average assays about \$13 per ton. The old ore sections and stopes throughout the mine show no sign of exhaustion, and bid fair to yield low grade ore for years to come.

CROWN POINT.—The ore stopes in the old bonanza workings yield about 350 tons per day, and the Belcher, which is being worked through this mine, yields from 100 to 150 tons a day, all of which is reduced at mills on the Carson river. Kentucky yields about 50 or 60 tons a day, which is worked at the Rock Point mill, just below Dayton, on the Carson river. All this ore from the three mines mentioned is of low grade, being the leavings or gleanings of the old high grade bonanzas which were worked out years ago.

SIERRA NEVADA.—On the 520 level the main lateral drift is being steadily advanced in favorable working ground. During the past week it has been advanced 67 feet, giving it a total length of 638 feet. As before remarked, this drift runs nearly in a northerly direction, diagonally across the ore channel, this being practically a cross-cut as well as a lateral drift. It will thus eventually skirt into the ore veins lying to the west, if it is continued on its present course.

ALTA.—The upraise above the 950 level has reached the 800 level, and the drifts and explorations from following up stringers and bunches of ore have not yet developed a rich bonanza. Small quantities of pay ore continue to be extracted and saved for milling, only one shift of miners being employed.

MONTE CRISTO.—This old mine situated in Six mile canyon, continues to yield about 6 tons per day of low grade ore, yielding \$10 or \$12 per ton, which is reduced at the Empire State mill. It is free milling ore, and the mill close at hand, otherwise it would not be made to pay.

BULLION.—Water coming into the west drift on the 160 level impedes progress considerably, all the hoisting being done with a whim. The face of the drift is in very favorable looking vein matter—porphyry, quartz and clay.

YELLOW JACKET.—The low grade resources of this mine, from the 1,100 level up to near the surface, seem to be practically inexhaustible. About 300 tons per day is the average daily yield, most of which comes from about the 400 level.

GOULD AND CURRY.—On the 1,000 level the 1st. from the main lateral drift, and is making good cross-cut east, near the average line, is now in 136 progress in favorable working ground. The joint west drift is in about 300 feet.

OVERMAN.—The yield from the stopes of the 226 level and above it has been increased to about 50 tons a day. It is all low grade ore, and is shipped

to the Vivian mill on the Carson river for reduction.

OPHIR.—On the 500 level the upraise to connect with and drain the old Mexican shaft made 20 feet of progress upward during the past week, and will probably be completed in two or three weeks more.

UNION CONSOLIDATED.—The joint Union and Mexican lateral drift north on the 500 level is being steadily advanced in good working ground.

WOODVILLE.—Still yielding 12 or 15 tons per day of good grade ore from the 400 level and stopes above it.

MEXICAN.—The joint Mexican and Ophir east cross-cut on the 500 level is making the usual good progress.

Castle Dome District.

LOOKING WELL.—Silver State, June 23: Wm. Rodifer, who discovered the rich lead in Castle Dome district is in town. He says the mines which are being worked look well. Luther & Bauman have a large streak of fair ore in their vein at a depth of 64 feet. Himself and partners have located three or four claims, which are considered good prospects. They are working some 400 feet from where they found the very rich ore and have a lead from two to three feet thick. They recently shipped a lot of ore to Utah which worked over \$1,600 per ton, but though there are rich streaks in the leads they require capital to develop them.

Tuscarora District.

NORTH BELLE ISLE.—Times-Review, June 26: North drift, 150-foot level, has been advanced a total distance of 208 feet. No change to note.

BELLE ISLE.—Cross-cut west, 350-foot level, advanced eight feet the past week; total length 84 feet. Drift north, 150-foot level, advanced 10 feet; total distance 100 feet.

NAVAYO.—Drifts and cross-cut on the 650-foot level has been extended 67 feet the past week. Cross-cut on the 350-foot level advanced 96 feet by the power drill. Good progress made with the work at all other points. Will close down this evening to clean boilers and make a few other necessary repairs.

GRAND PRIZE.—The south drift on the 200-foot level has been extended 30 feet during the week, the 300-foot level 27 feet and 400-foot level 22 feet. Stopes are producing the usual amount of ore. The mill is running all right. As most of the ore that is now extracted it manganese and sulphurets, it will be necessary to roast it. Will commence roasting in a day or two.

Willow Creek District.

BOOMING.—Silver State, June 23: The most important ore body ever encountered in the Ohio mine was struck early last week, and up to latest accounts was steadily improving. At the Wild Deer they have just completed the No. 1 tunnel, which opens up 240 feet of stopes and exposes over 1,500 tons of ore. The mill only waits to get the ore bins full before starting up for a long and prosperous run. The irrepressible Ed. Lucas comes down from his mountain cabin once in a while, with a fresh location each time, and his pockets full of the "biggest things on earth." If there is anything in this range, from Buckskin mountain to Castle Dome, Lucas is bound to get it. Old Pete Cassidy is delving away at the Democrat. He has uncovered a large ledge of gold quartz, which runs as high as \$27 a ton in gold. Pete swears that he has 10,000 tons as good as that, and thinks that under the present administration he ought to have the best kind of luck. Up the creek, the old prospectors pursue the even tenor of their way, digging a little, growing a good deal, and, as usual, predicting the failure of every other enterprise except their own pet holes in the ground.

COLORADO.

OPHIR NOTES.—San Miguel Journal, June 26: F. J. Kramer, who leased the Tidal Wave property for one year, has just set four men to work. As the men will commence work on ore it is probable that Mr. Kramer will realize a snug sum from his lease. Mr. James, representative of the Pasadena smelter, is in town bidding on the ore in this vicinity. The Bernier boys of the Silver Belt were in town on Sunday, and report that they have a tremendous heap of ore as the result of their winter's work. Douglass & Gillan, leaser on the Parsons, have struck a fine body of gray copper and chloride ore. Jack Simmons is working the Joogin, a good lode. It is reported that he has taken out some very fine ore within the last ten days. Mr. Simmons is also the owner of other valuable property situated in the vicinity of the Caribou mine. General M. J. Alkire has struck it rich on the Suffolk, a valuable gold lode situated on Silver mountain. The pay streak is over two feet wide and will mill-run over \$100 to the ton. The General will certainly be a rich man by fall. Tom McManus, leaser on the Fulton, will soon commence shipping ore. It is reported the Fulton is booming and looks away up. It is reported that the machinery for the stamp mill of the Hildebrand Mining Co. is on the cars in Denver.

BREFFS.—San Miguel Journal, June 26: The Cimarron is shipping daily, to the Pandora mill. The Flora has shut down for a month or so until the snow is off. The melting snow making surface water faster than it can be taken from the shaft by hand. In the Medota the finest body of ore was struck the first of the week that has ever been found in Marshall basin. Brittle and ruby silver abounds in the ore. The Smuggler is now shipping regularly. The Bell mill will concentrate the low grade ore. The Sheridan has its entire force at work shoveling snow, opening the trail to Silverton. The Boomerang continues to hold its own, and is shipping steadily. The Silver Glade is steadily improving as development progresses. It is now yielding some fine ore. Several valuable locations have recently been made, in the vicinity of the Boomerang and Silver Glade. The machinery at the Gold King mill, is in place and the mill will be started on the season's run early the coming week. John Real, one of the owners of the 76 in Marshall basin, informs us that this mine will be worked this season. It is good property. The J. W. Jr., of Marshall basin is shipping ore. The Argentine will remain idle this summer. The management announce that the mine will not be worked until they can put on pumping machinery.

IDAHO.

BANNER NEWS.—Idaho World, June 26: The

Silver Chief Company's new shaft was started on the 19th. Part of the force at the Golconda mine, consisting of Robbins, Davis, Hladley and Granger, were moved over for the purpose above stated. Thus begins work on a mine that has given good grounds for great expectations, and everybody would rejoice to see it first on the list by proving to be the biggest bonanza in Boise county, which is not at all improbable. The shaft is in a beautiful location two hundred feet west of the Elmiria company's line, and fifty-six feet south of the vein on the surface. Mr. Munron says he expects to strike the ledge on the 280 feet level of the Elmiria company, and from that point down one hundred feet the vein stands about perpendicular, judging from the Banner shaft. The dimensions of the shaft, which is compartment, are 4x8 feet in the clear. It will take some time, and cost probably \$5,000 to put this mine in good shape to pile out ore. The Elmiria company is now taking out plenty of ore from the Banner, and of very high grade. Every one who has examined the mine says the ore will mill between \$150 and \$300 per ton.

THE CALIFORNIA DITCH.—Every effort is being made to have the water in the California ditch running to Dream Gulch by Monday. On Tuesday ten peddlers were employed along the line and the water had been coaxed down to Reeder Gulch. Yesterday ten more men were put on to hurry the water forward, and if no breaks occur it should be on the point above Murray today, as all the fluming this side of Gold Run was to have been finished last evening. A stretch of fluming rock work is necessary along Alder Gulch, but the entire force of carpenters concentrated there to-day and the woodwork will be done by Saturday. The rock part is in the hands of John Treglone, who has a contract for the entire job and he was to have put twenty men to work yesterday. This is also to be completed by Saturday. Preparations on an extensive scale for using the water are being made by the Tiptop and Freeman claim owners. The former are setting boxes, and as soon as the flood comes along three eight-hour shifts will be put on to do as much execution as possible. The owners of the Freeman claim propose to apply hydraulic power if it can be arranged. Both claims have been promised water until it can be used in Dry and Dream gulches, and if the supply is ample they can obtain it right along. If not, they will be shut off. But it is expected that a large amount over and above what Dry and Dream gulches will use will be carried in the ditch. The charges are told, though not officially, will be 50 cents an inch for the present for 24 hours, but we presume the water will also be sold for specified hours during the day to give all the claim holders below Gold Run which the ditch reaches a show. The ditch down to Gold Run is said to have cost \$17,000, and even this large outlay may be increased some when all the figures are carefully summed up.

THE OUTLOOK IMPROVING.—Wood River Times: The local mining outlook has brightened considerably, during the past two weeks. The gold mill has proved to be a success, and this insured the exploitation of many claims along the gold belt that have never before been worked; another bonanza has been uncovered in the Elkhorn, and in the lowest levels at that; at Bullion work on the "King of the Hills" group has been resumed, the new owners intending to extract every pound of ore possible while keeping the development work well in hand; the Queen of the Hills (which, by the way, is opened to a greater depth than the Bullion vein, even) is steadily improving and showing a width of six feet of solid galena; the Idahoan is producing as much ore as ever; and there has been half a dozen promising strikes in the Alturas, the Mayflower, and other claims. Altogether, the condition of our mines is much better than it was a month ago—there is much more ore in light, and a larger number of men employed. If ore could only be struck in the Bullion Ohir tunnel now, every one here would feel better, and half-a-dozen other tunnels would be commenced.

A NEW SHAFT.—Cour d'Alene Sun, June 26: Stillwell, Page and Beauchamp, who have taken a lease of the deep ground of the Pacific claim, yesterday commenced work on a new shaft on Gold street, above Second. The hole will be 15 by 35 feet, but only 15 by 19 feet in the clear, the wheel and pump being expected to take up 16 feet. It will be remembered that the owners of the Pacific claim made an attempt to prospect the deep ground through the old shaft last Fall, but after running a drift some 40 feet or more from the shaft gave up the work. Bedrock was followed a few feet from the shaft, but it suddenly pitched down to such a depth that it could not be traced. The drift was continued in gravel in the hope of encountering it again, but it was not struck until a channel of about 35 feet in width had been crossed, when the water became so troublesome that work had to be suspended. All through along the drift the gravel prospected, but no pay dirt was found. The owners now propose to go to bedrock in the deepest ground encouraged by the pay found in the combination shaft a quarter of a mile below. The work of sinking will be prosecuted with energy.

A BEDROCK FLUME.—The Alder Gulch bedrock flume is progressing nicely, and on next Monday the company expect to shovel pay dirt into the sluices. An immense amount of work has been done, and the cut to reach bedrock, which was struck last week, is in the neighborhood of one thousand five hundred feet in length. A mammoth pit, 60 feet wide is now being ground-slued down to within a foot of bedrock. Owing to the running down of the water a reservoir has been made in the upper part of the gulch by damming up some of the old shafts, drifts and drains, which was easily done, and when the gates are opened a perfect flood is let loose, which with a fall of 18 and 20 feet does splendid execution. By this method an hour and a half's sluicing is secured five times a day. Immense boulders are met with and give a great deal of trouble, but the company is satisfied with the advance they are making, and believe they are in sight of the reward for their hard work. If a similar enterprise were started in Prichard Creek by a combination of several claims we would soon have different times in the camp.

GOLD AT SOLDIER.—A letter from Camas Prairie states that the ranchers in the vicinity of Soldier are wild with excitement over the recent discovery of gold-bearing veins on the north side of the Prairie. Road Supervisor Samson, a few days ago, picked up a boulder in which he found a nugget

worth \$5. The finding of this "float" started Pitt Smith and others prospecting, and Mr. Smith soon found and located a vein on Lisle's ranch, above Abbott's. Another vein was found near Upper Soldier creek, above Samson's place, another on Howell's place, and a fourth on an adjoining mountain. All the ranchers who can get away are in the hills, scouring the country for ledges.

THE STRIKE IN THE ELKHORN.—The recent strike in the Elkhorn mine is proving of very great importance, the ore-vein showing a width of over 18 feet, of which 10 feet is solid galena. The strike was made in tunnel No. 2, and not very far from Parker ground. As even the second class ore of the Elkhorn has always averaged 90 to 100 ounces, there is every reason to suppose that the ore recently struck will average at least 150 ounces per ton. The management, possibly made wise by experience, has concluded to extract only 10 tons of the ore per day, and to endeavor to keep the dead or development work well ahead of the stopes.

ANOTHER CLEAN-UP OF THE GOLD MILL.—Wood River Times, June 26: The Camas No. 2 mill was cleaned up for the second time yesterday. Somewhat better results are anticipated than at the first clean-up, as the mill must be getting down to steady work.

MONTANA.

PROGRESS OF OPERATIONS.—Inter-Mountain, June 26: While Mr. C. N. Laramie, owner of the Mountain view, is not at present extracting from the mine a large amount of ore, he is systematically developing the property and putting it in shape to rank with the heaviest producers of the district as soon as the copper market shall revive. On the 500 foot level operations are confined to the extension of the east drift on the north vein. The face of the drift is now 350 feet from the cross-cut, in workable ore all the way. The extent of the ore body is unknown, as neither wall has been touched. At a depth of 600 feet on the south vein the east drift has been advanced 125 feet and the west drift 115 feet, all in ore of mixed grades, some of it requiring concentration. On the north vein the 600-foot level has penetrated the ledge for a distance of 225 feet east and 250 feet west. In the east drift 100 feet from the main cross-cut a second cross-cut was extended to the foot and hanging walls, showing them to be 17 feet apart and the space between filled with good ore, varying in value from 12 to 70 per cent, every pound of it being susceptible of profitable treatment. The dump contains 12,000 tons of second and third class ore. Some first class ore is being shipped to Butte.

MOULTON.—The Moulton is reported to be in fine shape on the middle and lower levels and the company now proposes to make some extensive explorations at the depth of 500 feet on the big south vein, which has never been fully explored, and which in the east end of the claim was proved by a cross-cut to be 60 feet wide. This will be accomplished by means of the diamond drill owned by Mr. Clark but which for some time past has been in use at the Bell mine. The old veins of the Moulton are being developed, some of the ore being extracted and some left in place as a reserve. The mill is working steadily, and is perhaps doing the best work in the camp. The bullion product averages \$50,000 per month.

LEXINGTON.—In order to facilitate the successful treatment of Lexington ore, which is now very base in the lower levels, an addition to the mill has been started in which it is proposed to roast the ore more thoroughly. The result will be a much higher percentage of amalgamation and a corresponding increase in the bullion product. Nothing new is known to have been recently developed in the 650-foot workings, where the main ledge is being actively explored. The sinking of the main shaft will be resumed the coming week, and quick work is promised with the Ingersoll drills. The air compressor, which was made to special order and is a magnificent piece of machinery, works to a charm.

ELM ORLU.—The Elm Orlu, upon which an important surface strike was made some weeks ago, has now assumed a value as a permanent ore producer. From the old shaft south of the strike and at a point 60 feet from the surface a north cross-cut was extended to the ledge, a distance of 60 feet. The ore body was found intact and is 8 feet wide, most of it assaying 50 ounces in silver. The ore production of the property is 15 tons daily.

BELL.—The Bell is yielding about 30 tons of ore per diem, enough to keep one stack at the smelter supplied. It is extracted chiefly from the 500-foot level opened by a winze from the 400 level on which a pony hoist has been placed. The mine is said to be looking exceptionally well. The smelter product assays 50 percent and about 50 ounces in silver.

NEW MEXICO.

GOLD HILL.—Silver City Enterprise, June 26: Our camp just now is beginning to attract considerable attention from mining magnates. Scarcely a day passes without the arrival of individuals or letters of inquiry as to our mineral resources. Thus far all who have visited the camp speak in glowing terms of our future greatness, and predict for us a permanent position in the list of bullion-producing camps in Grant county. As yet but little work has been done on the majority of the claims in camp, but with the development already made the showing is certainly one to be proud of. Homestead is advancing rapidly, 20 feet having been made during the week. The rocks get harder as depth is attained, and progress is somewhat retarded. Everything thus far has worked smoothly, and if no unusual accident occurs the contract will be nearly completed this week. Standard continues to produce an unusually fine grade of ore, extracting about one ton of closely assorted ore a day. The returns from a shipment of two tons made last week have not yet been received, but will go about \$80 per ton. Tracure Box resumed work last Monday after an idleness of several months. As far as developments have gone the owners have every reason to be pleased with the outlook. Free gold is occasionally found, and a stratum of galena ore has made its appearance in the shaft. Operations will be commenced on the Grand Tower about July 1st. Work will be prosecuted with vigor, and the ultimate result is sure to be satisfactory.

WATER CANON DISTRICT.—A, Hogwall & Co.

are working without cessation on the Northern Light, in the north branch of Water Canon. They will perform ninety additional feet of work under the present contract. The property bears a very promising appearance. We were shown a day or two since a quantity of fine looking concentrates secured from the average ore now being dumped from the mine, which will be analyzed at the Billing works laboratory. This claim bids fair to call for a concentrator before many months expire. It possesses all the facilities of water, wood and transportation. The L. V. & St. L. M. & S. Co. are improving rapidly the appearance of the Tonto, a good claim situated south of the Garfield and Star of the East. It is now affording good-looking lead, copper, iron and silver. The steady exploitation of the Jane Bowman continues. There is no need of development on this claim, as the boys have only to quarry gold mineral out of a 50-foot ledge. It is not a mere rumor, but a fact, that steps are now being taken to commence active work in the Clipper mine, and also to erect a concentrator for the treatment of its ore.

LADRONE DISTRICT.—In Thwaites, Barduhn & Co's Picotite mine we note a remarkable improvement this week. Shaft No. 2 is forty feet in depth, and at this point their lode is three feet wide and consists of iron quartz gangue, bearing sulphide of silver. This mineral is exceedingly rich; it is not dumped at all, but stored up for shipment as it is extracted from the bucket. Whitacre & Hudson are steadily going down upon a full face of chloride and sulphide ore, in the Florence mine. The dump is increasing rapidly. Shaft No. 1 has reached thirty feet; the other workings also display the same character of mineral, and they are sacking ore for shipment. Thos. Dorsey, Henry Lockhart, Lindsay Henson and Thos. Dwyer have purchased the Reserve mine, in the Ladronne mountains, of Donald McRae, and the developments which they are to commence at once are to be superintended by Thos. Dwyer, the well known mining man. The Lawrence is keeping up its reputation as a producer of rich chloride and sulphide ore. Work upon the property continues without interruption, and the ore is sacked and stored for the market.

MAGDALENA DISTRICT.—Socorro Bulletin, June 26: The Hardscrabble mine is in full blast in charge of Wythe Walker, superintendent. The cars are running on the tramway, and convey fifteen tons of mineral daily to the chute. This quantity, however, will be materially increased as soon as the new machinery and upper drum arrives. Mr. Walker, in a drift leading from the tunnel, has succeeded in intersecting a new body of exceedingly rich iron and silver ore, which is well fitted for fluxing purposes. The mine is worked by full day and night shifts; the mineral is drawn from the openings only, as stoping has not been inaugurated. Shipments from this mine commenced last Tuesday. Wythe Walker has commenced working in the Zoe mine, at the north end of the Magdalena mountain. The mineral consists of free gold in iron quartz gangue. He let a 50-foot contract on Sunday, and work began the following day. The Ambrosia under the superintendency of Mike Dolan is making a fine record. A visible improvement in the character of the ore has taken place.

ORGAN.—Cor. Socorro Bulletin, June 26: The Bennett mine is looking first-rate. Mr. Skidmore has three shifts at work, and daily shipments are made to the Las Cruces smelter. A few days since the miners broke into an immense cave, which follows in on the vein for 250 feet. This beautiful cave is lined with white crystals, and is said to be a most wonderful sight. Not only is this enchanted chamber a thing of beauty, but it is also of great utility to the owners, as with a little work it will be an actual development of the mine. Of this, more anon. For the present the cave is closed to the public.

THE LITTLE BUCK has five men at work, and is a steady producer of good grade ore, which the owners always ship to the Billing smelter for treatment. A new strike on the east end of this mine bids fair to be quite a bonanza. Several tons of this ore have already been taken out that have netted the owners \$300 in silver and \$8 to \$10 in gold.

THE GRAY EAGLE has made another shipment to the Billing smelter. Like most of the Organ ore, it runs high in silver. There is an incline shaft of over 250 feet on this claim, with a good showing of ore in the breast.

THE SILVER STAR, which is an extension east of the Little Buck, has five men at work, and they are taking out sufficient mineral to pay all working expenses.

COPPER.—Two of our best copper properties have shut down on account of the fall in the price of copper.

OREGON.

PLACERS AND QUARTZ.—Jacksonville Times, June 26: A large number of claims have been located on the Yank ledge. Green Bros, of Galice creek, resumed work recently on their quartz ledge and have several men at work. They have one of the best ledges in the State. Excellent placer diggings on Cottonwood creek, above Shattuck's place, just south of the Siskiyou, are reported, and quite a number of men are at work there. John McCombe, of San Francisco, representing the capitalists who have bonded the Yank ledge, has returned home. He seems to be well pleased with the prospect. A great deal of prospecting is being done in Jackson and Josephine counties, and we may expect a great mining boom as soon as capital is introduced to develop our vast resources. Chas. W. Smith informs us that considerable placer mining is going on in the Hungry creek district, just across the Siskiyou mountains, and that some of the mines are paying well. Griffith & Runwalt are working a promising claim. Geo. H. Chick, of Yreka, Cal, and Mr. Ewing, said to be a California capitalist, went down to the Schumpf ledge in Willow Springs precinct yesterday. We learn that negotiations for the sale of this excellent property are likely to be commenced. We learn that a representative of a San Francisco company has lately bonded a placer mine on Wolf creek, Josephine county, and is now testing the same. He also intends to erect a quartz mill near that place, for the purpose of working some of the numerous quartz ledges in that vicinity. Capt. Ankeny is now superintending the work of building the Sterling Co.'s reservoir, and is making excellent progress. He is running a cut with a full ditch of water, and informs us that the late rains have in-

creased the supply so much that the mining season could have been extended several weeks. Capt. Haskell, who is said to represent Portland capital, has bonded the Roten ledge in Willow Springs precinct, and we learn will also bond the Swinden ledge near the same vicinity. Both of these mines have been worked before with fair results, and are likely to prove valuable property with the improved methods of crushing refractory ore. T. F. Dugan returned from Galice creek yesterday morning, having located several claims. He informs us that two tunnels are still being run on the Yank ledge, under the supervision of N. McNair, with favorable prospects. One tunnel has been run 120 feet and the other about 30 feet. Considerable prospecting besides this is also being done. D. Linn and John Orth, who have promised quartz ledges in this vicinity, propose subscribing liberally toward a quartz mill if the balance of our citizens will assist somewhat in the matter. There is no doubt but what the erection of even a one-stamp quartz mill would be of great benefit to this section, inasmuch as it would enable those owning quartz ledges to test their ore thoroughly and ascertain whether it is worth anything.

THE YANK LEDGE.—Cor. Oregon Sentinel, June 27: This monster ledge, which is the occasion of so much excitement now, is on Rogue river about 27 miles from Grant's Pass. The only means of transport at present is on the hurricane deck of a cayuse pony, as the last 12 miles is a rough mountain road. After traveling all day we reach the ledge. We can see for quite a distance where it ascends the mountain side, cropping out in higher pieces weighing a ton or more. The tunnel on this, the north side, has been run about 33 feet. The ore is very hard, and the entire work is done with powder. After inspecting the tunnel we follow Mr. McNair, the superintendent, up the mountain which the huge ledge traverses for a distance of 1,000 feet. About 300 feet above the river we find a second tunnel run by the Yank Gold and Silver Mining Co. of Jacksonville in 1877. This tunnel was driven about 42 feet, and the enterprise abandoned. The walls of this tunnel are covered with a blue and white powder secreted from the ore. A taste of this reveals arsenic and sulphate of copper.

UTAH.

BULLION.—Salt Lake Tribune, June 26. The shipment from this city for the week ending Saturday, June 20th, inclusive, was \$1,126,793. The receipts of bullion and ore in this city for the week ending June 24th, inclusive, were in aggregate \$92,578.95, of which \$80,228.95 was bullion, and \$12,350.00. For the week previous the receipts were \$32,458.52, of which \$22,058.52 was bullion and \$10,400.00. The output of the Ontario for the week was 86 bars of bullion, valued at \$52,344.99, bringing the total for the past year to date up to \$782,602.71. The Silver Reef district sent up silver to the value of \$4,433.96 during the week, of which the Stormont furnished 2 bars, \$2,780, and the Christy 1 bar, \$1,703.96. The product of the Hanauer smelter for the week was 9 cars of bullion of the value of \$23,400.

THE MILL.—Park Record, June 27: The good news has been circulated that the Marsac mill has been sold to the Ontario Co., and the transfer of the property will take place on the 1st of July. The Marsac Co. have been at considerable expense to repair and fit up this property which has been lying idle since the fall and winter of 1879-80. This prolonged idleness has been no fault of the management of the company. The only mill producing mines which have been worked to any extent whatever, since the repairs and additions have been made, has been the Ontario. The McHenry produced milling ore when it was worked, and several prospects showed indications of producing the same character of ore, but their developments had not progressed sufficiently to make them regular producers, and the mill enjoyed a long and protracted rest. For the past three or four years the Ontario extracted much more ore than their 40 stamps could handle, and for that period a new mill has been talked of, but no dirt for excavations has been removed.

THE STORMONT.—Southern Utah Times, June 26: The River Mill keeps ten pans running constantly. The Thompson is producing between 12 and 15 tons of ore per week and is looking well. The sixth level of the Savage is being extended south, and some fine ore bodies have been opened up. A winze has been run from the fifth to the sixth level, midway between the main shaft and the south end line, through a strong body of fair grade ore in which stopes are being opened up north and south. A winze is being sunk to the extreme south end of the mine from the fifth which will connect with the sixth level. This will open up a large chimney of ore, which lies partly on the Savage and partly on the Maggie ground. The stopes on this ore body have now reached a point above the fourth level.

THE CHRISTY.—The Christy Mill is running regularly, crushing between forty and forty-five tons of ore every 24 hours. The winze, below the 250-foot level in the New Shaft has now reached a depth of 70 feet. A drift is being run north on the ore, at a depth of 40 feet from the top of the winze. This winze has already opened up a large body of very high grade ore, with every indication that it will go down. The mine is furnishing between 12 and 15 tons of ore per day, although the work done at present is mainly for the purpose of prospecting and opening up the property. The stopes in the California are looking well and an average of 35 tons of ore is shipped to the mill every day. The drift on the fourth level south is now in a distance of 320 feet from the main incline. A cross-cut has been run from this level east to the ledge, at a point 280 feet from the working shaft—opening up a strong body of very fine ore, which is being stoped out. A prospecting winze is at present being sunk from the fifth level, 200 feet north of the main incline. It is now down to a depth of 40 feet, in ore all the way, showing conclusively that the ledge goes down.

OTHER NOTES.—Jas. McCarthy shipped 100 tons of ore to the Stormont mill, last week, which he extracted from Brischner's Maud mine. Andrew F. Greggeson made a 35 ton shipment of very good ore from the Duffin to the Stormont mill last week. There is a rumor current that parties interested in leaching matters here intend to put up a plant to reduce custom ores. A movement of this kind should receive the encouragement of every chlorider, individual mine owner, and every other person who desires to see our mining interests flourish.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery. Frank & Co.'s Woodworking Machinery. New Haven M'fg Co.'s Machinists' Tools. Bement & Son's Machinists' Tools. Bickford's Power Drills. Blake's Improved Steam Pumps. Perry's Centrifugal Pumps. Perin Band Saw Blades. Sturtevant Blowers and Exhausts. Shimer Matcher Heads. Brainard Milling Machines. Turbine Water Wheels. Bradley Cushioned Hammers. Massey's Steam Hammers. Schlenker's Bolt Cutters. Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines. Atlas Engine Works Engines and Boilers. Payne's Vertical and Horizontal Engines. Otto Silent Gas Engines. Clapp & Jones' Steam Fire Engines. Pickering Engine Governors. Judson Engine Governors. Tanite Co.'s Emery Wheels and Machinery. Nathan and Dreyfus Oilers. Korting Injectors and Ejectors. Disston's Circular Saws. New York Belting and Packing Company's Rubber Goods. Lane and Bodley Saw mills. H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco, Cal. E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL,

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power.

Those improving water power should not fail to write us for New Prices, before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York City

PARKE & LACY, General Agents, 21 & 23 Fremont St., S. F.

Machinery Buyers, Attention!

Miners, Millmen, Steamboat men, and all others wishing Machinery, will find a rare opportunity for a bargain in the following lot offered for sale by H. D. BACON:

- 1 BOAT ENGINE Complete, size 12x11 inch.
- 1 UPRIGHT BOILER, 56x7x6 inch, with ash pan and doors complete.
- 1 CAMERON PUMP, 12 inch steam and 10 1/2 inch water cylinder.
- 2 WILCOX PUMPS, 3 1/2 inch steam and 2 1/2 inch water cylinder.
- 1 BAND WHEEL, 4 feet diameter and 12 inch face.
- 1 PLUNGER PUMP, 1 1/2 inches
- 1 DECK PUMP, 1 SMOKE STACK.
- 1 Lot of 1/2 inch, 3/4 inch, 1 inch, 1 1/2 inch, 2 inch and 3 inch Pipe and Fittings.

All of the above will be found in good order, and can be inspected, and further information may be obtained, at 222 Fremont Street, San Francisco.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

H. N. COOK,

Manufacturer of

LEATHER BELTING and LACING.

OAK-TANNED, SHORT LAP BELTING.

SPECIALTY:

HEAVY DRIVING BELTS.

Order direct from the manufacturer for perfect guarantee and lowest prices. Correspondence solicited

Send for Catalogue.

405 Market St., cor. Fremont, S. F.

N. W. SPAULDING SAW COMPANY

Manufacturers of SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

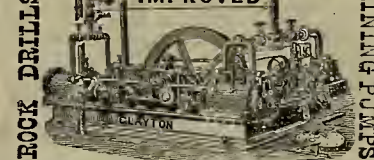
CIRCULAR

Saws.

SAW MILLS and MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

"CLAYTON" IMPROVED MINING PUMPS



AIR COMPRESSORS

For CATALOGUES, ESTIMATES, Etc. Address: CLAYTON STEAM PUMP WORKS 45 & 47 York St., BROOKLYN, N.Y. (Near Approach to New York & Brooklyn Bridge)

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT NO. 50.

Levied..... June 1, 1885
 Due in Office..... July 3, 1885
 Amount..... 40 Cents per Share
 Sale Day..... Wednesday, July 29, 1885

ALFRED K. DERBROW, Secretary.

OFFICE—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

San Francisco Savings Union,
 532 California St., cor. of Webb.—For the half year ending June 30, 1885, a dividend has been declared at the rate of four and one-half (4 1/2) per cent per annum on term deposits, and three and three-fourths (3 3/4) per cent per annum on ordinary deposits, free from taxes, payable on and after July 1, 1885.

LOVELL WHITE, Cashier.



The California Perforating Screen Co. All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for Flour and Other Mills.

Quartz Mill Screens a Specialty.

147 Beale St., San Francisco.

RICHARD C. REMMEY, Agent,
 Philadelphia Chemical Stoneware Manufactory,
 1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Brick for Glover Tower.

H. M. RAYNOR,
 No. 25 Bond St.,
 NEW YORK.

ESTABLISHED 1890. FOR ALL Laboratory —AND— Manufacturing Purposes. Wholesale and Retail. Native Platinum and Scrap purchased.

EUREKA PIPE TONGS

Beat the world for Simplicity, Durability, and Cheapness.

They fit all sizes of Pipe Nipples, Elbows, Reducers, Union Couplings, etc. Will answer for a wrench, take out and put in Stud Bolts, etc. Are light and convenient and can all be carried in one hand. No slipping or splitting pipe. Patent Right for Pacific Coast for sale. Address, GEORGE B. KOONS, Half Moon Bay, Cal.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Roe St., New York; and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorey, 529 Commercial St. S. F.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
OISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Cruci-
bles, Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

THE DIXON CRUCIBLE CO.

JERSEY CITY, N. J.

—Manufacturers of—

Dixon's Crucibles, Fine Office and
Drawing Pencils, Lubricating,
Plumbago, Axle, Machine,
Belt and Railway
Grease.

J. G. ALLEN,

Sole Agent for the Pacific Coast,

106 Davis St. (near California), San Francisco

Prices same as at Factory.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

GOLD MEDAL AWARDED

—AT—

Mechanics' Fair, 1883 & 1884

—FOR—

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
—1883—
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

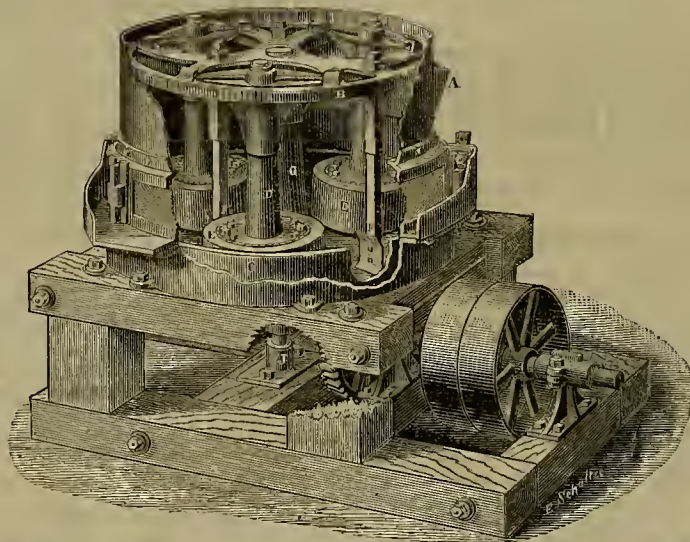
22 Fremont Street,
SAN FRANCISCO.

L. PETERSON,

INVENTORS. MODEL MAKER,

258 Market St., N. E. cor Front, up stairs, S. F. Experiment-
al machinery and all kinds of models, tin, copper and brass.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy
in Saving Gold. Economy in Transportation of Machinery.
Economy in Cost of Erection of Mill at Mine. Econo-
my in Time Required to Establish Plant
(one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of
continuous use at a number of mines in California has enabled the inventor to perfect and im-
prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and
Rice Mills, Grain and Malt Driers, Furnaces, Chases, Ce-
ment and Smut Mills, Separators, Revolving and Shot
Screens, Stamp Batteries, and all kinds of Mining and
Milling Machinery. Inventor and manufacturer of the
Celebrated Slot Cut and Slot Punched Screens Mining
Screens a Specialty, from No. 1 to 15 (fine).

Orders Promptly Executed

Metallurgy and Ores.

**SELBY
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF....

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL.

H. KUSTEL.



METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

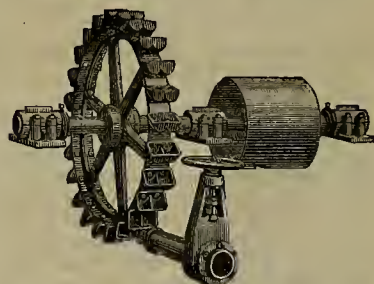
113 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO.

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent, distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

SILVER PLATED

COPPER PLATES

FOR SAVING GOLD.

California Electro Plating Works,

657 MISSION STREET,

Between New Montgomery and Third, SAN FRANCISCO.

KEATING & FAGAN, Prop'rs.

Manufacture of Soaps.

Few people have much idea of how large a quantity of soap is used in the community from day to day. Every family uses more or less of it, as even the very poorest must have it. Soap is therefore not a luxury, but a necessity, though the manufacturers of late make it in such good form, and with such pleasant perfumes that it is a luxury to use the article. Even what we call common soap is made much better than formerly. People know now-a-days what good soap is, and are bound to have it. The demand has to be met by the manufacturers in making a higher grade than was formerly the case. A visit to the New England soap factory of Fischbeck & Gloatz, out on Utah street, in this city, recently, gave the writer a new idea of the soap question. The common idea of a soap factory is a place of grease and bad smells, but in this case at least, we found it very different. The factory is a commodious one, with perfect facilities and the appliances are such that the work is conducted in a very systematic manner.

These works were established here as long ago as 1852, and when first started only the common grades of soap were made, but now upwards of 50 different brands are manufactured.

At these works they have three immense kettles or boiling vats, holding 50,000 pounds each, in which the mixture is boiled. The latest improved mixing machines are in use and are run by a steam-engine. Some \$6,000 or \$7,000 have recently been spent in enlarging the factory, until it is now the most convenient in the city. They have all the improvements, elevator, steam pipes for heating and drying, commodious packing room, box room, label room, drying rooms, etc. The lye vats are over the tanks so that the lye may be drawn off as desired. The oils and the lye are refined very carefully, much of the success depending on that. The grade of the soap depends on the refining process, as the rough stock must be well prepared. Mr. Fischbeck has had many years' experience in refining stocks, and says that as he finds people want better soap than they used to he makes it to meet the market.

As stated, many brands of soap are made here. One very successful one is the "Queen Lily," which is used for general purposes, washing or toilet. Mr. Fischbeck has built up a big trade in this brand of soap alone. It washes without rubbing and is in good demand. All kinds of toilet soap in castles, different colors and scents, are made. These are neatly put up to suit special trade. They make the German powdered soaps, washing powders, etc., also the German green soap, mostly used for dye shops, silk houses, wool houses, etc. A number of dye houses are supplied with these fine soaps. Of course large quantities of common brown soap are made, but it is of superior quality. Borax soaps are also made; in fact, there are so many brands and styles that one would be surprised to learn the variety that can be made. The trade of these works extends all over this coast. This being a pioneer factory, it has long been well-known, and lately its facilities have been greatly enlarged to enable it to keep up with the demands.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, department 10, San Francisco:

CENTRAL G. & S. M. Co., June 29.—Location, Pima Co., Arizona.—Capital Stock, \$10,000,000 in 100,000 shares. Directors—Timothy P. Riordan, Christian C. E. Russ, John Crockett, James Newlands and H. B. Tiffany.

EMMA G. & S. M. Co., June 29.—Location, Pima Co., Arizona.—Capital Stock, \$10,000,000 in 100,000 shares. Directors, T. P. Riordan, C. E. Russ, John Crockett, James Newlands and H. B. Tiffany.

COMBINATION RAILROAD CAR AXLE CO., June 30.—Object to sell the Combination Railroad Car Axle to purchase and manufacture rolling stock, acquire patent rights, etc.—Capital Stock, \$10,000,000.—Directors, Patrick Connolly, Philip McGovern, John Martin, J. C. Hamill, Arthur J. Hartford and Augustus Laver.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.			
COMPANY.	LOC.	N. NO.	AMT. LEVIED. DELINQ'T. SALE.
Aultman M & M Co.	California.	2.	01. June 15. July 20. Aug 10. J. M. Buffington.
Baker Divide M Co.	California.	9.	25. May 12. June 15. July 6. D. M. Kent.
Best & Belcher M Co.	Nevada.	32.	50. June 2. July 9. July 25. W. Willis.
Chollar M Co.	Nevada.	16.	50. May 11. June 24. July 15. C. E. Elliott.
Con Imperial M Co.	Nevada.	22.	15. May 25. July 10. Aug 5. W. L. Oliver.
Caledonia M Co.	Dakota.	15.	01. June 17. Aug 13. Sept 17. A. L. Perkins.
Copper Mt Con M Co.	California.	2.	01. June 17. Aug 13. Sept 17. A. L. Perkins.
Con Reforma L & S M Co.	Mexico.	6.	40. July 1. July 31. Aug 17. T. S. Gifford.
Entracht Gravel M Co.	California.	18.	05. May 19. June 20. Aug 11. D. A. Smith.
Endowment M Co.	Nevada.	5.	50. May 19. June 20. Aug 11. D. A. Smith.
Golden Gate M & M Co.	Nevada.	2.	25. June 11. July 14. Aug 1. R. Hewston.
Gould & Curry M Co.	Nevada.	53.	40. June 1. July 8. Aug 3. A. K. Durbin.
Gold Canyon M Co.	California.	1.	23. June 10. July 18. Aug 4. F. A. Berlin.
Homeward Bound M Co.	California.	4.	25. June 12. June 20. Aug 11. D. A. Smith.
Johnson Gravel M Co.	California.	1.	05. July 1. Aug 5. Aug 25. G. W. H.
Murchie M Co.	California.	9.	13. June 24. Aug 7. Aug 31. W. L. Oliver.
Mayflower Gravel M Co.	California.	30.	40. June 4. July 20. Aug 11. J. Morio.
Mono M Co.	California.	22.	50. June 17. July 22. Aug 11. G. W. Sessions.
Pay Day M Co.	Nevada.	3.	02. June 6. July 14. Aug 10. W. Van Bokkless.
Potosi M Co.	Nevada.	18.	30. May 13. June 19. July 10. C. E. Elliott.
Peaceful M Co.	Arizona.	4.	30. May 18. June 23. July 17. A. Waterman.
Sierra Nevada M Co.	Nevada.	82.	25. June 9. July 14. Aug 1. J. W. Parker.
Starlight M Co.	California.	2.	05. June 25. Aug 1. Aug 24. C. E. Hayes.
Silver Hill M Co.	Nevada.	22.	10. July 1. Aug 4. Aug 24. E. B. Holms.

MEETINGS TO BE HELD.			
NAME OF COMPANY.	LOCATION.	SECRETARY.	MEETING.
Best & Belcher M Co.	Nevada.	W. Willis.	309 Montgomery st. Annual. July 13
Belmont M Co.	Nevada.	J. W. Heath.	310 Pine st. Annual. July 13
El Dorado S. M. Co.	California.	D. M. Kent.	330 Pine st. Annual. July 6
Live Oak Gravel M Co.	California.	C. Callischo.	328 Montgomery st. Annual. July 7
Savage M Co.	Nevada.	E. B. Holmes.	309 Montgomery st. Annual. July 16
Union Con M Co.	Nevada.	J. M. Buffington.	301 California st. Annual. July 24
Utah S. M. Co.	Nevada.	A. H. Fish.	309 Montgomery st. Annual. July 7

LATEST DIVIDENDS—WITHIN THREE MONTHS.			
NAME OF COMPANY.	LOCATION.	SECRETARY.	AMOUNT.
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery st. 06. Mar 16
Mt Diablo M Co.	Nevada.	R. W. Heath.	318 Pine st. 20. June 30
Nevado M Co.	Nevada.	J. W. Heath.	310 Pine st. 25. Feb 13
Plymouth Con G M Co.	Nevada.	W. Van Norden.	Pres. 23 Nassau st. N. Y. 50. Apr 6
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery st. 25. Feb 16
Syndicate M Co.	Nevada.	J. Stoddard.	419 California st. 10. May 5

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.		Red Bluff.		Sacramento.		S. Francisco.		Los Angeles.		San Diego.	
	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.
June 25 July 1	...	...	...	...	...	...	...	...	...	...	...	...
Thursday	.00	69 S	.00	80 S	.00	76 S	.00	62 W	.00	79 SW	.00	70 SW
Friday	.00	75 S	.00	83 NW	.00	77 NW	.00	65 SW	.00	80 W	.00	69 W
Saturday	.00	74 NW	.00	93 N	.00	84 S	.00	60 W	.00	83 W	.00	72 SW
Sunday	.00	76 S	.00	93 NW	.00	84 SE	.00	62 SW	.00	55 W	.00	72 SW
Monday	.00	77 N	.00	86 S W	.00	81 SW	.00	63 SW	.00	77 W	.00	61 S
Tuesday	.00	71 S	.00	92 W	.00	80 SW	.00	62 W	.00	69 SW	.00	72 SW
Wednesday	.00	71 NW	.00	91 S	.00	79 SW	.00	67 W	.00	74 SW	.00	71 SW
Totals	.00	...	.00	...	.00	...	.00	...	.00	...	.00	...

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy. foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Mining Share Market.

The stock boards did not do their usual six days' work this week, the holidays shortening the time. It was just as well, however, as the volume of business has been small and prices far from satisfactory. Considerable ore has been sent to mills from Hale & Norcross, but none has passed under the stamps as yet; therefore, the real bullion yield and value of it of course is not definitely ascertained, but it is all good, free-milling ore, easily reduced, and should yield \$60 per ton or more. In fact, numerous daily assays indicate a much higher yield, average car samples being from \$80 to \$100 per ton during the past week. The *Enterprise* says: The fact of it is that the stock market is so sensitive that the least strike of water or porphyry met with scares all the small stockholders out of their great American wits, and the general desire to realize and be on the safe side, causes the most timid of stockholders to dump in their stocks, thus causing a general panic, as it were. Of course, as already stated, this may not prove to be a veritable bonanza, but there is every mineralogical and geological promise that it will. Stockholders, small or great, should be patient, same as Job used to be, and hold firm until the true merits of the situation can be fairly and squarely demonstrated. The Hale and Norcross management are doing their best to show a real paying mine, and to that end are utilizing what pay ore they have in sight, while sinking deeper and exploring elsewhere for more and better ore. All the other mines along the lode simply record usual progress, with no features of special interest.

Bullion Shipments.

Mt. Diablo, June 30, \$10,495; Richmond, Con., 24; \$23,659; Zelia, 22, \$1,344; Lexington, 22, \$1,984; Alice, 22, \$17,360; Moulton, 22, \$15,376; Hanauer, 23, \$2,400; Mayflower, 23, \$3,450; Ontario, 25, \$24,754; Hanauer, 25, \$5,200; Queen of the Hills, 25, \$1,300; Hanauer, 26, \$2,700; Queen of the Hills, 26, \$2,500; Crescent, 27, \$1,960; Hanauer, 27, \$2,700; Chrissy, 27, \$1,780; Honerine, 27, \$5,425; Hanauer, 28, \$4,100; 29, \$2,600. The banks of Salt Lake City report the receipt for the week ending June 24th, inclusive, of \$80,228.95 in bullion, and \$12,350 in ore; a total of \$92,758.95.

THE GEOLOGICAL SURVEY.—The coming fiscal year's work of the geological service has been mapped out and the plans have been approved by Secretary Lamar. Topographical parties will continue work already begun in Massachusetts and New Jersey, whither they have been invited by the State authorities, which co-operate with the Government to the extent of defraying one-half the expenses of the survey. The mapped areas of coal and iron bearing regions will be considerably enlarged. These are three in number, namely, the Appalachian district, extending from Maryland to Georgia and Alabama; portions of Missouri, Kansas and Arkansas, and a portion of Texas. Geographical surveys will also be continued in Arizona, New Mexico, California, Oregon, Montana and Idaho, and in the Yellowstone Park. Several astronomical parties will also be sent out to establish starting points for new surveys to be begun next year.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 11.	WEEK ENDING June 18.	WEEK ENDING June 25.	WEEK ENDING July 2.
Alpha.	1.10	1.70	1.80	1.80
Alta.	.50	.50	.50	.50
Andes.	.55	.60	.60	.60
Argenta.	.10	.10	.10	.10
Belcher.	1.10	1.40	1.20	1.50
Bell.	3.70	3.95	2.45	3.75
Best & Belcher.	.40	.50	.35	.40
Bullion.	...	...	...	...
Bonanza King.	...	...	...	...
Belle Isle.	...	...	...	...
Bodie Con.	2.25	1.50	2.20	2.20
Benton.	1.55	.15	.40	1.35
Bodie Tunnel.	...	...	...	...
Bulwer.	.45	.50	.45	.55
California.	2.50	3.45	1.90	3.25
Obalence.	...	...	...	...
Champion.	2.25	2.65	1.45	2.50
Chollar.	...	...	...	...
Confidence.	...	...	...	...
Con. Imperial.	...	...	...	...
Con. Virginia.	2.50	3.45	1.90	3.25
Con. Pacific.	...	...	...	...
Crown Point.	1.40	2.30	1.25	1.90
Day.	...	...	...	...
Eureka Con.	7.87	7.55	8.00	7.00
Eureka Tunnel.	...	...	...	...
Exchequer.	.35	.40	.25	.45
Grand Prize.	...	...	...	...
Hale & Norcross.	7.12	8.25	7.60	9.87
Holmes.	4.75	5.00	...	...
Independence.	...	...	...	...
Julia.	...	...	...	...
Justice.	.15	.25	.15	.20
Martin White.	...	...	...	...
Mono.	1.60	1.40	.80	1.25
Mt. Diablo.	1.15	1.80	1.25	1.90
Northern Belle.	...	...	...	...
Nevado.	.85	.90	.85	1.00
Northern Belle.	...	...	...	...
Occident.	1.50	1.60	1.50	1.75
Ophir.	2.00	2.75	1.00	2.25
Overman.	.40	.65	.40	.75
Potosi.	.85	.95	.95	1.05
Princeton.	4.00	4.80	2.75	4.60
Seg. Belcher.	1.50	2.60	1.35	2.05
Sierra Nevada.	...	...	...	...
Silver Hill.	...	...	...	...
Union Con.	1.30	1.80	1.15	1.85
Utah.	2.40	3.00	2.50	3.25
Yellow Jacket.	2.70	2.80	2.35	3.10

Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 2.	950	Gould & Curry.	1.65@1.70
50 Alta.	50c	Hale & Norcross.	.72@.8
50 Andes.	50c	Justice.	.15c
530 B. & Belcher.	1.85	160 Mexican.	.95c
100 Bullion.	35c	150 Ophir.	1.30
100 Bodie Con.	1.40	215 Potosi.	1.00
100 Chollar.	.55c	600 Savage.	3.35@3.40
900 Bulwer.	1.80@1.85	1000 Sierra Nevada.	1.05@1.10
500 Cal. & Cal.	1.80@1.85	20 Union.	.90c
100 Caledonia.	.15c	30 Yellow Jacket.	2.00

THERE is said to be great excitement in Union county, Eastern Oregon, over the discovery of rich placer mines. Some say the reports of the richness of the diggings are circulated and exaggerated by the Oregon Short Line railroad, which wants another Cœur d'Alene boom. The diggings are in the Eagle Creek mountains near the junction of the Powder and Snake rivers. The nearest point on the railway is at Durkee or Baker City, distant 30 miles. A wagon road runs within eight miles of the scene. The new camp is known as Pine Valley, and parties are pouring in at the rate of 50 a day. The diggings consist of placer and quartz.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTELL—California.
A. C. KNOX—Ventura and Los Angeles Co's.
G. W. INGLETS—Arizona.
E. F. RICHARDS—San Diego Co.
F. W. SMITH—El Dorado and Placer Co's.
W. B. TURNER—Oregon.
GEO. McDOWELL—Fresno and Tulare Co's.

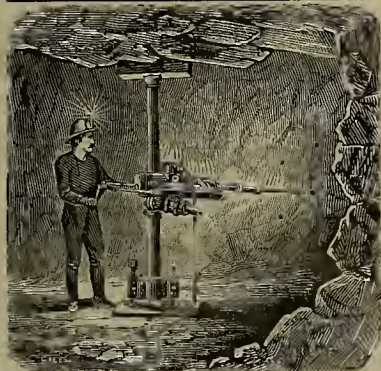
COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!
We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.
CHICAGO PLATING COMPANY, 21 Stevenson Street.
JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St., San Francisco, Cal.



INGERSOLL ROCK DRILLS ...AND... AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,
PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.
Punching and Shearing Machinery for Hydraulic Pipes.
SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.
221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.
NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.
ELECTRIC VOLTAIC AMALGAMATORS.
ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor, SAN FRANCISCO, CAL. Room 5, First Floor, BOSTON, MASS.

PYROMETERS



GAUNTLETT'S, HOBSON'S, and STEINER'S
PRESSURE GAUGES
Hot-Well THERMOMETERS
ANEMOMETERS
SAFETY LAMPS
BAROMETERS
SALINOMETERS
Mining and Meteorological
Instruments of every description.
List and Description of our Ten Catalogues sent free on application.

JAMES W. QUEEN & CO.
924 Chestnut St. Philadelphia

San Francisco Cordage Factory.
Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.
Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

HEINE PATENT SAFETY BOILER. RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

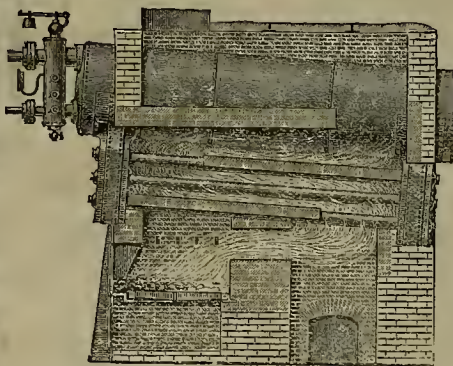
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Borax Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.

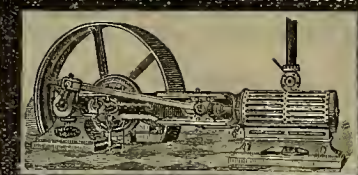


Send for Circular and Prices.

THE CUMMER ENGINE CO.

CLEVELAND OHIO

SEND FOR 150 PAGE ILLUSTRATED CATALOGUE



Awarded highest premiums at Cincinnati and Louisville Expositions of 1883, for "Best Automatic Engine." We will furnish anyone copies of the ORIGINAL ENTRIES of several engine builders who claim they were not competing with us. They all entered in the same class with us, and now by deceptive Circulars (one headed "Act versus Falsehood") attempt to mislead. No premiums were offered for Condensing Engines.

AUTOMATIC

JOSHUA HENDY MACHINE WORKS Agents for the Pacific States, 49 & 51 Fremont St. San Francisco.

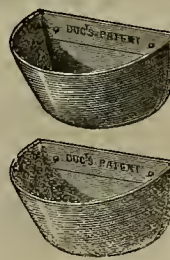
THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.
Extra Strong and Very Durable.
Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.
IRON CLAD MANUFACTURING CO.,
22 Cliff Street, New York.

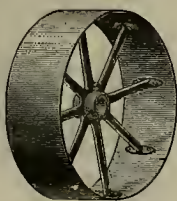


THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

For Sale by DUNHAM, CARLIGAN & CO., San Francisco, Cal. | Manufactured only by JENKINS BROS., 71 John St. New York.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.
CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON.

**THOMPSON BROTHERS,
EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works, WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF—

Steam Engines, Flour Mill, Mining, Saw Mill and Dredging Machine

Brodie Rock Crushers, Steam Power, Hydraulic, Side Walk and Hand-Power ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

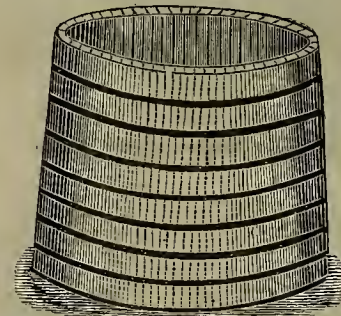
STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets, SACRAMENTO, CAL.

WATER TANKS.



Our well-known Water Tanks are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

WELLS, RUSSELL & CO.,

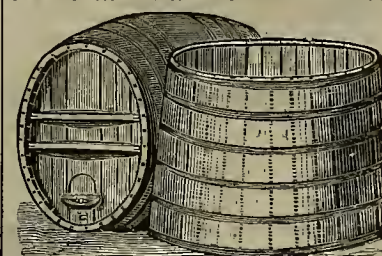
Proprietors Mechanics' Mills

SAWING, PLANING AND GENERAL MILL WORK.

Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!

CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,

30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

Dewey & Co. { 252 Market St. } Patent Ag'ts

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

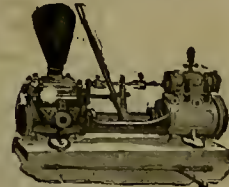


Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,



Knowles Steam Pump
The Standard.

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE,

Flat and Round, of the best material and workmanship. Large Stock always on hand. Special sizes made to order.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper and Steel, all kinds, and meshes from 1 to 10,000 to the square inch.

WIRE FENCING

Of various designs for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS,

BRANCHES—Sacramento, Los Angeles and Portland.

No. 329 Market Street, Cor. Fremont, San Francisco, Cal.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS; RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Flow Steel, Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero, P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

DOW STEAM PUMP WORKS.

DOW'S IMPROVED
STEAM PUMPS

—AND—

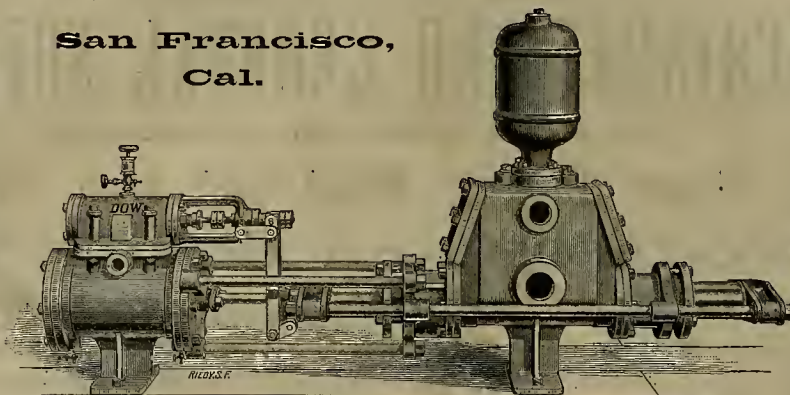
Pumping Machinery

—FOR—

EVERY POSSIBLE DUTY.

Correspondence Solicited.

San Francisco,
Cal.



COMPOUND PUMPING
ENGINES,

Condensing and Non-Condensing,

—FOR—

WATERWORKS,

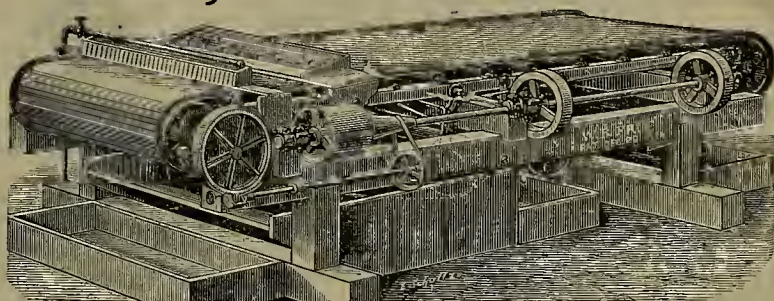
MINING PURPOSES,

IRRIGATION, Etc.

WORKS: 114 and 116 BEALE ST.

Call or Send for Catalogue.

\$1,000 CHALLENGE!



THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. Thoro will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement patents owned by them.

Protected by patents May 4, 1883, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

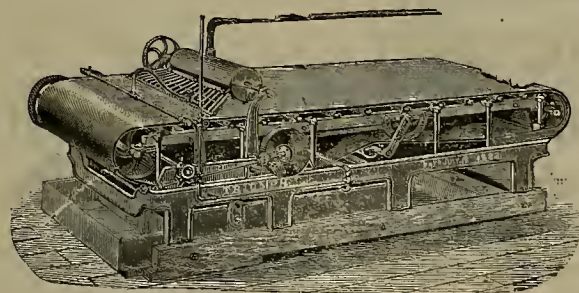
Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.

THE "TRIUMPH" TRIUMPHANT!



THE
"TRIUMPH" ORE CONCENTRATOR.

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$3.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

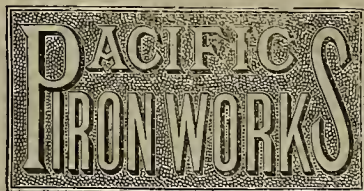
We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.



1850. 1885.
RANKIN, BRAYTON & CO.,
...BUILDEES OF...
MINING MACHINERY.

San Francisco: Chicago: New York:
127 First Street. 100 N. Clinton. 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

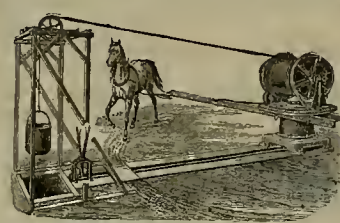
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JULY 11, 1885.

VOLUME LI.
Number 2.

Continuous Coarse-Ore Quicksilver Furnaces.

Among other furnaces at the New Almaden Quicksilver Mines in this State is a pair of duplicate structures, with some improvements of detail on the continuous coarse-ore furnaces introduced at Idria, Austria, by Bergrath Exeli, from the model of the old Rumford lime-kiln. They are coarse-ore shaft-wasting furnaces, with exterior firing, and are represented in the accompanying engraving. The description we take from the elaborate and well-written paper prepared by S. B. Christy, of the University of California, for the American Institute of Mining Engineers.

As will be seen from the horizontal sections and top view, the lower half of the furnace is a regular hexagon, with abutments at the alternate sides. These abutments contain the fire, ash and draw-pits. Vertical section *AB* shows this still more clearly. Each abutment has on its face a fire-door and an ash-pit door, which latter also commands the discharge-door for the spent ore. The spent ore, after being drawn from the cooling pit of the shaft into the ash-pits, is left there until its lumes are exhausted, and is then drawn into the slag-cars through discharge-doors. These discharge-doors are placed on the side of each of the three abutments, lower down than the ash-pit doors. One of them is shown on the side of the abutment seen in the elevation.

The upper half of the furnace is cylindrical. It is closed at the top by a flat dome which contains the charging apparatus in the center. The fumes of the furnace are removed from the vapor-chamber at the top of the shaft above the surface of the ore, by means of iron pipes 12 inches in diameter. In No. 9, there are three of these discharge-pipes, one of which is placed at the top of the shaft on the side opposite each fire-place. In No. 7, there are, in addition, three others placed at the top of the shaft, one above each fire-place. By means of short cast-iron pipes, these bores are connected with a cast-iron down-take by means of a rectangular system of pipes which encircles the head of the furnace. These pipes, inclined downwards at an angle of 10°, lead into the condensers. To keep the pipes clear of soot, they contain small disks of iron. These disks are moved by iron rods, passing through stuffing-boxes at the angles of the pipe-system. They are only occasionally used, and the piston rods are luted with clay when not in use.

The shaft itself is a cylinder, 6 feet interior diameter, by 11 feet, 3 inches high, joined to the frustum of a cone 8 feet deep, contracting to a diameter of 4 feet at the bottom. Along the sides of the cylindrical part of the shaft, opposite each of the fire-places, are placed a series of 4 peep-holes. These, ordinarily closed gas-tight, are used to determine the height of the ore-column and its temperature.

The fire-places and discharges have the details common to well-designed continuous shaft roasting-furnaces of this type. The shaft and fire-places are lined with fire-brick; the rest of the furnace is of red brick, with the usual expansion-space between.

The entire structure rests on a slightly cone-shaped iron plate which crowns the foundation. This causes any quicksilver that might permeate the masonry to flow to the center of the furnace-bottom where provision is made for receiving it. Experience shows, however, that this pre-

caution is hardly necessary, as no metal has ever reached it.

The lower half of the furnace is inclosed by cast iron plates, bolted and cemented with rust-joints. The cylindrical part has a jacket of 4-inch sheet-iron; and a cast iron top-plate crowns the whole, and makes the furnace vapor-tight. The charging apparatus consists of a combi-

into the hopper, and the cover is lowered into place. The charge is then allowed to warm in the hopper, till it has nearly assumed the temperature of the top. This is done to avoid chilling the fumes and condensing them in the furnace by contact with cold ore. At the proper time, an equal volume of spent ore having been meanwhile drawn below into the ash-

follows: When first started for a campaign, they are filled above the level of the fire-places with spent ore, and then with ore to just below the level of the uppermost peep-hole. This level is never exceeded; so that there is always above the level of the ore a vapor-chamber, at least three feet high, containing 140 cubic feet, in which the fumes collect before passing out of the exit-flues. With the ore when charged there is mixed 1½ per cent of coal, charcoal, or coke, to assist in raising the temperature at the top of the furnace and to keep the ore-column more open. A good fire of pine or oak is maintained in each of the three fire-places. The charge of 1,600 pounds of ore and 24 pounds of coke or other fuel, previously weighed on the ore-scale, has been placed in the hopper. As soon as the lower peep-hole shows a dull cherry red, a quantity of spent ore is drawn into the ash-pits, the new charge is lowered into the furnace, and the hopper is refilled as before described.

The spent ore is allowed to remain in the ash-pits, discharging any fumes that may be still retained, back again through the fire-place into the furnace. At the end of this period it is drawn through the side doors of the abutments into the "slag" cars. Another charge, equal in volume to the new charge, is again drawn through the discharge bores of the shaft into the ash-pit, and then the new charge is dropped from the hopper into the furnace. This series of operations goes on every two hours as long as the campaign lasts.

At this rate these furnaces roast 9 3-5 tons per 24 hours, and, as by actual experiment they hold 21 tons, it takes 52 1-5 hours for a charge of ore to pass through the furnace. The capacity of these furnaces might easily be increased by drawing and charging more frequently or in greater quantities, and with poor ores this would be advisable; but with the rich ores (6 to 8 per cent) now treated in these furnaces, experience has led to the above practice.

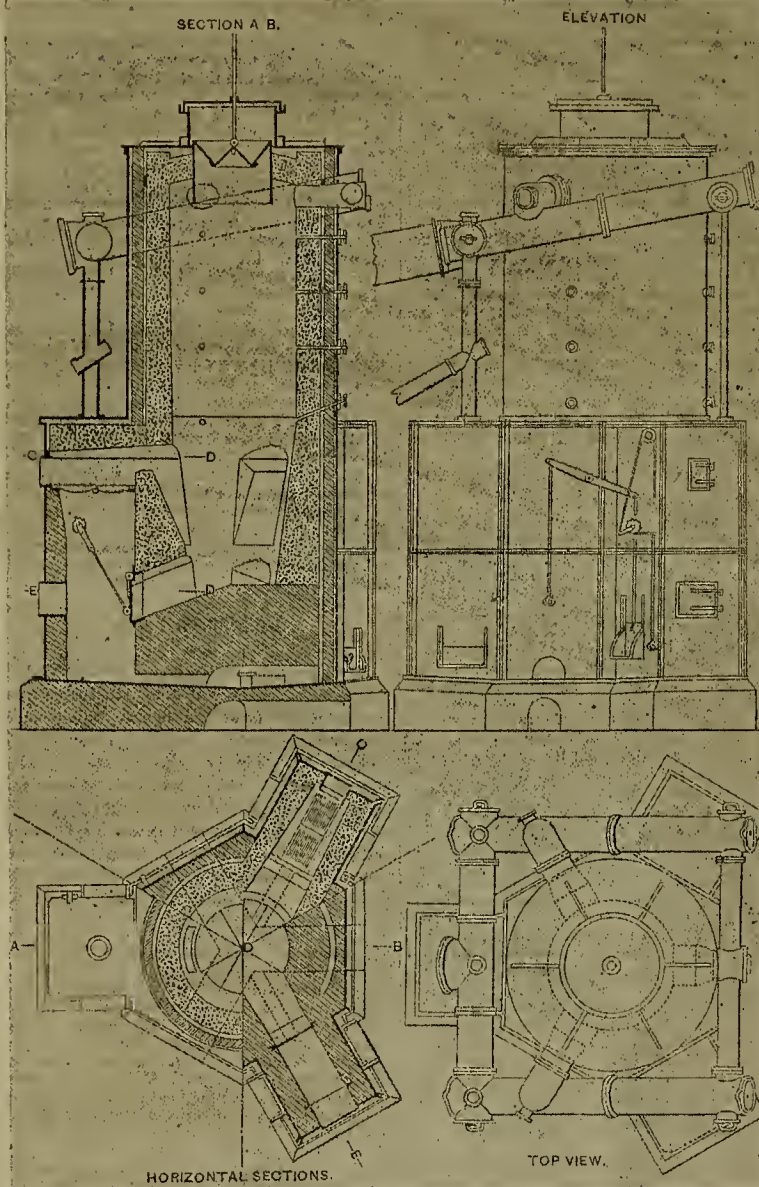
The amount of labor required for these furnaces is very small. Two men per shift of 12 hours charge and discharge both of them.

In Mr. Christy's paper very elaborate tables are given, showing cost and results of work with these furnaces for a year. The total amount of ore treated, of quicksilver produced and the expenses, are given; also, the expense per day and per ton for each furnace and the average for both.

THE FIELD FOR PROSPECTORS.—For prospectors, says the *Scott Valley News*, we know of no better fields in the whole State of California than can be found in the belt of mining district lying between the Oregon State line on the north and Trinity county on the south, extending from Shasta on the east to Del Norte on the west. In this belt of country the placer mines, nearly all of them, have been rich, which goes to show that rich quartz is near at hand. Taking all things into consideration, we have no hesitancy in saying that here is the place which promises a prosperous outlook to the genuine and energetic prospector.

The Cour d'Alene mines seem to be making a very good showing, now that the wild stampede or crazy boom, or whatever it may be termed, is over, and the people have settled down to honest, practical mining.

OVER \$18,000 in gold dust was shipped from Auburn, Placer Co., in June.



IRON CLAD CONTINUOUS SHAFT FURNACE FOR QUICKSILVER ORE.

nation of devices used in iron-smelting, viz., the hanging cylinder, and cup, and cone. But, owing to the value and poisonous nature of quicksilver fumes, an additional cylinder and cover, with water or sand-joint, is introduced above the other devices (section *AB*). The rod moving the cone passes gas-tight through a stuffing-box in the center of the cover, and is attached to a balance-weight. The cover itself is also attached to balance-weights by two chains passing over pulleys. The charging is thus easily effected without exposing the men to the fumes. The cover is lifted; a charge of ore and a little fuel is dumped from the ore-car

pits, the cone is lowered and the charge dropped into the furnace. The small quantity of fumes that escapes into the space between the cup and cover is allowed to cool a few minutes, and the cover is again lifted and a new charge is added to the hopper.

These furnaces were erected under the immediate supervision of Mr. H. J. Huttner. The details of construction are throughout excellent; they work admirably, and, although they have been in almost continuous operation for nearly ten years, they have required hardly any repairs.

The mode of operating these furnaces is as

Treatment of Nickel-Cobalt Mattes.

Mr. James W. Neill, of Mine La Motte, Mo., read before the American Institute of Mining Engineers, some notes on the treatment of nickel-cobalt mattes at that mine, which are of general interest.

The occurrence of minerals of nickel and cobalt at Mine La Motte is probably known to every mineralogist. I will not attempt to describe these minerals, but before entering on my subject, will briefly mention the ores, etc., which call for metallurgical treatment and enter into the composition of our mattes. Our staple lead-ore, the dressed galena, is the chief source of nickel and cobalt. It carries but a small percentage of these metals, viz., 0.2 to 0.3 per cent usually, though when much copper pyrites is contained in the gangue, the amount of nickel and cobalt may be as great as 1.0 to 1.5 per cent. Next in importance is the "middle product" of the dressing works, consisting of the sulphides of iron (and copper) with gangue and galena. This usually carries 20 to 23 per cent of lead, 0.5 to 1.0 per cent of copper and 2.5 to 3.5 per cent of nickel and cobalt. A larger percentage of copper always carries with it an increase of nickel and cobalt. In some few cases 12 to 15 per cent of copper gives 6.5 to 8.0 per cent of these metals. Besides these products of the dressing-works, there is a small quantity of true nickel-cobalt ore produced, which, averaging only 1.0 to 2.5 per cent, has until lately been of small importance. Through recent developments in the deeper workings, where the nickel, cobalt and copper sulphides occur disseminated (but separate from one another) in a porous sandstone, the amount of this ore has been largely increased.

The dressed galena we roast in reverberatory furnaces, treating from 6 to 8 tons per 24 hours, and leaving from 5 to 7 per cent of sulphur in the charge. This is then treated in the shaft-furnace with fluxes, producing lead, "first matte" and slag. The "middle product" is also roasted in the same furnaces (leaving from 8 to 10 per cent of sulphur), and is then used in part as iron-flux in the lead-smelting, where it can only be employed in small quantities, lest it should raise too much the percentage of sulphur in the charge, and also give mechanical trouble from its fineness. Where these sulphides are rich in copper and nickel-cobalt, they are roasted and smelted separately, producing a rich matte.

The first matte formed, as above remarked, from lead-ore with sulphides as flux, etc., carries usually from 3 to 3.5 per cent of nickel and cobalt (about 2 nickel or 1 cobalt), 0.5 to 1 per cent of copper, and 20 to 25 per cent of lead. After a period of exposure to the weather, which slacks it more or less thoroughly, it is broken with hammers to fist-size and roasted in a reverberatory having a 45-foot by 12-foot hearth. This furnace produces from $\frac{1}{2}$ to 6 tons of roasted material in 24 hours, leaving about 5 per cent of sulphur in the charge. It burns from 4 to 6 cords of wood, and is served by 6 to 8 men, according to the amount produced, etc.

This roasted first matte, when accumulated sufficiently, is used as iron flux in smelting the lead-ore, producing lead, "second matte" and slag. The second matte should carry, if no losses occurred, at least double the quantity of nickel and cobalt contained in the first; but experience has proved that the more thorough the roasting of the first matte, the greater the loss of nickel and cobalt in the slag; i. e., the better the matte is as an iron-flux, the worse the concentration. I have found from 5 to 6 per cent of sulphur in the first matte to be the best limit. This does not make a very good flux, but the losses are smaller.

Slags from This Matte-Lead Smelting
Having shown as much as 0.7 per cent of nickel and cobalt, I made one campaign, as an experiment, on this roasted first matte alone, using acid fluxes, and expecting to produce a matte rich enough to warrant shipment. But the resulting matte, carrying 12 to 15 per cent of nickel and cobalt and 25 to 30 per cent of lead, was made at such expense for labor and fuel, that we returned to the old method.

The second matte, carrying from 3.5 to 6.5 (usually 5 to 6) per cent of nickel and cobalt, 25 to 30 per cent of lead and 1.0 to 2.0 per cent of copper, are roasted in the same manner as the first mattes, but not so sharply, the roasted charge retaining from 7 to 9 per cent of sulphur. This high percentage is necessary to protect the nickel and cobalt, which, if entirely deprived of sulphur, will largely enter the slag, even though the sulphur-contents of the charge be sufficient to "cover" them. Of course, in the subsequent smelting, the matte produced is high in lead. It will thus be seen that in this process the lead works against the concentration of the nickel and cobalt.

Until recently, the roasted second matte was smelted with acid fluxes (such as sandstone, old acid slags, etc.) and limestone. The resulting "third matte," after crushing and packing in barrels, was shipped to Europe. This smelting was done in the lead-ore furnace, which is circular, 45 inches in diameter at tuyeres, 6 feet at charge-door and 12 feet high. It proved too large for the purpose. The charge being very low in lead, and of the lead present, very little being reduced, the lead always froze in the basin and "well," thus increasing the percentage of lead in the matte by imper-

fect mechanical separation in the slag-pots. Four per cent of lead was the highest we produced from the second matte by this process. The resulting third matte usually carried from 35 to 40 per cent of lead, 12 to 15 to 17 per cent of nickel and cobalt, and 3 to 5 per cent of copper. The slags would average 2.25, and often 1.75 per cent of nickel and cobalt, and 2 to 2.5 per cent of lead. The losses in the slags were large; and, moreover, by shipping this matte, the lead contents (35 to 40 per cent) were lost, since the buyers do not pay for lead.

An Attempt to Concentrate

This matte further by melting it in a reverberatory furnace, was made some years ago, but was not a success, the resulting (granulated) matte being higher in lead than in direct proportion to the amount of iron which had been slagged off, while the slag carried 5 per cent of nickel and cobalt, and 5 per cent of lead. I am told that formerly some lead was regained from the matte, by an addition of metallic iron to the molten matte in this furnace; but I found this to be impracticable, the expense of iron, labor and fuel being far above the value of any lead regained.

In this state of affairs I advised the trial of arsenic as a means of separating nickel and cobalt from the lead by making speiss; and after much discussion of arsenic ores, speiss, etc., we bought 13 tons of mispickel-ore (carrying 23 per cent of arsenic) from the Canada Consolidated Gold Mine of Marmora, Ont. With this we smelted in the large furnace some 35 tons of a roasted matte, carrying 12.5 per cent of nickel and cobalt; the furnace basin, as usual, chilled; and the resulting speiss and matte did not separate perfectly in the pots. The clean speiss regained, carried 36 per cent of nickel and cobalt and only six per cent of lead. The matte was still high in lead (35 per cent); but it carried 19 per cent of nickel and cobalt. The slag was unsatisfactory, carrying many shots of matte, and was all returned to the furnace. No analysis was made of it. The lead produced carried some 3 oz. gold and 3 oz. silver per ton. There was a large loss of arsenic in the fumes, probably carried off by the sulphur, as the gases at times looked yellowish, at times red.

This experiment, though financially not successful, proved satisfactorily that arsenic would separate the nickel and cobalt from the lead, and would prevent large losses in the slags. It showed, also, that the lead-furnace was too large. Before making further experiments, we built a smaller and more suitable furnace, 30 inches square at the tuyere-line, 48 inches at the charge-door, and 6 feet, 6 inches between these points, with 18 inches depth of basin, lead-well behind, fore-hearth (or sump), three tuyeres, no jackets, sides of 9-inch fire-brick, cooled by irrigation.

For our next experiment, we bought some Low-Grade Speiss.

A hand-sample of which had the following composition: silver 3, ounces per ton; gold, 0.04 per ton; lead, 5 per cent; copper, 3 per cent; arsenic, 12.5 per cent. (antimony not determined); iron, 55 per cent. With this speiss, I smelted a second matte, carrying in percentage 23 of lead, 1 of copper, 6 of sulphur, 5.28 of nickel and cobalt and 35 of iron. As an acid flux, some of the nickel-cobalt ore previously mentioned, was employed. This carried 77 silica, 2 nickel and cobalt, 2 copper and lime, per cent. After the first few shifts, the fumes of arsenic, which at first were strong, almost disappeared; the lead (or rather bullion) ran freely and remained hot throughout; the slag was much higher in silica than calculated (owing probably in part to corrosive action on the fire-brick walls), but was fair in appearance and separated nicely from matte and speiss; and these also separated well in the pots. The slag carried one per cent of lead (wet assay) and 0.78 per cent of nickel and cobalt. The amount of speiss made was much larger than calculated (owing to the larger percentage of antimony in the purchased speiss), and, of course, the percentage of nickel and cobalt was lower than expected, viz., 14.5 per cent, while the lead amounted to 12 and the copper to 5.8 per cent. The matte produced carried only 5.14 per cent of nickel and cobalt, 5 per cent of copper and 13 of lead, was thus too poor to ship (as was desired) and will be treated with the next lot. The lead produced amounted to 26 per cent of the matte used, showing that the speiss sample did not justly represent the pile. This lead carried per ton, 9 ounces silver and 0.1 ounce gold, and netted us enough to pay all expenses of smelting and leave a decent margin. After running ten days, the brick walls of the furnace were nearly eaten through, in spite of the water; and, as other work was pressing, I blew down; but we have now ordered a set of water jackets, and expect to blow in again on their arrival.

This last experiment has conclusively proved that the old method must be abandoned, certainly, for the treatment of the second matte; whether it will not be more economical to treat the first matte also with speiss, remains for future experiment to determine. The same may be said of the "middle-product" sulphides.

Whether the nickel-cobalt speiss produced can be advantageously treated here, either by using it again as arsenic-surrogate in the blast-furnace with further first or second matte, or by concentrating in the reverberatory-furnace, is also a question for future solution.

The Russian Government has increased the tariff on imports from 10 to 12 per cent.

The Evil Genii of Mining Camps.

The evil spirits of mining camps are the locator, the bonder and the crank. Now, we propose to give the natural history of these odd geniuses separately, because, though they all work evil, they have different ways of working.

The locator is the man who locates every vein, seam and quartz boulder he finds, and holds the same to the detriment of the honest prospector, who is met at every turn by locations, which are usually simply a notice without any monuments on the claim, and very seldom does the locator take the trouble to have his location recorded, and he never is guilty of any such folly as to work his location, and holds it like a dog in the manger, by location and relocation from year to year, always asking enough for his claim to buy a good mine. Now, we think the man who takes possession of a few quartz holders or the croppings of a vein, and does no work, has earned nothing and deserves nothing; but the honest miner, who works a mine and develops it, is a benefit to the district and the State. We are tired of these locators, who are holding the mines of the county without working them, and whose only object is to sell them to some tender-foot, just as the boys trade jack-knives, "unsight, unseen."

The next evil genius is the bonder, who is, in mining matters, the middleman. He is generally an adventurer, of good address, who knows a little of the technical terms of the craft, and has that mysterious something—a "company"—to back him. He is well versed in the slang terms of the mines, and can talk learnedly of stopping, sinking, raising, concentration, amalgamating, etc., and generally this is as far as his knowledge goes. He mines well—in a bar-room; but if he attempts it practically, he makes a failure, always. He is the villain of the play. The locator gets his claim, and the bonder catches the company, and generally makes the lion's share of the money. The bonder generally makes his game by showing a lot of rich specimens, or by the "traditions" of the camp about rich ore in the mine. He tells how Mexicans, or the early prospectors took out rich ore, etc., and draws largely on his imagination for his facts.

The last is the crank, who is of "imagination all compact," and sees more millions in a barren quartz vein than the Bank of England can hold. A color of gold looks as large to him as the full moon, and in his calculations he has not the slightest regard for the decimal point, for \$5,000 becomes, in his mind, \$50,000. A small bunch of quartz is, to him, a big bonanza, and he sees, with all the second sight imagination, untold wealth in the bowels of the earth, and generally dies the victim of his own fancies; for these cranks will starve to death rather than sell these treasures of their imagination.

These three evil spirits are, truly speaking, parasites and non-producers. They are clogs on the wheels of mining progress, and want to be, metaphorically speaking, sat down upon by all honest miners.—*Tuolumne Independent.*

Freight on Salt.

It is sincerely to be hoped that the Union Pacific management will take into careful consideration the facts and figures which have been presented to them by the mill men of this district, touching the present rate on salt. That the rate of \$20 per ton from Ogden is too high, there can be no question. Silver mining in Butte to-day is not what it was three or four years ago. The mines are much deeper, the volume of water has increased, the ore has grown base, and in short, the cost of extraction and reduction has been very largely increased. It is true there is an abundance of silver ore in the camp, but it is mainly of a very low grade. The choicest free milling bodies have all been worked out, as far as discovered. The silver ore being mined here to-day will not average more than thirty-five ounces to the ton. If it falls much below this, it cannot be profitably reduced. When the ore is base, it requires from 12 to 15 per cent. of salt to treat it successfully. The amount of salt consumed in the treatment of silver ore is about thirty tons per day.

There are at present three or four mills lying idle in this camp, not from any lack of ore, but because their ore supply is of too low a grade to be profitably worked with the present rate on salt.

This tariff on salt has grown to be the leading question with our silver men. The appeal for relief is born of the necessities of the case, and the alternative becomes every day more apparent, that a cheaper rate must be had, or the music of the silver mill stamps will cease to be heard.

The Union Pacific management have heretofore paid careful heed to the concessions asked by the copper producers of this district. Their action in reducing the rate on copper matte and ores was a much needed measure and entitles them to the thanks of this community. Now, we ask them to look closely into the statements which have been and will hereafter be made to them respecting this salt question, believing that they will find therein ample argument for an immediate and material reduction of the rate on salt.—*Butte Inter-Mountain.*

The Lick Observatory.

Capt. Thomas Frazer, Superintendent of the Lick Observatory, in an interview states that they are getting along very smoothly at the observatory, and if nothing occurs to impede progress, they hope within two years to complete the construction and enable the Trustees to transfer to the State University this most valuable bequest.

Capt. Frazer says: "I expect to hear every day that the process of rough grinding has been completed successfully. This is the twentieth attempt, all others having failed. In the process of making, the constituents of glass are first carefully selected and the whole melted into a rough hock; then melted or ground down to the general shape required. This is the work of the glass-maker, Field, which, I trust, has almost been successfully completed now. He must see that there are no imperfections whatsoever. The glass is then transferred to Alvan Clark, the optician, who polishes and prepares it for insertion in the telescope. All the principal danger lies in the first process, and if this is successfully completed all is practically over. So, if we learn in a few days that Alvan Clark has accepted the glass, there need be but little apprehension of future delays. So far the Trustees have expended about \$290,000, of which \$12,500 has been paid to Alvan Clark upon his contract of \$51,000 for the object glass, and the remainder upon the building and various instruments. The original bequest, as you know, was \$700,000, and we expect to expend \$160,000 or 200,000 more upon the construction, leaving a nest egg for the University of two hundred or two hundred and fifty thousand. The Trustees simply construct, while it is left for the University to appoint a corps of astronomers to conduct the investigations.

"As for astronomical investigation, there is practically no work being done now, although we have already some of the best and most improved instruments in the world, including a 12 inch equatorial telescope, a 6 inch French meridian circle, a 4-inch French transit, a 4-inch comet seeker, a 6½-inch equatorial telescope, an eclipse telescope, a measuring engine, a set of self-recording barometers, rain-gauge and wind-gauge, and other minor instruments ad libitum. For the past six years we have kept statistics upon the barometer, wind and rain-gauges, which, of course, will be valuable.

"As to the completed observatory there can be no doubt that it will far exceed the best in the world. That has already been admitted by the best astronomers, such as Newcomb, Harkness, Hall, Young, Todd, Burnham and others. At the observation of the transit of Venus, Prof. Newcomb stated that the best reports were received from our observatory. In the first place, Mt. Hamilton is most phenomenally adapted by the climate, the rarity of its atmosphere, its freedom from disturbance, and possesses every good factor, in fact, as a point of astronomical observation. Combined with this is the fact that we are procuring instruments regardless of expense, and you can realize how far ahead of all other observations it will be. The object glass of our large telescope will be 36 inches in diameter, exceeding by 6 inches the largest in the world.

"I've seen some misstatements in regard to that glass. But it is only a 28-inch glass. Alvan Clark has just completed a 30-inch glass for the Russian Government, but it was omitted to stipulate in the contract for a guarantee of perfection, and as a result the glass contains a large defect which will virtually reduce the size of the object glass considerably. In the case of our glass, however, perfection is guaranteed or no pay.

"I've just recently returned from a three months' tour through 12 of the best observatories of the United States, visiting among others those at Washington, University of Virginia, Madison, Amherst, Harvard, Yale, Columbia and Princeton, and I do not hesitate to state that all combined could be placed under the roof of the Lick Observatory. The largest object glass possessed by any is 26 inches. Our site is immeasurably superior to any other in the world. We will be enabled to view objects 20 degrees further south than any observatory in the northern hemisphere.

"Aside from the astronomical observations which must benefit the whole world, it is the intention to give full and complete weather prognostications. Even with our present limited capacity, I am enabled to prophesy a storm five or six days in advance, and I have no doubt but that when all is completed, the general outline of the weather for an entire season may be told beforehand. You see, California needs a good local observatory. When the Lick Observatory is completed daily bulletins will be issued which can be relied upon."

QUARTZ MOUNTAIN.—The item going the rounds of the press concerning extravagance at the Quartz Mountain, Fresno county, is greatly exaggerated. The president's house is said to have cost \$30,000 and to be elegantly furnished. We are told it really cost about \$3,500. So far from a "flashy superintendent, fast horses and champagne," one who is in a position to know says the superintendent does not touch wine or liquor. The item, which is being extensively copied, is stated as being a great misrepresentation of facts.

MECHANICAL PROGRESS.

The Compression of Molten Steel.

In his recent inaugural address as president of the Iron and Steel Institute, Dr. Percy said: Various methods have been tried for the compression of steel, of which I will mention two. A kind of gunpowder was proposed for this purpose in the United States in 1869. It was recommended for the casting of steel cannon, with the special object of preventing blow holes. The metal was run into a suitable mold, the mouth of which was immediately afterward hermetically closed by a metallic cap, firmly fixed in its place by bolts or otherwise. In the center of the cap was fitted a vertical pipe, provided with a stop enck at its lower end, while its upper end was closed by a washer pressed by a bolt so as to act as a safety valve. Before attaching the cap at, say, an inch from the surface of the molten metal, a charge of about a quarter of an ounce of powder, composed of 80 per cent of niter and 20 of charcoal, was put into the vertical pipe between the stop enck and the washer. On opening the stop enck, the powder falls out the metal, ignites, and, it is said, produces about one-third of a cubic foot of gas at the temperature of 3,000° Fahr., which exerts a pressure equivalent to that of a head of liquid metal 90 feet high, supposing the capacity between the cap and the surface of the metal to amount to 30 cubic inches. Whether this process was ever tried, and if so with what result, I am unable to say.

Liquid carbonic acid has been used for compressing steel at Krupp's works, at Essen, and, it is reported, with success. The top of the mold, when closed is connected by a pipe with a vessel containing liquid carbonic acid, heated sufficiently to produce the necessary degree of vapor tension, which, at 400° Fahr., is said to amount to 800 atmospheres, or only slightly to exceed five tons to the square inch. I have heard it rumored that the process has been abandoned, but whether truly or not I cannot say.

In 1876 Sir Joseph Whitworth had the kindness to permit me to see his process in operation, and was present at the time. The charge of molten steel was from seven to eight tons, and the pressure about seven tons to the square inch.

Balancing Machinery.

We frequently observe in workshops, factories and mills, where machinery is in operation, says a contributor to an English journal, that the floors, the walls and even the ground in the neighborhood are in a constant state of vibration, causing an unpleasant sensation and a reasonable fear of danger. Now, the principal causes of such results arise from the inaccurate balancing of the drums, pulleys and gearing, as the following fact will illustrate: Belonging to one of the largest machine works in England there was a large shed in which was a circular saw, driven from a countershaft fixed to the roof beam; this shaft was driven about 600 revolutions per minute, and the pulley was 30 inches in diameter; it caused the beam and roof to vibrate exceedingly, to prevent which the proprietors secured a large upright and spur timber to the beam and to the stonework on the ground; when the shaft was put in motion the vibration was as great as ever, and shook the ground all about it so that draughtsmen and clerks in a building on the other side of the street complained of its interference with their operations. The foreman of the works mentioned this fact to me and I informed him that the pulley was not balanced; "but," said the foreman, "it is beautifully turned and polished, and runs as true as a hair." "It matters not," said I, "it is not balanced." I then showed him how to test it, and found that the pulley was 2½ pounds out of balance; it was then adjusted and perfectly poised and again set in motion. The result was most satisfactory; it worked without any perceptible vibration, and as was remarked, as quietly as a lever watch. It thus appears that the small weight of 2½ pounds uncounterpoised, and revolving at a velocity of 600 or 700 per minute, is sufficient to exert the marvelous force described; and when we consider that there may be hundreds of wheels, pulleys, etc., similarly poised in mills or workshops, we can account for much of the vibration.

STEEL MADE AND REWORKED.—Some tests have been made of steel from the roll and from the hammer as compared with steel that is annealed and turned to size. It appears from these tests that the commercial steel, untouched by annealing heat or by the turning tool, is better in its resistant qualities than the annealed and turned material. Unannealed steel is tougher—it resists torsion better—than annealed steel. This fact was constant through a large number of tests of the steel made by five of the most prominent and best known manufacturers. Further trials proved the fact that steel as it comes from the hammer is better for certain tools than the same steel annealed, turned and after worked. A square bar of commercial steel centered and cut to thread made a better tap than the same bar annealed and turned round, and then four-scored and retempered. It is possible that for certain tools—lengthwise tools, as taps and reamers—steel might be forged in bars to size and shape with

advantage, not alone as to saving of lathe work, but as to value of the finished tool. If steel-makers can be induced by sufficient orders, it is probable the experiment will be made on a scale large enough to establish the question of its value. The claim of those who have made the tests is that the "skin" of the steel as it comes from under the hammer is stronger than any after coating by the oxidizing of tempering.

Hints on the Care of Tools.

The following hints on the best means of keeping tools in good condition cannot fail to be useful:

WOODEN PARTS.—The wooden parts of tools, such as the stocks of planes and handles of chisels, are often made to have a nice appearance by French polishing; but this adds nothing to their durability. A much better plan is to let them soak in linseed oil for a week, and rub them with a cloth for a few minutes every day for a week or two. This produces a beautiful surface, and at the same time exerts a solidifying and preservative action on the wood.

IRON PARTS.—Rust preventives.—The following receipts are recommended for preventing rust on iron and steel surfaces:

(1.) Caoutchouc oil is said to have proved efficient in preventing rust, and to have been adopted by the German army. It only requires to be spread with a piece of flannel in a very thin layer over the metallic surface, and allowed to dry up. Such a coating will afford security against all atmospheric influences, and will not show any cracks under the microscope after a year's standing. To remove it the article has simply to be treated with caoutchouc oil again, and washed after 12 to 24 hours.

(2.) A solution of India rubber in benzine has been used for years as a coating for steel, iron, and lead, and has been found a simple means of keeping them from oxidizing. It can be easily applied with a brush, and is as easily rubbed off. It should be made about the consistency of cream.

(3.) All steel articles can be perfectly preserved from rust by putting a lump of freshly-burnt lime in the drawer or case in which they are kept. If things are to be moved (as a gun in its case, for instance), put the lime in a muslin bag. This is especially valuable for specimens of iron when fractured, for in a moderately dry place the lime will not want any renewing for many years, as it is capable of absorbing a large quantity of moisture. Articles in use should be placed in a box nearly filled with thoroughly pulverized slaked lime. Before using them rub well with a woolen cloth.

(4.) Soft soap, with half its weight of pearls; one ounce of mixture in about one gallon boiling water. This is in every-day use in most engineers' shops in the drip-cans used for turning long articles bright in wrought iron and steel. The work, though constantly moist, does not rust, and bright nuts are immersed in it for days till wanted, and retain their polish.

NATURAL GAS VS. COAL.—A heavy reduction was recently made at the Alleghany Water Works, in Pittsburgh, by the change of fuel from coal to natural gas. There are four batteries of boilers at the works, two of four boilers and two of three boilers. Only two batteries are used, the others being the reserve. A short time since arrangements were made for using natural gas under one of the largest batteries, and a test made proved successful. The other battery will still be heated by the old method. The estimated saving on coal is about 30 per cent. Natural gas costs \$12 per day, while to operate the battery with coal the expense has been \$18 per day. In addition to this the wages of two firemen, \$120 per month, is saved. There is also a trifling saving on utensils, such as shovels, pokers, grate-bars, etc. If the natural gas gives out fire can be placed in the reserve boilers in a short time.

GAS AGAINST STEAM.—Civil Engineer L. Starck, at Mayence, Germany has endeavored to solve the problem of cheap gas for large gas motors (horse-power), by a method of simultaneously producing hydrogen gas, coal gas and oil gas in one furnace. The cost is said to be so cheap as to be able to run a large gas motor at less cost than the best constructed steam-engine. L. Starck uses the cheapest coal, and his method produces by-products which will realize higher prices than the cost of production, thus getting the gas free. His method is based on the use of moss turf, which has a great capacity for absorption—for instance, one part turf will absorb 5 to 6 parts liquid oil, petroleum refuses, &c. This capacity of turf would also simplify the refining of crude oil and facilitate the bleaching of heavy oil.

AN ABSOLUTELY EXACT STRAIGHT EDGE of more than thirty-six inches is a wonder of mechanism. One of six feet was not recently believed possible, although several had been made on different plans of web-like and truss construction. It has been claimed, however, that almost absolute exactness has been secured by a straight edge twelve feet long. The appliance looks like an arched truss, the highest spring of the arch being only twenty inches in a length of twelve feet.

TO PREVENT RUST.—To prevent the rusting of steel instruments smear their surface with a mixture of equal parts of carbolic acid and olive oil.

SCIENTIFIC PROGRESS.

THE QUATERNARY FAUNA OF INDIANA.—As every student of geology knows, the Quaternary period was characterized by great changes of climate, accompanied by remarkable sinking and rising of the earth's crust. Enormous quantities of clay, gravel, and boulders were carried by glacial action from the higher latitudes as far south as the Ohio river, and even, at some points, a few miles into Kentucky. The area thus covered by drift extends from Cape Cod as far west as Dakota, and, farther north, to the Rocky mountains and the Pacific Coast. The limits of glacial action are marked by ridges known as moraines, in which have been found some interesting relics of ancient life. Following this glacial era came one of general depression, when the Atlantic Ocean extended inland so far that whales and seals played in the waters now known as Lake Champlain; while the chain of lakes along our northern border were connected with the Gulf of Mexico. A subsequent upward movement of the earth's crust restored this depressed region to its former level, when the continent took its present shape, and what is geologically known as the Recent period began, which is still in continuance. The Quaternary period was remarkable for its gigantic mammalian fauna, and numerous animals then existed in North America that have now no living representatives. The places where such remains are most liable to be found are in the numerous caverns of southern Indiana, the wide marshes and swamps of the northern portions of the State, the moraines and other deposits left by the glacial action of the earlier part of the period, and the beaches and terraces characterizing the latter portion.—H. C. Horey.

POTENTIAL ANIMAL LIFE IN FLESH.—In a paper on "The liquefaction of gases and other effects of extreme cold," lately read before the Philosophical Society of Glasgow, J. J. Coleman stated that at about 86° C. the flesh of animals, such as nutmeg, becomes so exceedingly hard that it rings like porcelain when struck with an iron instrument—indeed, crushes by the blow of a hammer into a fine powder, in which muscle, fat and bone are intermingled; and, what is still more singular, according to the experiments of Mr. Coleman and Prof. McKendrick, recently communicated to this society, it appears that microbia alive in the flesh before the freezing operations can be detected still alive after thawing, even after exposure to 86° C. or 133° F. for 100 hours, thus pointing to potential animal life in the solid state capable of being brought into activity by heat and moisture. In the discussion which followed Sir W. Thomson said it would be most interesting to see if Mr. Coleman's deduction—that "potential life can exist in a solid state"—is confirmed by experiments on vegetable seeds, with a view to ascertaining whether their vitality is destroyed by desiccation in a Sprengel vacuum or by long-continued drying at moderate temperatures.

WOOD CRYSTALS.—Chemical analysis has long since detected the presence of various mineral substances—potash, soda, silica, etc.—in many forms of vegetable growth; and the main source of potash at present, as of soda in former times, is the ashes of certain trees and plants. It also appears, as the result of microscopic investigation, that many of these mineral salts retain or assume a crystalline form even when embedded in the solid portion or bark of certain plants, as the microscope most unmistakably reveals. Should it be proved that the form these crystals assume is regulated or modified by the conditions and character of the growth which encloses them, it is evident that the fact would be one of great interest to science, and of peculiar value and service to the druggist, since it would enable him to determine the nature and purity of any medicinal bark or wood, by examining a crushed sample under the glass, and comparing the forms of the crystals with those presented in a series of standard plates. Thus the absence of the desired crystal, or the presence of others differing in form from the standard, would enable him to determine the nature and extent of the impurity or adulteration. A new study is here opened up.

PROGRESS IN ASTRONOMY.—When the old astronomers mistook the earth for the center of the solar system, or that of the universe, what were the results of their calculations? When the sun and earth were put in their right places by Copernicus, how astronomy progressed in the right direction; and what splendid advances were made by Sir Isaac Newton and Sir William Herschel! The elements of our solar system were not only determined, but with the telescope they peered into the invisible heavens, unfolding telescopic stars, and nebulae composing and decomposing in the formation of stars. With the spectroscope they have not only given the elementary composition of our sun, but that of the stars and nebulae, with their speed of motion in approaching and receding from our system in their orbicular motions. Such have been the achievements in the stride of science in the microcosm of the universe. What exultation there is in the conception of all this!

ZYLONITE.—The basis of the very remarkable substance zylonite is a plain white tissue paper, made from cotton or cotton and linen rags,

The paper being first treated with a bath of sulphuric and other gases, undergoes a chemical change. The acid is then carefully washed out and the paper treated with another preparation of alcohol and camphor. After this it assumes an appearance very much like parchment. It is then capable of being worked up into plates of any thickness, rendered almost perfectly transparent or given any of the brilliant colors that silk will take. It is much more flexible than either horn or ivory, and much less brittle.

PETROLEUM AS A WOOD PRESERVER.—A correspondent of the *Rural New Yorker* writes in regard to the value of crude petroleum as a wood preserver, as follows: Fresh, light petroleum, if applied warm, will penetrate—if the wood is dry—almost as readily as water, and once thoroughly saturated "it is there to stay"; water will not wash it out. I have been for years a producer of crude petroleum, and have yet to find a board or piece of timber connected, or otherwise, with the works, that had once been saturated, which is not sound where the oil touched, while frequently parts not oiled have decayed rapidly. I have just finished taking down and making over into smaller ones, a wooden storage tank. This was first built over 18 years ago, and left exposed to all kinds of weather. We did not find one rotten spot in it; everything was sound. I have known oil barrels, and also small tanks, to be covered with a thin layer of earth and remain so, in one case over 14 years, and come out sound. He especially states that saturated with this moisture-repellant from nature's own marvelous laboratory, sills of barns and similar buildings will outlast any other part of the frame; and he remarks that, after the first two or three days, the application does not expose wood to any increased risk from fire.

SALTS IN WATER.—A small amount of any soluble salt dissolved in water will heighten the boiling point. For instance, about four per cent of common salt dissolved in pure water will raise its boiling point 213 deg. F., while a saturated solution of calcium chloride (i. e., Ca Cl₂, not chloride of lime) boils at 355 deg. F. It is for this reason that when sea-water, or any other water charged with saline matter is used for steam engine boilers it becomes gradually stronger of the salt contained in it (for the salt is fixed and does not evaporate), and has at stated periods to be blown off, otherwise, as the boiling point rises, there would be a great waste of fuel and deposition of scale upon the surface of the boiler.

CHEMISTRY OF THE ANCIENTS.—Chemistry, which, like other sciences, has been wonderfully developed during the past century, is often mentioned as of recent origin, but many chemical facts were known to the ancients even before the dawn of historical times. Specimens of their work still in existence indicate that the ancient Egyptians had considerable chemical knowledge. They were skilled in smelting ores and working metals, had a good understanding of dyes, made glass and knew how to prevent decomposition of dead animal matter, while the priesthood evidently had some idea of pharmaceutical chemistry.

ASSOCIATION OF COMETS.—"There is a family of comets," says Mr. R. A. Proctor, "every member of which travels in an orbit passing near the orbit of Jupiter; another family every member of which can be similarly associated with Saturn; others depending in the same way on Uranus, others on Neptune; and, in fact, so fully has this sort of relation been recognized that the idea has ever been thrown out that a planet traveling outside the orbit of Neptune, but as yet unknown, might be detected by the movements of a comet intersecting the great plane of planetary movement far beyond Neptune's orbit."

THE USE OF FORMENE AS A COOLING AGENT.—Wroblewski having claimed priority for the employment of formene, in producing very low temperatures, stated that his experiments date from the month of March, 1884, while Cailletet did not speak of his own experiments until April. Cailletet replies by a sealed note, which was deposited on December 12, 1881, in which he proposes to apply formene and ethylene in studying the compressibility of nitrogen, hydrogen, etc., at very low temperatures.—*Comptes Rendus*.

BATTERY WITH TWO LIQUIDS.—The author succeeds in suppressing the nitrous vapors of the Bunsen battery by using a depolarizing liquid, consisting of nitric acid in which 75 grs. potassium dichromate have been dissolved per liter. In contact with the zinc he employs either acidulated water or potassium disulphate.—A. Dupre.

HIGH PRESSURE STEAM.—A peculiarity of high pressure steam is, that it does not scald the hand applied near the orifice from which it is issuing. This arises from the fact that on its first escape it expands so rapidly that its heat becomes latent. In other words, the heat is so reduced by expansion that it is cold to the hand.

OXYGENATED WATER.—Distilled water, saturated with oxygen, is now prepared in Paris, and is rapidly gaining favor. Aside from its healthfulness for ordinary table use, it is said to be valuable in the treatment of diseases of the digestive organs.

MINING AND SCIENTIFIC PRESS

A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 253 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES.	1 week.	1 month.	3 mos.	12 mos.
Per line (agate).....	.25	.80	\$2.20	\$5.00
Half inch (1 square).....	\$1.50	\$4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG

SAN FRANCISCO:

Saturday Morning, July 11, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Continuous Coarse-Ore Quicksilver Furnaces, 17. Passing Events; The Northern States of Mexico; Speculative Exchanges; Fossil Elephants in California; New Dry Ore Separator, 20. Auriferous Sea Sand; Water Wheels for Quartz Mills; Cable Railway Edition, 21.

ILLUSTRATIONS.—Iron Clad Continuous Shaft Furnace for Quicksilver Ore, 17. Arrangement of Water Wheel to Run a 60-Stamp Mill, 21.

MECHANICAL PROGRESS.—The Compression of Molten Steel; Balancing Machinery; Steel Made and Reworked; Hints on the Care of Tools; Natural Gas vs. Coal; Gas Against Steam; To Prevent Rust, 19.

SCIENTIFIC PROGRESS.—The Quarterly Fauna of Indiana; Potential Animal Life in Fleas; Wood Crystals; Progress in Astronomy; Zylonite; Petroleum as a Wood Preserver; Salts in Water; Chemistry of the Ancients; Association of Comets; The Use of Formic as a Cooling Agent; Battery with Two Liquids; High Pressure Steam; Oxygenated Water, 19.

USEFUL INFORMATION.—The Future of the Wine Industry of California; Polishing Wood with Charcoal; Origin of Crazy Quilts; Veneering; Furniture Polish; Combination Furniture, 93.

GOOD HEALTH.—How Alcohol Intoxicates; Food for the Nervous Person; How Shall the Physician Cleanse His Hands; Epitheliosis; Good News for Hungry Folks, 23.

MISCELLANEOUS.—Treatment of Nickel-Cobalt Mattes; The Evil Genii of Mining Camps; Freight on Salt; The Lick Observatory, 18. Mining in Mexico; In the Sierra Madre; Borax; Cleanliness About Railroad Cars, 22. From Fresno County; The Need of Capital, 23.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon and Utah, 24-25.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments. Dividends and Bullion Shipments, 22.

Business Announcements.

Annual Meeting—Spring Valley Water Works, S. F.

See Advertising Columns.

Passing Events.

It is stated that in many of the small camps along the line of the Carson and Colorado, where miners are working for themselves in a small way, matters are looking very well, and considerable ore is being taken out. Further south, however, in Mono county in this State, all the camps are dull and little is doing.

The prices of lead and copper still continue low, and many mines of this class are making no profit.

The Cœur d'Alene mines are reported as doing very well this season, and recovering from the evil effects of their boom of two years since. New River has, so far, not come up to expectations, very little development of note having occurred.

General business continues rather dull throughout the country, but it is hoped the depression will not last much longer.

COMMERCIAL statistics for the first half of the year 1885 are now made up, and it is seen that notwithstanding the dull times we have done more business in the past six months than in the corresponding period last year. Our exports of wheat in round numbers for the cereal year just closed were 15,974,000 cts., valued at \$21,278,000 against 11,256,000 cts., at \$19,147,000, in 1884. The exchanges at the San Francisco Clearing-House for the first half of 1885 amounted to \$273,649,000, against \$267,959,000 in the first half of 1884. These clearings are now accepted as the nearest guide to the volume of business, and they show that we have done about \$5,500,000 more business thus far this year than in the corresponding period last year. True, the gain is slight, but it is much better than a loss.

The Northern States of Mexico.

It is stated that plans have been submitted to the United States Government having in view the sale to this country of some of the northern territory of New Mexico. The most popular of the plans put forward is the purchase of Tamaulipas, Nueva Leon, Coahuila, Chihuahua, Sonora and Lower California. The value of the territory comprised in the above six States is estimated at from \$100,000,000 to \$300,000,000. The second scheme provides for the sale of Sonora, Sinaloa and Lower California only. A mass meeting is to be held in Santa Fe, called by many representative Spanish-Americans, to endeavor to get our Government to send a commission to Mexico to treat for the purchase of Chihuahua, Sonora, Durango and Coahuila.

Without attempting to discuss the point as to whether our people desire to add more territory to our already extensive domains, or whether this is the best use we can make of idle millions now in the Treasury, it may be said that should anything come of the schemes the result would bring under our laws a vast amount of mining region only partly prospected or worked. A number of mines are being worked in Durango, Chihuahua, Sonora and Coahuila by Americans, but they have great difficulty in conducting operations under existing conditions. In case the territory should belong to the United States thousands of miners would go there, and a speedy revolution of present systems and customs would result.

There are undoubtedly rich mines in the mountains of the regions referred to, which have been worked in a rude way for several hundred years. There are also many which have been abandoned because the Mexicans could not cope with the water with their crude systems and lack of machinery. Moreover, there are wide ranges of country unprospected to any extent, which would be fine fields for our mining population. There are some drawbacks to mining thereabouts, of course, but many of them would soon be removed by American enterprise and energy.

Speculative Exchanges.

One of the results of the general business depression has been in the East to seriously effect the various speculative exchanges and the value of memberships therein. The value of seats in some of them has fallen to one-third of what it was not long since. The disinclination of "outside" people to deal in margins in the New York Produce Exchange has left brokers with few orders, and they are compelled to deal on their own accounts. They are beginning to think there are too many members.

Perhaps, also, there are too many speculative exchanges of various kinds. We have our share in this city, but they have not the influence they used to exercise. The gambling in mining stocks here which used to be indulged in by all classes of people, is now confined among those who cannot give up the idea of gaining sudden riches by this means, or those who, having money, can afford to speculate. But so many people on this coast have received severe practical lessons about dabbling in business out of their control that the speculative exchanges interest them no more.

Of course there are certain people who will speculate, come what may; and as a nation we are somewhat given to it. But it seems that all over the land the impression is gaining ground that it is an expensive luxury in which only the rich should indulge. Certain it is that here at least many have become cured of the mania; and it appears that in the commercial centers East the lesson has also been learned.

It is as well for those of moderate means to think twice before launching their earnings into speculations of any kind. There are plenty of legitimate channels for investment, where, if the profits are small, the principal is at least comparatively safe, and in a tangible form.

BUSINESS is said to be picking up at a lively rate in the little mining camps adjacent to the line of the Carson & Colorado railroad. Tri-weekly shipments of bullion are made from Marietta, and another mining company in that camp has recently put on a force of 20 men. At Candelaria the Columbus and other mines are to be started up in a short time which are known to contain bodies of high grade ore.

Fossil Elephants in California.

That both mastodons and mammoths once existed in California there is no doubt, since several finds of their bones in a fossilized condition have been made. No complete skeleton has been exhumed which could be set up in a museum for exhibition, owing to the fact that in most cases the bones have been more or less scattered, portions have been missing, or else what have been found soon crumbled when exposed to atmospheric influences. A deposit of bones of a mammoth has lately been opened in Yolo county, and the remains have been carefully removed and brought to San Francisco, where they have been placed in the museum of the California Academy of Sciences, Mr. C. D. Gibbs, by authority of the Academy, and in its behalf, visited the deposit last week.

The situation is in the Sacramento valley, about 12 miles from the foothills of the Coast range, 60 miles from San Francisco in an air line, and six or seven miles from Dixon, Yolo county. It is on the ranch of Hecht Bros., and opposite that of Montgomery S. Currey. The bone deposit is on the dry bed of the creek on the north side of a shallow stream about 40 or 50 feet wide, flowing through the center of the creek bed, which is about 150 to 200 feet wide.

In his report to the Academy, Mr. Gibbs states that Mr. Hecht discovered the bones two years since on a point of land in the bend of the creek that had been carried away in the great flood three years since, sweeping off two or three acres to a depth of 20 feet. Some of the large bones Mr. Geo. W. Pierce had taken out and given away to Mr. J. B. Hollingsworth, of Woodland. Mr. Gibbs reports that the bones are not in the bluff bank but are resting on a blue clay or mud, under a yellow clay, 30 feet from the present stream, which was once the margin of the north bank, and are 70 feet from the bluff on the present left, or north bank of the creek. The bones are about three feet above the level of the stream, and the bluff bank 20 or more feet above the bones. This being the deepest part of the bend makes it 100 feet of earth, over 20 feet in depth, that was cut off and carried away by the flood.

Fifteen or sixteen feet in depth from the surface the soil is a sandy loam, then a yellow clay seven or eight feet thick, resting on a blue mud or clay. Most of the yellow clay was carried off by the flood, leaving about 12 or 15 inches above the bones, but cut in small channels or grooves by the water, and in one of these channels the bones were exposed. There was a grove of large oaks on the surface above the bones before the high water referred to, and the north bank is still lined with large oaks above and below.

The yellow clay is intersected by a complete network of hard seams of a white calcareous deposit, and in some places a solid mass 10 or 15 feet in diameter, resembling a honey comb, as if a pool of water had evaporated, leaving these specimens. At the first view over the ground it had the appearance of numerous bleached ribs, and other bones imbedded in the clay, and these seams made it difficult in excavating to distinguish between the bones and this calcareous deposit.

The impressions of the large bones taken out by Mr. Pierce still remained on the blue clay, and Mr. Gibbs commenced work at the upper end of the bumerus, near the shoulder, as it was desired to obtain the jaw, or at least a tooth. The work proceeded slowly, as they had to dig with a knife carefully all around each bone to loosen it from the tenacious mud and clay in which it was imbedded; yet even with the greatest care, many of the bones broke. Several fragments of ribs and other bones were uncovered, some imbedded under and across others. It became evident, from the result of digging, that the head had been above the level of the other bones, and had been washed away in the upper portion of the clay bank. It may yet be found further down stream. As far as can be judged, Mr. Gibbs thinks the animal must have been lying on its right side, with its head up stream. The elevation above sea level is between 45 and 50 feet. One of the bones found by Mr. Pierce is a humerus 2.2 feet in length, and the other a femur, 3.2 feet long. No teeth were found, so it could not be stated whether the bones were those of a mastodon or a mammoth. Mr. Gibbs is inclined to think it was a mastodon. A large number of the bones are now at the Academy

museum. While on his way back to this city, he stopped at Martinez, as requested by Prof. Davidson, President of the Academy, to examine certain large teeth which had been found there. What had been supposed to be three large teeth of a mastodon, found by Mr. Martin Woolbert, proved to be a portion of the tooth of a mammoth, split in three pieces, and not whole teeth. Mr. Gibbs also examined the tooth found by a son of Mr. Jones, which is in a better state of preservation. Both were found near each other on the beach below high tide, near Mr. Woolbert's, a mile east of Martinez. Mr. Gibbs visited the spot, and though the tide was partly up, they dug under the sand and found yellow clay on blue mud. One of the teeth, supposed by Mr. Gibbs to be that of the *Elephas Americanus*, has been presented to the Academy.

New Dry Ore Separator.

Joseph Behm, of San Jose, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency an ore separator and concentrator, into which the ore is received after having been properly pulverized. From a hopper the ore passes downward through an inclined passage and is discharged into a vertical cylindrical chamber, through which a vertical shaft extends, having a suitable step, journal-box and driving-gear. Upon this shaft is fixed a disk just below the open end of the cylinder. The rapid revolution of this shaft and disk causes the pulverized material to be thrown outward within the larger inclosing-cylinder, the finest portion of the dust being drawn upward and over the upper end of the cylinder by a suction fan, while the heavier portions will fall into a hopper beneath the open bottom of the cylinder, and may discharge outward by a spout in its inner end.

The disk has an inclosing sleeve where it passes up through the cylinder and thus protects the shaft from the wear and attrition of the material, which is fed into the cylinder around it. A second sleeve also surrounds the shaft, which passes through the hopper. The distance between the disk and the bottom of the cylinder is subject to regulation, so as to control the discharge of the material from the cylinder.

The fine dust is drawn upward over the top of the larger inclosing-cylinder by a suction fan which is situated at the end of a passage which has a series of boppers or chambers formed in it. These passages are also provided with diaphragms which serve to prevent the air and dust from passing in a direct line to the fan. The diaphragms divert the current downward, so that any material which is heavy enough will be retained in the chambers. These chambers are graduated in size, those nearest the inlet being made smaller than those which are more distant, in order to produce a stronger current through them at this point. This is necessary by reason of the greater specific gravity of the ore which is deposited in the first chambers, and the strength of the air draft lessens toward the outlet as the chamber increases in size, the deposited material being lighter.

The material which is deposited in the different chambers may escape automatically through doors or valves at the bottom, which may be kept closed by springs or weights until the weight of the material within overcomes the springs, when it discharges, after which the doors are again closed.

The finest portion of the dust is carried through the fan-case and is discharged into a large dust chamber from which it may also be withdrawn through suitable openings at the bottom. From the top of this dust-chamber a pipe or passage connects with another suction fan. This passage is in the form of an inverted cone or pyramid, having its base connected with the top of the chamber and the opening is covered with a fabric of some fibrous material, which, while allowing the air to escape, will arrest any dust which may be drawn upward by the action of the second suction fan. The material thus arrested in the chambers may be further concentrated by being discharged from these chambers into a second apparatus, which operates in the same manner as the ore described. The ore is thus graduated in fineness and separated into as many grades as may be desired, all that is too coarse for further operations being again returned to pulverizer. The machine is quite simple both in construction and operation.

Auriferous Sea Sand.

[Written for the MINING AND SCIENTIFIC PRESS, by C. H. AARON.]

By the kindness of a friend I obtained two samples. The first was only a few ounces; it contained 0.7 ounces of gold in the ton. An experiment in amalgamating the gold by a new process of my own resulted in the extraction of just one-half. This was not satisfactory, but, as the material was exhausted, I could do no more with this sample.

Having reason to think that this kind of sand offered a field for further experiment, I procured another and larger sample from another locality, I believe, but of the same general character; it, however, contained only \$2.60 to \$2.30 per ton by two assays on 1,000 grains each, average \$2.45.

Taking 1,000 grains of the sand the following results were found: Separated by magnet, 333.3 grains; separated by 80-mesh sieve from non-magnetic residue, 219.2 grains; passed through sieve, 447.4 grains. The three portions were separately smelted; the first and second yielded no gold, the third non-magnetic matter, which passed through the sieve, gave 0.0045 grains of gold, or \$2.60 per ton for the original material, or \$5.80 for the concentrate. Taking another 1,000 grains and proceeding in the same manner I got

Magnetic sand containing no gold	332.0
Coarse matter containing no gold	213.4
Fine sand containing 0.004 gr. gold	454.0
Total	999.4

This was considered conclusive as to the possibility of concentration, without loss, to less than one-half; having no finer sieve I could not ascertain the limit.

A thousand grains thus concentrated to 415 grains was carefully vanned, the heavy black sand, though not magnetic rendering this a tedious and difficult operation and doubtless causing some loss. Half a dozen specks of gold were found which appeared, under the lens, as clean little chips as one would wish to see. Nevertheless the gold utterly refused to attach itself to a globule of mercury. Addition of potassium cyanide solution was without effect during several minutes, but, on washing that away and replacing it by a drop of my reagent, amalgamation took place in a few seconds. I do not mention the character of this reagent, because, though rather promising, its practical utility is not yet established, and should it prove valuable I may possibly derive some much needed revenue from it. The gold thus collected amounted to only one-fourth of that which the material contained, according to the previous assays.

Treating 3,500 grains of the sand, not concentrated, by amalgamation with the aid of the above reagent, I extracted just half of the gold value. This, if not a mere accidental coincidence, is interesting as being exactly the same result as was got in a similar experiment on the previous and richer sample. Taking 7,000 grains I got

Separated by magnet	Grains.
Passed sieve	2723.7
Refused sieve	3441.1
Total	6164.8

That which passed the sieve was moistened with water in which two per cent of salt and a little magnesium sulphate were dissolved, in order to roughly imitate the composition of sea water. It was then treated with chlorine as in Plattner's process, and yielded 0.027 grain of gold, which was a satisfactory result.

The portion which had been separated by the magnet was similarly treated; it yielded no gold. The magnetic sand did not appear to have been affected by the chlorine; it remained magnetic, and the leach contained little if any more iron in solution than that from the other portion.

In these small operations in chlorination, it is not feasible, without special apparatus, to confine the proportion of manganese, etc., used to that which may be profitably employed on the large scale, consequently the question of economy, so unimportant in a mere chemical

experiment, but vital in practical metallurgy, remained, so far, an open one. In order to settle this as well as my scanty means permitted, I took 7,000 grains of the sand and, after moistening it, placed it in a glass funnel upon a bed of broken glass, as indeed I always do in testing by the Plattner process. The beak of the funnel was luted into the neck of a flask containing 35 grains ordinary manganese binoxide, 45 grains commercial salt, and 100 grains commercial sulphuric acid; also a little water. The funnel was covered with a piece of paper, tied on, and having a small hole pierced in it. A wash-bottle was dispensed with in this experiment in order to save "dead space."

In the course of two or three hours the chlorine had permeated the moist sand and issued

cost of handling the material in charging and emptying the leaching vats, and of bringing it to the proper condition as to moisture. Secondly, the leach from a vat would contain so little gold to its volume as to offer difficulties in the collection. Both can be overcome.

A pound of the sand, not concentrated, was steeped for about 10 hours in chlorinated (imitative) sea water; it yielded 66 per cent of its gold. It would doubtless have yielded all with stronger liquor and a continuous current of that.

As to concentrating or not concentrating, that would depend on circumstances. If the magnetic sand could be sold, its separation would surely be advantageous, and would probably be so under other circumstances where it constitutes one-third of the material and con-

livered where required. From the sluices the stuff would pass through the revolving sieves, or trommels, where the coarse sand would be separated. The fine sand and gold would again flow through launders to the leaching vat until that should be charged, when the stream would be diverted to another. The water being drained out of the vat, chlorinated water, which might be sea water, would be passed in, and, percolating the sand, would pass to another and to yet other vats, with a reinforcement of chlorine if required, and would issue finally as a moderately strong and ever-flowing stream of gold solution, from which there would then be no difficulty in separating the precious metal. When the first vat was exhausted of gold, the initial stream of chlorinated water would be applied to the next, thus making that the first of the series, while the exhausted vat, emptied and recharged would, by suitable connection become the last. Thus all the chlorine would be utilized, and all the gold would be extracted.

The emptying of the vats could be done by shoveling at small expense, or it might be done automatically. Of course the plan involves many details into which I cannot now enter.

I cannot judge of the expense of collecting the sand and placing it above tide-water (the rest of the elevation could be done by machinery), but, if that can be effected at a cost of from 50 to 70 cents per ton, even the low grade of material on which I experimented could, I think, be made to pay a profit of a dollar a ton, and better sand can be got. It would be necessary, however, to work on a large scale, and with a thoroughly equipped labor-saving plant. My friend, who sent the samples, says San Franciscans won't do anything of the kind, "they want gold for a circulating medium, but you must not produce it."

A Cable Railroad Edition.

We shall next week issue a double sheet edition of the MINING AND SCIENTIFIC PRESS devoted to the cable railway system so extensively in use in this city.

This number will contain detailed descriptions of the local roads now in operation—the Market, Haight and McAllister street, Presidio, Clay, Geary, Sutter and California streets, and some description of Eastern lines. The details of construction and operation will all be considered, and all the desirable information concerning the subject will be gathered. This edition will be very fully illustrated with plans, drawings, etc. All the new improvements in the running of the cable roads will be given. In addition we shall have articles embodying the engineering features of the road. There will also be descriptions of the new and improved appliances of recent invention adapted for use on these roads.

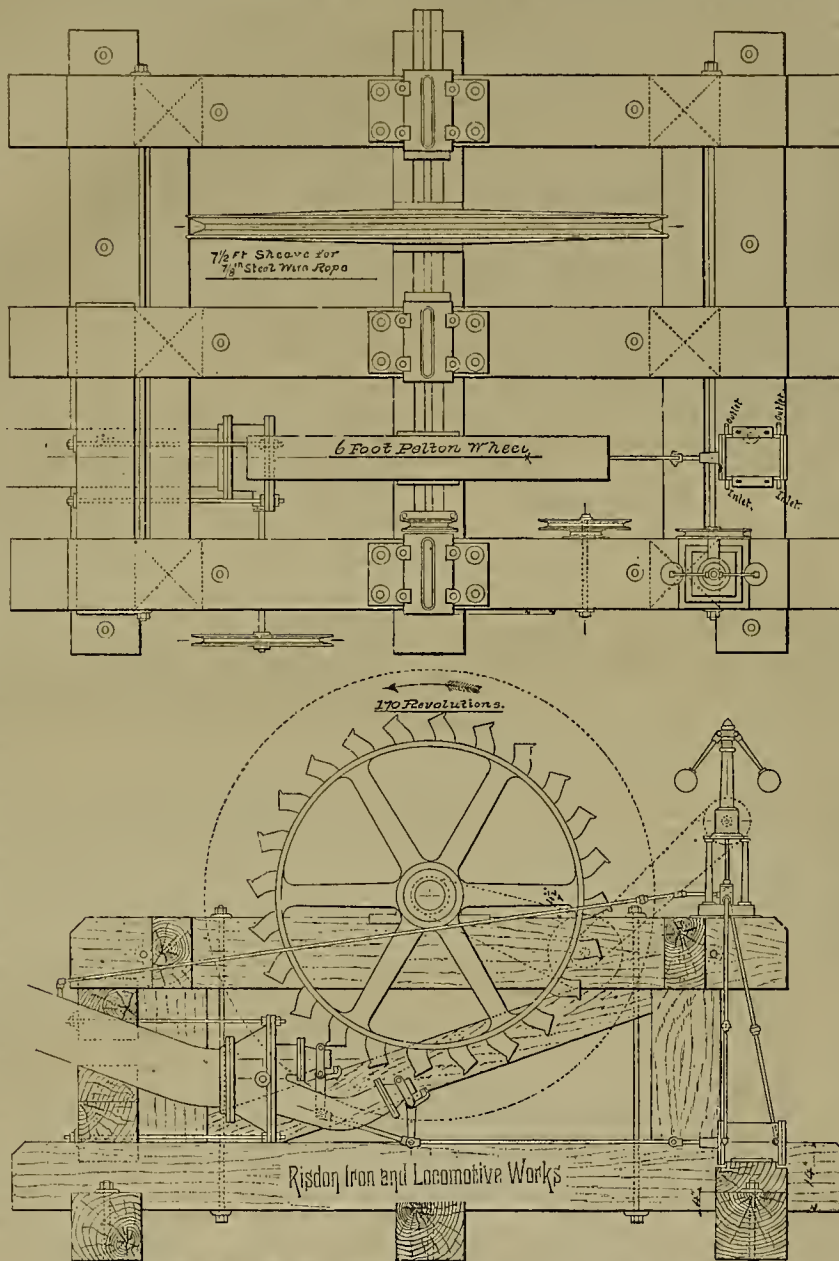
We shall print a very large edition of the number of the PRESS referred to, as the subject is one of such great interest to so many persons. The cable system for the propulsion of street cars is rapidly being introduced into other cities in this country, Europe and Australia. But as it had its inception in San Francisco and is most largely used here, carefully illustrated descriptions of our local roads will be useful to engineers and the public everywhere.

Those interested in cable roads, and desiring extra copies of the double number of the PRESS should send in their orders without delay.

Water Wheels for Quartz Mills.

The use of water for power is one of the factors which has reduced the expense of gold milling in this State of late, and wherever practicable it has been adopted. In some places the water has been brought a considerable distance in pipes or flumes, at great expense, a saving being made in the long run. In this State what is known as the hurdy-gurdy wheel is the favorite, as it is especially adapted to high heads, and is one of the most simple and efficient wheels in use. The two forms of hurdy-gurdies mostly in use are the Knight and the Pelton wheels, the latter a more recent invention, and one which has met with decided success, and especially in quartz mill work. It is not only used in many mills in this State and on this coast, but some have been sent to South Africa, Valparaiso, New Zealand, Alaska and elsewhere.

The engraving on this page shows one of these Pelton wheels, with automatic governor, as adapted to run a 60-stamp quartz mill, built by the Risdon Iron Works of this city. The wheels are adapted to drive air-compressors, pumps, saw-mills, hoisting machinery, factories, mills, printing offices, etc.



ARRANGEMENT OF WATER WHEEL TO RUN A 60-STAMP MILL.

through the cover. By applying a gentle heat to the flask, at intervals, the gas was several times caused to issue instantly and copiously from the hole in the cover. On leaching the ore the next morning, the smell of chlorine was distinct, but not as strong as was desirable, which, however, may have been due to the imperfect covering of the funnel. The yield of gold was not determined, but was evidently less than it should have been had the whole been extracted. This may have been due to the escape of chlorine by diffusion, to the insufficient moistening of the sand (for this comparatively coarse gold), or to the absence of a wash-bottle, allowing acid fumes to reach the ore. On the whole, and judging mainly from the readiness with which the chlorine was repeatedly caused to issue from the funnel, it is my opinion that this sand would require no more than the usual proportion of material for its treatment by chlorination, that is, in San Francisco, from 60 to 90 cents worth per ton. By concentration of the sand, the cost of the extraction would be reduced more than half.

In considering this matter, two practical difficulties present themselves. Firstly, the

tains no gold, as in the instance under consideration. The separation might be effected by means of Edison's very simple apparatus, though I have some doubts of its suitability for the purpose. I have myself contrived a machine, almost as simple as Edison's, in which small permanent magnets would be used, instead of electromagnets; it will separate the magnetic matter continuously, rapidly, and, I believe, with sufficient completeness. The sifting, by which at least another sixth of the material can be removed without loss of gold, may be omitted, or performed also continuously and quickly by well known means.

Granting that concentration would be employed, and otherwise it would make no difference in the manner of subsequent treatment, the auriferous sand would be collected on the beach, transported to a point 30 feet above tide-water, and beyond the reach of surf, and dumped into a large bin. From the bin the sand would be removed continuously by means of jets of water thrown in near the bottom. The sand and water would flow continuously through inclined launders, and in its passage the magnetic portion would be arrested and de-

Mining in Mexico.

Coal Fields Being Opened in Sonora.

From a letter by John I. Ginn in the *Oakland Times*, written at La Trinidad, Sonora, Mexico, we make the following extract:

Your correspondent has been wandering about for the past two months, and hence has not at all times been in mail communication with the "whits settlements." A good deal of that time was spent about Los Bronces, San Xavier, La Barranca, Tarumari, Toniche and other places west of and along the Yaqui river. While west of the Yaqui I spent a good deal of time in examining the anthracite coal fields and silver, gold and iron mines of the eastern slope of Los Bronces range of mountains.

The Coal Fields of that Region

Are something wonderful, and are destined, ere long, to revolutionize the fuel trade on the Pacific Coast. I found by examination and comparison that that field (for the coal seams are continuous from the summit of Los Bronces range to the Yaqui river) contains 108 square miles more superficial area than all five of the anthracite coal basins or fields of Pennsylvania, and within 12½ miles square of the aggregate area of all the coal fields of England. The coal, too, of even superior quality to the anthracite of Pennsylvania, having 90 to 92 per cent of fixed carbon, 3½ to 5 per cent volatile combustible matter, 4½ to 5 per cent of ash, and leaves no clinkers on burning. No prospecting for coal has ever been done in this field, all the discoveries yet made being through aqueous erosion, and even those exposed by meteoric agencies have been worked but little—just sufficient to furnish coal for local consumption by mining companies operating machinery in the immediate vicinity. One silver mining company has, in the past twelve years, consumed over 20,000 tons from a single seam. But, even in the absence of prospecting, the number of

Workable Seams Exposed

is very great—many of them being four to five feet thick, several ten feet, and some as much as sixteen feet thick of clean coal. The seams run north eighteen degrees east, and dip easterly at an angle of thirty two degrees. No crosscuts have yet been run to ascertain the vertical thickness of the intervening strata, but where crosscut canyons are not denuded of the breccia sheet which originally overspread nearly the whole of Sonora, the coal measures of the field, taken in descending order, are as follows: Aqueous breccia and conglomerate, gray sandstone, clay-slate, shale ornate with fossilifera of the coal period and impregnated with carbonaceous matter next to the coal, impalpable fire clay, then again sandstone, slate, fossiliferous shale, coal, and so on in the same order of recurrence until veins of iron ore displace the seams of coal along the western border of the uplift. In these underlying strata of the coal fields are veins 4 to 20 feet in thickness of singularly pure brown hematite iron ore, of the compact variety known as clay-ironstone, the purest of which carries from \$14 to \$32 in silver to the ton, while an impure iron ore of the same variety constitutes the veinstone or gangue matter of the rich silver mines known as the Prieta, Los Bronces, Division, Cruceros and the Sierra, all situated near the summit of the range and occupying fissures cutting the coal measures at various angles to their trend—these argentiferous iron ores paying from \$90 to \$3,000 and \$4,000 in silver to the ton.

English Capital in Sonora.

The greater or more valuable portion of this splendid anthracite coal field has already been purchased by English capitalists, and a company is now in process of formation in London for the purpose of building a railroad from the port of Guaymas to Los Bronces, 105 miles, and opening and working the coal mines on a large scale. Another English company, the Silver Queen United (limited) has been incorporated to work three separate groups of silver mines at Los Bronces. The property of this company embraces four adjoining mines at Los Bronces proper, two adjoining, and one mile distant from the first group, and two others adjoining in and forming the third part of a triangle, a 20-stamp mill, seven 10-ton leaching tanks, three 1,000 gallon solution tank, four triple-floor chloridizing furnaces, refining furnaces and other accessories, two sets of steam-hoisting works, one square league of land and numerous buildings, water-works, etc. La Trinidad (limited) is also a London company, and the pioneer English investor in this part of Sonora, having purchased the munmoth mine of this place last September. This mine has been more than paying its way since the new company took hold of it, although both the hoisting and reduction machinery was nearly worn out, and not capable of handling more than eighty tons of ore per day. New machinery has just been constructed at and is on the way down from San Francisco, as follows: Reduction, concentration and smelting works, at a cost of \$200,000; hoisting machinery, \$40,000; suspension wire tramway for the transportation of coal, wood and mining timbers, \$25,000; steam saw-mill, shingle machine, planing machine, etc., \$15,000. This company has also recently constructed about \$20,000 worth of new buildings, and has just completed, at a cost of \$50,000, from Ortiz, on the Sonora Railway to La Trinidad, 165 miles, the first wagon road ever built into the Sierra

Madre mountains from the plains of Sonora. The prospects of the mine more than justified the expenditure of this \$550,000, in addition to the \$2,000,000 paid for the property, even before the new management began deeper explorations, but now La Trinidad seems destined to soon become celebrated as the greatest silver mine the world has shown. The vein is 335 feet wide at the surface, and on the fifth level it shows a width between walls of 480 feet. The country rock is a hard porphyry, while the veinstone or gangue is a soft or decomposed gray porphyry, with some calc spar, but scarcely a flake of quartz—a peculiarity of many of the richest mines in this portion of Mexico. The silver (there is scarcely a trace of gold in the ore) is found in the sulphuret form, with long wisps and great globes of wire silver, and broad ribands and massive sheets of native silver traversing the gangue in all directions, associated with gray copper (10 to 12 per cent), a small percentage of galena near the surface, bisulphuret of iron, etc. From the fifth or 500 foot level upward the ore has been reckoned at from \$35 to \$60 in silver to the ton. On the fifth level, however, a chamber 110 feet long, 60 feet wide and 30 feet high has been excavated in ore paying from \$1,000 to 1,100 per ton, and now, on the 750-foot level, a breast 15 feet long and eight feet wide has been carried 20 feet in apparently free milling ore carrying from \$1,200 to \$4,000 in silver to the ton. This latest rich strike is about 200 feet from the hanging wall and near the center of the lode, about 500 feet south from the main shaft, and immediately under the extensive surface workings of the miners of antiquity. Heretofore the copper in the ore has not been saved and, in fact, but 50 to 60 per cent of the silver, but the new reduction works, having a capacious copper-silver water-jacket furnace, is calculated to save about everything of value. Still the company, which is not a speculative but a working one, as most English companies are, modestly estimates the future output at only \$3,000,000 in silver and \$500,000 in copper per year.

In the Sierra Madre.

George Cummings, a young man well known here, returned this week from a prospecting tour in that portion of the Sierra Madre in which General Crook was captured by the Chiricahuas two years ago. Ever since that time prospectors have fancied that it was one of the finest mineral countries in the world, and have only been deterred from entering its hidden precincts by fear of the Apaches. But George and his partner had become so thoroughly imbued with the idea that they concluded some mouths since to invade the wilds and take their chances. After a tedious journey they reached the foothills and boldly entered the wilds whose soil had never been trod by the feet of white men except those of Crook's small command. They penetrated to the very heart of the wild region, and spent seven weeks in a fruitless search for the rich veins it was supposed to contain. They found any number of low grade ledges, none of which could be worked at a profit, owing to their inaccessibility and great distance from the lowlands. It would be necessary to build the most expensive roads, over a hundred miles in length, to reach the mines. The country is very rugged, and scarred and seamed by impossible gorges, through whose gloomy depths flow tiny rivers over high falls and among huge boulders dashed down from the mountains' almost perpendicular sides. In many places they were compelled to lead their animals for days, and even then it was difficult for the poor brutes to ascend the abrupt hills. But in the very heart of this rugged region they found, in little basins, the remains of villages that had evidently been destroyed by the red-handed Apaches centuries ago, for in the ruins of buildings stand the largest size of mesquite, a slow-growing tree. The trails leading to and from these ruined villages have been entirely obliterated by the elements. The mountains are full of good pine timber and cool crystalline water, and abounded in game of all kinds, deer and turkeys being marvellously abundant. Feed for animals is apparently inexhaustible, and the climate is simply delightful at this season of the year. Taking everything into consideration, George does not wonder that the Chiricahuas should select it as their refuge. It is the finest country in the world for ambuscades and strategic warfare. A handful of men well acquainted with the region could cope successfully with a large army. George and his partner came out of the range by way of Nacosari, and passed the mining camp where the three Americans were murdered by the renegades just two days prior to the occurrence of that tragic event. They then took the trail for Arizona, and crossed the line near Bisbee. At Nacosari they heard of the Indian revolt, and felt greatly relieved when they discovered that they had left the Sierra Madre just in time to save their scalps. George says he is content to prospect in Arizona hereafter, and will leave the Sierra Madre to others who may think the rich mines are just in the beyond. He says all the American companies operating mines in the vicinity of the Yaqui river have failed and are becoming disgusted with the country.—*Enterprise*.

THE early-closing movement which started at New York has got as far south as New Orleans and as far north as Montreal.

Borax.

The price of commercial borax has greatly decreased during the past three years. It can be bought now for half what it cost in 1882. Then the market rate was 11 cents a pound, and at the present time it is 5½ cents a pound. This falling off in prices has continued, notwithstanding the imposition of a tariff which virtually prohibits the importation of borax and boric acid. It has been due, therefore, to this consumption not keeping up with the supply. The production of borax on this coast, which is the only part of this country where it is found, has been steadily very large. Last year 4,500 tons were extracted by the various borax mining companies in this State and Nevada. Its use has not grown more limited, but it has not kept pace with the production. It is employed in welding, glazing, pottery and cleansing. The iron trade consumes the largest quantity of borax, and with the increase of that industry the business of borax mining will be benefited. New uses are being found for this mineral. At first it was thought fit only for iron-workers and blacksmiths. Its detergent properties were revealed afterwards. The manufacture of glazed iron and earthen-ware was begun after other virtues were discovered in borax, and now it is employed in packing metals in Chicago. Notwithstanding the supply from Italy, large quantities of borax are exported to Europe from the Pacific Coast. Last week 775,000 pounds were shipped from this port to Liverpool. Some of the London illustrated papers contain flaming advertisements, in true American style, lauding the virtues of soaps made from California borax. Boracic soaps and borax in the shape it comes from the mines are admirable cleansers. A piece of borax dropped into water renders it pleasant to wash in. The supply on this coast is practically inexhaustible, as when crude borax is removed from the fields where it is found a renewal of it ensues. So important is this industry here that Sackville Nest, the English minister, recently made it the subject of a communication to Earl Granville. Most of the mineral deposits of this region carry borax in a crude form, and consequently there are many horates from which the pure borax is obtained. The crude borax of this coast is of a high quality. The largest supply comes from Teel marsh, in the Candelaria district, Nev. This field has been worked the longest and has given the greatest yield of any on the coast. There is a big marsh, twelve miles long, in San Bernardino, and several in Mono, Lake and other counties. The depression now existing in the borax trade will, it is thought, gradually be removed.—*Chronicle*.

SHELBOURNE.—Peter Lovell, lineman for the Western Union Telegraph Company for Eastern Nevada and Western Utah, returned to town on Monday last from Shelbourne, where he has some very promising mining claims. Shelbourne is on the old emigrant road, some 15 miles east of Cherry Creek, and although the place has but a few inhabitants to-day, it had in 1871-'72 a population of upwards of 800 people. The camp sprang into existence with one bound, so to speak, and notwithstanding the surrounding mines gave promise of good returns, yet in the midst of this most encouraging hopes on the part of the town's denizens an exodus to Cherry Creek and other new camps close by set in, and it continued until, like many other relics of mining camps to be seen to-day in the State and on the coast, all that remains to tell of its former greatness are a few stone walls and the foundations of what were probably substantial buildings. Mr. Lovell has great confidence in the properties there that he still retains, and on some of them he holds United States patents. From the Summit mine, in which he and Henry (commonly known as "Salty," from the fact of his owning large salt marshes in the State) Williams are interested, several pieces of ore fresh from new explorations in the property were brought in, and the same being assayed were found to contain precious metals to the value of \$500, \$890 and \$1,010 a ton. Altogether both gentlemen named feel quite certain that the old camp will yet vindicate itself, but it will be when a class of men go into it and prosecute work with judgment and practicability. Too much dead and senseless work has been done during its brief palmy period, and it was to this, in a great degree, that the camp was allowed to decay.—*Eureka Sentinel*.

GREAT DEMAND FOR ARSENIC.—Til. Burke reports that his house has sold 700 pounds of arsenic since Saturday, while he has orders on hand for some 400 pounds more. A prominent San Francisco drug store has sent 2,000 pounds of arsenic into the valley in the past few days. Frank H. Ball & Co. also report large sales of this drug. This gives some idea of the onslaught that is being made on the grasshoppers. The preparation suggested by George West is found to work like a charm. The hoppers eat it whether wet or dry, and rather seem to like it, and there is no danger of their communicating the poison to the fruit or anything of that kind, as they never fly after eating it, simply contenting themselves by crawling off and bunting a shady place to die at.—*Fresno Examiner*.

A CEDAR log was struck at San Bernardino, while sinking an artesian well, at a depth of 105 feet.

Cleanliness About Railroad Cars.

General Superintendent Smith of the Union Pacific Railroad has issued a circular, in which he calls attention to the necessity for a rigid enforcement of the company's rules regarding cleanliness, in view of the probable appearance of cholera in this country. Railroad officials and employees are reminded that the most important means of preventing disease is cleanliness—cleanliness not only of the person, but of the surroundings, as no disinfectant, in the superintendent's opinion, can take its place. He says that all shops, stations and adjacent grounds should be kept scrupulously clean and neat, and decaying animal or vegetable matter should be burned or buried. Closets should be scrubbed with soap and water as often as once in two weeks, and drains and sewers should be flushed with water as often as once a week if the water supply will admit. Passenger cars should be thoroughly cleaned and ventilated and the plush beaten frequently. The closets and floors of passenger cars should be washed as often as once a week and the Union Pacific disinfectant used thereon according to the printed instructions furnished with each package. Freight cars should be cleaned before loading. Mr. Smith calls attention to the fact that stockyards, corrals and outlets of drains are often so located that the drainage from them finds its way into the water supply, and he directs that, when practicable, springs, where the high land surrounding them was pure drainage, should be selected. The circular contains the following paragraph:

If a case of infectious disease is found at stations, or elsewhere on the company's property, a physician should be immediately sent for; if in cars, such cars should be removed from the train as soon as practicable, the doors locked, and should not again be used until fumigated in accordance with the printed instructions of the chief surgeon.

It is further stated that refuse from telegraph batteries form a good disinfectant, the residue to be mixed with common salt in the proportion of one and one-half pounds of salt to a gallon of residue.

All employees are expected to heartily co-operate in keeping the premises of the company clean and neat at all times.

MINING AT PLACERVILLE.—Mining operations in this immediate vicinity are at present lighter than they have been since the first discovery of gold here, or at least fewer men are employed in mining than at any previous time since the first discovery of gold here, and yet we have one of the best fields to prospect on the coast. The Placerville Gold Quartz has a fine property and a most excellent plant, but there is a hitch among the owners, causing it to lie idle. They are on a belt that is positively known to be rich. A few thousand dollars spent in prospecting the mine cannot fail to develop a rich ore body, and we are confident that the time will come when from 50 to 75 miners will be employed in the mine at an immense profit to owners. The Young and old Harmon property is another that will be eventually worked at great profit, but the ten or twelve thousand dollars that will be required to thoroughly open the property and put it on a paying basis is the drawback at the present time. The Reid mine is another property that promises well for a brilliant future, but it seems impossible at present to get capitalists to take hold of the most promising properties here, and the chances are that until our own citizens come to a better understanding in regard to the development of our resources, we must stay at a stand-still. We have it in our own hands to build ourselves up or tear ourselves down at present, but the time will surely come when all obstacles will be removed, and Placerville become the most prosperous town in the mountains, as it was years ago.—*Placerville Herald*.

A NEED.—The importance of the proper development of our widely extended fields of mineral, is sufficient to justify the government in establishing at different points schools or stations for the purpose of demonstrating the best methods of mining and treating the ores of each locality. The field is so broad and diverse, that the knowledge acquired in one locality, is often practically unavailable at another, hence the necessity of qualified scientists who are able to adjust themselves to the requirements of any location. The establishments of fish commissions and of weather reports form a sufficient precedent for the inauguration of this system, in a field vastly more important, the results of which would be permanent and lasting, and valuable for reference and instruction, so long as there was demand for their absolute existence. The results, thus obtained, in fact, become a part of the permanent knowledge of the people, forever valuable. The discovery, analysis and classification of a mineral, or the discovery of an agency which can be economically supplied in its treatment and use, becomes a permanent factor of value, which compared with report of the direction of the wind or probabilities of rain or sunshine, is worthy of consideration.—*Mining Review*.

It is thought that attempts have been made to cut the boom which holds several million feet of lumber in the Sacramento river at Redding, and the watchmen have received orders to shoot the first man seen prowling about the place after dark.

From Fresno County.

EDITORS PRESS:—I think I have found the great mother lode of gold-bearing quartz that runs from Trinity to Kern river. It lies here, about 30 miles east of Fresno City, in Fresno county. The people hereabouts do not take much to mining and think a man insane who is interested in quartz. As, however, I come from the Silver State of Nevada, I pay little attention to their talk. They have the impudence to tell an old Californian the mines are played out. If they would read your MINING AND SCIENTIFIC PRESS they would shudder at their folly. But as I am nothing but a poor prospector I have found a rich gold lode, in ground they have run over since Fresno county was settled by the Anglo-Saxon race. My mine lies directly above the granite formation, where it comes in contact with the slate. The gold is fine and almost pure. I can easily trace it a distance of six miles. It shows it is no blow-out on a common pay chute. There is plenty of wood and abundant water for milling and mining purposes. I wish some good man would come and see it. Please publish this in your valuable MINING AND SCIENTIFIC PRESS for the benefit of the wayfaring prospector and the future development of the quartz mines of California.

J. W. SUMNER.

Fancher Creek, Fresno Co., June 24, 1885.

The Need of Capital.

The great need of all new mining camps is capital. Prospectors who, after patient search and privations, with scarcely enough food to keep from starving, find districts which they deem of value, cannot develop them, and unless capital comes along to sink shafts, run drifts and put up machinery, the richest mines must remain idle. In a district as new as the *Coeur d'Alene*, there are tempting prospects for moneyed men to take hold of. All about us are ledges of quartz—gold, silver, copper and lead—which show as well on the surface as those of any camp ever discovered on this coast. Many of these prospects exhibit veins of ore that promise, with development, to become the best of bonanzas. The *Coeur d'Alene* is a perfect network of rich mineral-bearing veins. They are not confined to one spot, but run from the lake east for a distance of forty miles, and from ten miles north of Murray to twenty miles, and perhaps more, south. Here is an unlimited field for capital, and never were better opportunities presented for investment. Labor and living are cheap, and the facilities for working mines were never more advantageous. For reduction works especially there is an opening seldom equaled. There is lots of idle capital East and West. Let its representatives come and examine our claims.—*Coeur d'Alene Sun*.

RIVER MINING BY CHINESE.—A traveling correspondent of the *San Francisco Report*, who has been doing the upper part of Nevada county, tells what he saw and learned of the river mining now being done by Chinese miners along the Yuba: At Bridgeport, where I crossed the South Yuba, the river was running pretty thick and white with debris. There was not much water in it, and what there was showed that there was still some debris in the stream above. In following the river, I could see that many Chinamen were at work mining along its course, and I was informed that above this crossing as far as Omega, which is far above Bloomfield, they occupied the river in squads at every convenient place. This is also the case, I believe, along the Middle and North Yuba rivers, as it is along the main Yuba nearly down to the Narrows at Smartsville, some 12 or 15 miles below Bridgeport. These people do not own these river claims; they are located by white men, and the Chinamen lease them from the locators, paying pretty roundly for the privilege. None of these river claims will pay for white labor at \$2.50 per day, but pay well for Chinese labor at half that price. No one knows the number of Chinese at work along the Yuba and its tributaries, but it must be large—as must be the quantity of gold extracted and sent away to China. They certainly keep the material in the river bed stirred up, and so aid it in passing on down for the benefit of their friends, the anti-miners of Marysville.

SHASTA MINES.—Much interest is taken in the Shasta county gold mines, and all items relating to that section are eagerly read. The MINING AND SCIENTIFIC PRESS has had a correspondent in your county for three weeks past. His letters have elicited much favorable comment.—*Cor. Shasta Democrat*.

KEEPING COAL.—It is not generally known that coal is less valuable for having long remained in store perfectly dry. Most coal mines are saturated with water, and if the water is drained off the coal becomes flinty and valueless. Coal stored through the summer should be sprinkled and kept moist.

THE Canadian Government has issued a proclamation establishing quarantine against vessels from Mediterranean ports, as well as from London, England, Victoria, B. C., and Sydney, Nova Scotia, are created quarantine stations.

USEFUL INFORMATION.

The Future of the Wine Industry of California.

When the wine trade of California shall become fully developed, the production of wine will be enormous. At the present time there are not far from 170,000 acres planted in vines, divided into about 4,000 vineyards, which are owned by nearly as many individuals. The productive area is given at about 46,000 acres, which, at 400 gallons of wine to the acre, say 100 gallons of wine to a ton of grapes, gives a total product of 18,000,000 gallons for the State. It is thought the product this year will reach fully 20,000,000 gallons; that the increase in 1886 will have reached 25,000,000 gallons, and in 1887, 35,000,000 gallons will be produced.

An exchange says: The value of the wine now produced in California varies widely. Ordinary wine produced from common varieties of the grape sells as low as 20 cents a gallon, the buyer furnishing the barrels; but choice wine from carefully selected varieties and fine Riesling commands from 40 cents to 50 cents. As a rule, a judicious buyer with cash in hand can pick up excellent wine from choice French grapes at from 35 cents to 40 cents. Three-year-old Zinfandel is worth about what the holder asks; it is equal to good Beaune. A dollar a gallon is not at all out of the way for a very fine wine. The wine experts figure that California received last year for her crop \$4,643,750 (includes wines and brandies), and has besides a considerable stock on hand. The industry now gives employment to about 20,000 people, with their families. The shipments of wine to the East during 1884 were about 3,500,000 gallons.

When the entire present plant of 170,000 acres of vines comes into full-bearing the yield at 400 gallons per acre will amount to an annual product of 68,000,000 gallons. With that yield our annual receipts for wine and brandy ought to reach fully \$23,000,000.

Even that figure is but a mere moiety of the product of one single country in Europe—France. The official returns of the vintage in France for 1884 show the total yield was 918,310,000 gallons, being 33,180,000 gallons less than in 1883, but an increase of 105,608,000 gallons over the yield of 1882. During the year 1884 more than 60,000,000 gallons of wine were made from raisins and from the lees of grapes after they had been pressed.

In order to reach one-half of the present product of France the area of the vineyards of California will have to be increased to nearly seven times their present extent.

When we come to look the possibilities, or even the probabilities, of the growth of this business in California fairly in the face, there is no apparent reason to fear that we are overdoing, or, in fact, can overdo it. There is no reason why within the next half century California with all her advantages may not be able to produce and sell in her own and the markets of the world fully as much wine as is now produced in France. The possibilities of the business in this State are enormous. It feeds and clothes over 1,000,000 of people in France. It will eventually support that number in California.

Polishing Wood with Charcoal.

This method of polishing wood is described in a Paris journal. All of the world now knows those articles of furniture of a beautiful dead of black color, with sharp, clear cut edges, and a smooth surface, the wood of which seems to have the density of ebony. Viewing them side by side with furniture rendered black by paint and varnish, the difference is so sensible that the considerable margin of price separating the two kinds explains itself. The operations are much longer and much more minute in this mode of charcoal polishing, which respects every detail of carving, while paint and varnish would clog up the holes, and widen the ridges. In the first process, they employ only carefully selected woods, of a close and compact grain; they cover them with a coat of camphor dissolved in water, and almost immediately afterward with another coat, composed chiefly of sulphate of iron and nutgall. The two compositions, in blending, penetrate the wood, and give it an indelible tinge, and at the same time render it impervious to the attacks of insects.

When these two coats are sufficiently dry, then rub the surface of the wood at first with a very hard brush of couch grass (*chienden*), and then with charcoal of substances as light and friable as possible, because if a single hard grain remains in the charcoal this alone would scratch the surface, which they wish, on the contrary, to render perfectly smooth. The flat parts are rubbed with natural stick charcoal; the indented portions and crevices with charcoal powder. Alternately with the charcoal, the workman also rubs his piece of furniture with flannel soaked in linseed oil and turpentine. These pouncings, repeated several times, cause the charcoal powder and the oil to penetrate into the wood, giving the articles of furniture a beautiful color, and also a perfect polish which has none of the flaws of ordinary varnish.

ORIGIN OF CRAZY QUILTS.—"Crazy" patchwork originated in the following manner: A certain titled lady while learning embroidery

in an English seminary lost her mind, and it became necessary to confine her in a private madhouse. But she still retained her passion for needlework and spent most of her time in mending pieces of material furnished her from the madhouse scrap-bag. Although unable to perform the difficult stitches of embroidery work, it was noticed that in joining the odds and ends of material given her she invariably used contrasting or assimilating colors of thread or silk and that nearly every stitch was different from the others. Specimens of her work found their way outside of the asylum and since then millions of women, apparently sane, have found delight in imitating the handwork of the crazy countess.

VENEERING.—A correspondent of the *London Cabinet Maker*, writing on this subject, speaks as follows regarding the veneering of large panels, etc.: A great many engaged at the bench are aware of the irritating difficulties of preventing the veneered side going hollow as the glue sets, in fact, many tedious methods have been devised to avert it, such as joining onds in several places, veneering on both sides, the one to counteract the other, and fixing round, before and after veneering. The method I have strictly observed for over 20 years has two great advantages of being simple and inexpensive regarding material and time. In the preparation of the surface for veneering, many workmen damp or swell the heart side of the board, and the side on which the veneer is to be placed. This I consider radically wrong; the very reverse is the correct mode. Let any one try the experiment on, say a wardrobe end made of pine, and 6 feet by 1 foot 9 inches. After preparing the heart side for veneering, swell the other side by placing a layer of damp sawdust on it over night; it will in the morning be about three-quarters of an inch hollow on the face side; then size the face side, keeping the hack damp until the size is sufficiently dry for the cold, and it will be observed on coming from the cold, to be round on the face of the veneered side, and may be kept nearly so by placing the veneered side against a flat board, or the two veneered sides face to face, to dry gradually. Of course, after trying this experiment it will be necessary to know how long the article will require swelling. Considering the pine fairly seasoned and the veneer well dry, one night as a rule is sufficient.

FURNITURE POLISH.—The subjoined simple preparation is said to be desirable for cleaning and polishing old furniture. Over a moderate fire put a perfectly clean vessel. Into this drop two ounces of white or yellow wax. When melted, add four ounces of pure turpentine, then stir until cool, when it is ready for use. The mixture brings out the original color of the wood, adding a luster equal to that of varnish.

COMBINATION FURNITURE.—Combinations which economize space still continue to attract much attention, and are being rapidly multiplied by manufacturers of chamber work for hotels, boarding and rooming houses. Many of the designs have much merit for originality, and are welcomed by many a household.

GOOD HEALTH.

How Alcohol Intoxicates.

Those of us who are accustomed to strong drink have often noticed how quickly a glass of wine or a small amount of distilled liquor "goes to the head."

Most of us know that this effect is caused by the direct presence of alcohol in the blood, but it is not generally known just how it gets there.

To explain the delicate but simple operation of conveying the alcohol into the whole system is the object of this article.

All liquors, wine and beer, are merely alcohol, diluted with water and flavored by the juices of the fruit or grain from which the drink is made. The beverage, being taken into the stomach, comes in contact with the lining of that organ.

Now, this lining is provided with a network of delicate blood vessels, which are very small and have a thin membranous covering. Alcohol has the property of permeating this coating and being taken up at once by the blood within the capillaries, which carries it away to other parts of the system. Water, however, requires a much longer time to be absorbed, and as the alcohol becomes partially removed from the contents of the stomach, they pass into the small intestines. A small percentage of the alcohol which remains after this takes place, is rapidly taken up by the lacteals or the absorbent vessels of the small intestine and enters the main blood stream by way of the thoracic duct. The alcohol all eventually goes to the heart and thence through the liver into the general circulation.

All the organs in which blood circulates are now brought into contact with the mixture of blood and alcohol.

The nerve pulp, the brain substances and the great nerve centers are rich in blood vessels, and being the most sensitive part of the body to the action of alcohol, by reason of the fact that the natural moisture of the nerves, on which they largely depend for healthy action is largely taken up by the alcohol and conveyed

to the blood, they soon lose their control of the muscles, both voluntary and involuntary.

The heart, as a consequence, beats more rapidly, having less resistance to meet. The muscles of the veins and arteries relax, and the capillaries expand.

A feeling of warmth and flushing of the face is the result. The brain acts more quickly and thought and speech flow more freely.

Upon taking a still greater quantity of alcohol, some of the functions which are governed by the spinal cord become completely uncontrolled. The legs, feet and lips are first to feel this effect.

As more and more alcohol is taken, its effect progresses from one nerve to another, until the brain itself is stupefied and the mind is totally under the deadly influence, while the man sinks to the lowest level of mere animal existence. Finally, real temporary paralysis of all the nerve centers sets in, consciousness is lost, and the victim sinks into sleep. The beating of the heart and the moving of the lungs, is all that distinguishes him from the clay from which he came—sense, reason, mind, all gone. What can be lower or more degraded?

In connection with the above which we clip from Hall's *Journal of Health*, we give from the *Medical Age* the following on

The Effect of Alcohol on the Arteries.

Dr. Loomis, of New York, on presenting a case of aneurism to his class made the following pointed statement touching the causative relation of alcohol to this accident: "A man can take two or three glasses of stimulants through the day as he may feel the inclination, and he may continue this habit for perhaps twenty years without any evident harm accruing from it; but, when this man reaches that period of life when the vital powers are on the decline, he suddenly feels himself old before his time, for he has all these years been laying the foundation of a chronic endoarteritis. I believe, gentlemen, that 50 per cent of all these diseases arise from the use of alcoholic stimulants. The more I see of disease, the more I am convinced that, as a rule, a man is young just in proportion as his arteries are healthy and old as they are diseased."

FOOD FOR THE NERVOUS PERSON.—A distinguished physician says that he is disposed to exclude vegetables, with the exception of cereals and a little fruit, entirely from the dietary of nervous persons. Animal food is more nutritious to the nervous system and to the body generally than a vegetable diet. It has all the elements for the formation of the tissues of the body, and is easily digested. Men can exist on it in any climate. Of meats, beef is by far the best. Pork is good for nervous persons, but is not easily digested. Wild game is excellent. Fish is good food for nervous people. Eggs boiled just enough to harden the white are easily digested. It is a mistake about people eating too much. The majority do not eat enough. Nervous dyspepsia comes from working too hard and not eating enough. When a man begins to suffer from overwork he should eat plenty of good bread and butter, drink two quarts of milk a day, and eat plenty of good meat. When such a person resorts to a vegetable diet, he grows weaker and loses his nerve power. Man was made to eat meat, and he never will flourish on a vegetable diet.

HOW SHALL THE PHYSICIAN CLEANSE HIS HANDS?—Dr. Forster, of Amsterdam, contributes an article on this subject to the *Centralblatt für Klinische Medizin*. He calls attention to the great importance of physicians thoroughly disinfecting their hands before leaving a case of infectious disease (especially any of the exanthemata), and at the same time he asserts that few of the disinfectants now in use really have the power of destroying those microspores which are recognized as so dangerous an element in modern medicine. After a series of careful experiments in the hygienic institute at Amsterdam, in which every precaution was taken to avoid error, the author decided that a solution of carbolic acid of the strength of two and a half per cent was not capable of "sterilizing" the finger, but that a solution of corrosive sublimate of the strength of one or two thousand formed a reliable antiseptic wash. He urges that the latter be adopted by all physicians as well as surgeons.—*N. Y. Med. Jour.*

EPITHELIOMA.—General Grant's disease is termed epithelioma or true cancer. It is a tumor caused by the morbid growth of epithelial tissue. This is the tissue that covers or lines all cavities of the body with an external opening, no matter how small. The mouth and throat are examples, and the covering or lining of these parts is an epithelial tissue. It may be caused by long continued irritation of the part, such as would be caused by smoking, drinking, or the use of highly spiced articles of food. An epithelioma is one of the various forms of cancer, and is more or less malignant. Were General Grant's tumor on the external covering of the body it could be removed with safety.

GOOD NEWS FOR HUNGRY FOLK.—A physician says that wakefulness is oftentimes merely a symptom of hunger. Gratify the desire, and sleep ensues. The feeble will be stronger if they eat on going to bed. Some persons are exhausted merely by the process of making their toilet in the morning. A cup of warm milk and toast on retiring, or of beef tea on awakening, will correct it.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

MISCELLANEOUS.—Amador Ledger, July 4: The taking out of the water from the Moore shaft was completed early this week. The mine is free from water to the lower level, 160 feet from the surface. The shaft is found to be in excellent preservation to this point. Below, however, the shaft is in poor condition, and will have to be extensively repaired and retimbered before any sinking can be done. A prospect tunnel is being run in a northerly direction at the 180-foot level. At the Gover, everything is in good working order again, and the mill will be started in a few days. All indications point to the return of prosperous days for this mine. A fine body of ore has been struck on the footwall, which, according to all reports, justifies the sanguine expectations of the stockholders. The crushing of 900 tons of ore from the Median mine realized at the rate of \$8 per ton in free gold—a very satisfactory result. Having proved the paying quality of the rock by mill test, the company intend to put up steam hoisting works, and proceed to put the mine in good working order. Notices are posted calling for proposals for running a cross-cut at the 700-foot level of the South Spring Hill, at Amador City, the cross-cut to be 100 feet long, 4x6 wide and 8 feet high. A splendid ledge, 15 feet wide, was struck in the Moore mine Wednesday.

SUTTER CREEK.—The sale of the Mahoney is still an undecided question. Everybody is anxiously waiting to hear of something definite in regard to the property. The water is being kept out. S. D. R. Stewart, who is operating on the south extension of the Lincoln, is pressing the work energetically. About 50 feet more remains to be sunk, and then drifting will be commenced. Existence of a body of good ore is known, and for this locality the present work is being directed. The mill will be started next week on surface rock to help pay expenses while sinking is being prosecuted.

Calaveras.

STICKLE MINE.—Mountain Echo, July 4: In the Stickle mine, owned by F. K. Bechtel, a three-compartment shaft is down to a depth of 400 feet. At present ore is being extracted from the 200-foot level, the breast being from 14 to 20 feet wide and all good milling ore. The water is being pumped out of the lower levels, where a large body of high grade ore lies, and as soon as this is done work will be resumed on those levels. There is a 10-stamp mill running constantly, which will soon be increased to 20 stamps, when about 50 tons of ore will be milled daily. The hoisting works and mill are both run by steam power, and about 20 men are employed about the works. The Utica mine, a double compartment shaft, is down to a depth of 150 feet, on which level two drifts, one north and the other south, are being run. The north drift is 85 feet long and the south drift 35 feet; the ledge is from 15 to 25 feet wide and all good milling ore. A 20-stamp mill, run by water power, is crushing about 30 tons per day, and 30 men are employed by this company. The Lindsay & Co. mine is down to a depth of 120 feet, and the prospects are good. Three men are engaged in running a drift on the 110-foot level to cut the vein. The drift is in 115 feet, and the formation is of black slate. The Northend mine, Smith & Co. proprietors, is down to a depth of 85 feet. The ore lies in contact veins about four feet wide, all good milling ore. A 5-stamp mill is now running on the ore, crushing about 10 tons daily. The ore is hoisted by a whim and the mill is run by water power. The water in the mine is easily handled, and but six men are on the pay roll. The Potter mine, recently purchased by J. V. Coleman & Co., is now doing considerable work. Two new hoisting works with substantial machinery are being erected on two of the old shafts. It is the intention of this company to develop the mine to such an extent that a large mill may be kept constantly running. The Reserve mine is sufficiently developed to keep a 40-stamp mill running constantly. Full particulars could not be learned. Some very rich strikes have been made in pocket mining in this vicinity, and the prospectors are encouraged. Numerous arastras are running on prospect rock and doing well. All the above mines which have mills running are producing profitable results, and work is encouraged in them.

MORE RICH ROCK.—Calaveras Chronicle, July 4: The Tiger mine at Rich Gulch continues to produce very rich rock. Mr. C. Schlund, the lucky owner, showed us some specimen of ore one day this week. The specimens of quartz were "lousy" with gold and abounded in sulphurets. The quartz is what is called "ribbon rock." At the depth of one hundred feet a level was started, which is now in some fifteen feet, revealing a vein of ore fully six feet in width of the character of rock mentioned. There are now about 30 tons of rock on the dump. There is a 10-stamp steam-power mill on the mine, and when a good quantity of rock shall have been taken out, Mr. Schlund states that he will then start up the mill and crush the rock. He is in no hurry, however, to start the mill, but his main object is to explore the vein well before going into any more extensive operations. If it continues as it is now developing it is going to prove a veritable bonanza.

El Dorado.

WILD GOOSE FLAT.—Georgetown Gazette, July 3: Mr. J. Zentgraf is associated with his father Mr. Antoine Zentgraf, in working a quartz mine at Wild Goose flat which promises in the near future to become one of the permanent paying mines of our county. The ledge is from two to four feet in thickness and is being worked through a tunnel 800 feet in length. They have 250 feet of "backs," the ore is of good quality and has paid for all expenses incurred up to the present time. The work of development has been prosecuted judiciously and economically. At present but five stamps are in operation, but there is sufficient quartz for a much larger mill, and the Messrs. Zentgraf have concluded to add another battery of five stamps before the close of the present year.

Inyo.

BENTON.—Cor. Inyo Register, July 3: In early days, about '63 and '64, I believe, some very rich rock was found in Montgomery Canyon, and a tremendous

rush and excitement was the consequence. A lively little town of 3 or 4 thousand inhabitants at once sprung up, locations were made and mines opened out, and large shipments of rich ore made to San Francisco and other places. I have been told that some of the ore was worth from \$2 to \$3 a lb.; but the ledges were broken on the surface, and apparently gave out, and the excitement soon subsided. In the meantime, parties prospecting around found rich ore on Blind Springs Hill, and every one rushed for the new discoveries, and soon Montgomery had nothing left but the few who went on working their mines. On Blind Springs Hill the Diana was discovered, the ore cropping out on the surface like the back of a whale. And this was for a long time one of the best mines on the hill. Then we had the Comanche with a chimney of ore sometimes 6 feet in thickness and worked down for 800 feet. The Cornucopia paid well for a while, and is still owned and held by the Cornucopia Co., of Philadelphia. The Laura & Eureka have been steady bullion producers since they were discovered. The Lyford & Rockingham, from one chimney of ore, netted Albert Mack over \$60,000. The Elmira, a small vein west of the Comanche, discovered and located by Jas. Shaw, J. O. Wheeler and J. A. Lyford, produced \$25,000 from one small piece of ground, after it had passed into the hands of the Comanche Co., and very little work was done on it since. Besides these there are 30 or 40 other claims of more or less account, but all needing development to show their value. Many of these have been abandoned and relocated time and again, parties sometimes making a strike, others not; perhaps one locator would do work for a year or two on a claim, then give it up, another party would come in and perhaps in a day or two's work strike a pocket or chimney that would produce enough to pay for all the dead work that had been done. Many mining camps on the coast have given out, their mines failing to produce after spending on them millions of money; but Benton though sometimes experiencing a dull spell like what it is at present, has always been a strictly bullion producer since the first discovery, and it will continue to do so, for the veins are here; the ground is only scratched; the great mass of the ledges contain more ore than was ever taken out. Dan Cathey came over to the Sierras a couple of weeks ago to continue work on a ledge in Montgomery Canyon on which he has been working for two or three years. He has tunneled in now over 600 feet, and proposes to go through the mountain or find the ledge. Several other parties are prospecting in that vicinity, and we may look for something lively this summer.

BROWN MONSTER.—Inyo Independent, July 4: A lease of the Brown Monster was granted this week to Tom Bastion, W. Bastion and their brother-in-law Wilmot. Tom Bastion moved his family from Lone Pine to the mine a few days ago. The parties who had the mine leased prior to the granting of the present lease, earned about \$70 per month; but not content with this they threw up the mine, and wandered off to Montana, Idaho, or other distant places in search of "a big thing." It is curious how inveterate this wandering habit is with miners, they are always hunting shadows, seeking the gold buried at the end of the rainbow, but the disease appears to be as incurable as cancer. Miners who stick to the Inyo range, and are industrious, earn good wages.

VANISHED.—The prospective greatness of Antelope Valley, Mono county, has vanished like the baseless fabric of a vision and has left, not a wreck, but many wrecks behind. Specimens of the mineral were most thoroughly tested by State mineralogist Hanks, and by him pronounced to be worthless. Everybody in Inyo county would have rejoiced heartily if the wildest hopes of the Antelope valley prospectors had been more than realized. A much better field for prospecting, and an assurance of at least a good living, can be found by these prospectors in the Inyo mountains, and they will be welcome here if they come with intent of honest work. Hilario Arambula, Miguel Escobar and one more man, got fifteen hundred dollars' worth of gold from the last run of their ore from the Chilula mine. The men worked just sixteen and a half days getting out the ore. Last Monday the three started in again getting out ore for another run, and they are certain of doing even better on this than the former run. The ledge in the Chilula is three feet wide, all of the ore is worked, and averaged forty dollars per ton. Parties who have recently been to the White Hill district give very favorable reports of the mine belonging to Welch and Downs. The ledge where recently opened is strong five feet wide for a distance of 50 feet. Samples of the ore brought to Independence are evidently rich in silver. This is the largest ore body yet found in the White Hill district, and the mine gives better promise with every day's work of turning out a valuable property.

Nevada.

TO RESUME WORK.—The Virginia City Enterprise, July 4: J. P. Wheeler, one of the oldest and best known mill and mining men of the Constock, leaves to-morrow morning for the Centennial gravel gold mine in Washington township, about 14 miles this side of Nevada City. He goes under the direction of the trustees of the company, and will at once proceed to put the engine and hoisting machinery in order to resume work in the shaft. The proposition is to pump out the water and sink into the gravel channel struck when operations were suspended for the winter. It is thought that this shaft is located right to strike directly down into the very heart of the great blue gravel lead or channel from which so many millions in pure gold dust have been taken, and the strong influx of water with the gravel struck after passing through the lava indicates this. When properly commenced the work will be actively prosecuted.

PRODUCING PROPERTIES.—Eureka Sentinel, June 29: The mining situation in Eureka district remains substantially the same as last week. In one or two properties on Prospect Mountain new developments have been made, but as yet they have not been prosecuted to any great extent, and consequently their values are not ascertained. During the past week from mines there, the following shipments have been made to the Richmond reduction works: Whippoorwill, 22 tons; Lunderberg, 11; Home Tippet, 6; Lord Byron, 9; Eldorado, 14; Silver Connor, 8; Maria, 8. To the Eureka Con. furnace Maurice Hartnett made a shipment of two tons from the Plute mine. On Adams Hill the situation continues interesting. At the Wilde West mine, which is leased by Messrs. Frazer & Malino, over 300 sacks

of ore are on the dump ready for shipment. From the Lone Pine, which is being worked by Messrs. Quinn and Berry, some ore which will work over \$300 to the ton, is being extracted. The following shipments were made during the week from properties of that section to the Richmond works: Silver Lick, 71 tons; Bowman, 42; Wide West, 2; Reserve, 1; Marguerite, 11. The mines on Ruby Hill continue to produce ore as usual. The Williams' pitch on the seventh level of the Eureka Con. mine is looking as well as ever. From this body alone over 350 tons of ore have been extracted during the past few weeks, and as yet there are no evidences of its proving less in any way than was predicted by the company when first encountered some two months ago. In fact, it is proving larger than anticipated over a fortnight ago, and its general character is holding out fully up to the expectations of all the interested ones watching the work as it progresses. The other pitches of the property are said to be looking and holding out well. Ore from the mine is being shipped to the company's works as it is required there. Not knowing what work is being done in the Richmond mine, we are unable to make any report of it. The Albion mine shipped during the week to the Eureka Con. furnace 11 tons of ore, and the Phoenix 7. From Revelle district, over in Nye county, G. E. Clark brought in to the Eureka Con. furnace during the past few days 8½ tons of high grade ore, and from some properties in Tybo 4 tons were brought in to the Eureka Con. furnace. Several small shipments of ore were also made from properties in and near Hamilton to the furnaces here.

Plumas.

NOTES.—Greenville Bulletin, July 4: T. F. Enmons is running the Kettle mill on ore from the Altoona mine. Work on the Gold Stripe continues. The rock in the tunnel is very hard, making the progress rather slow. Things progress at the Green mountain with the usual regularity and smoothness. Good advancement is being made at the Indian valley. The Forest King is looking well and doing well. The Arcadia mill is running regularly on some fine ore from this mine.

San Bernardino.

CALICO DISTRICT.—Print, June 28: Notwithstanding the cry of dull times, mining at no time in Calico district has been in a more prosperous condition than at present, or the outlook of the mining interest brighter. It is not saying too much to assert that the camp is by far the most extensive and richest silver belt discovered upon the coast. As yet no great developments have been made, the greatest depth attained upon any one mine being that of the King upon which a depth of 600 feet has been reached, without any sign of a failure upon the part of the vein, or a giving out of the ore, but enough developments and explorations have been made to satisfy and convince the most incredulous that the mines of Calico are true veins, and carrying immense deposits of chlorides and horn silver, the ores being with scarce an exception free milling, requiring no roasting, but the simplest of chemicals. The ores are worked up to as high as 90 and 95 per cent. Among the different mines visited during the last week is the Paw Paw, owned by Harry Erckenbach, Cahill and Wentz. This mine is located about 200 feet east of south of the King, and one-half mile from the town of Calico. A tunnel has been run in and along the vein a distance of nearly 400 feet, showing a well defined footwall and a vein of high grade ore of two feet in thickness, and gradually widening as depth is attained in the tunnel by running in the hill. Several tons of ore of a most excellent quality are now on the dump. The owners are men of limited means, hence the developments are naturally slow enough.

THREE ANGELS.—This mine is located on the new wagon road leading to the Blackfoot mine, and is owned solely by Thomas Wiltier. There is a magnificent showing, a splendid milling proposition with plenty of high grade ore, carrying horn silver and chloride. Alone and unaided the owner works his mine. Of course the developments made must naturally enough be slow. Wiltier being without capital can do little else than surface work.

BLACKFOOT.—This mine is under lease and bond to the Calico Mining and Reduction Co., and likewise located in East Calico and north of the San Houston No. 1. Some 20 men are employed at and around the mine, which is yielding ore in large quantities of first-class milling grade, which will be reduced at the company's new mill in Daggett. A new wagon road has lately been constructed to the mine, and several hundred tons of ore are already on the dumps awaiting transportation. The Hap Hazard is likewise under lease and bond to the same company, and is located about half way between the town of Calico and Cuba mine, being worked by a small force of men under the foremanship of Wm. Cochran, with gratifying success, as the ore is of a fair grade, with a fine showing and like all ores of this camp, is free milling. The Dora Belle is located in the vicinity of the Bismarck, owned by J. B. Whitfield and others, is under lease to Page & Co., who are good miners, and have recently made in the lower levels of the mine an important development. This mine has a shaft down 50 feet, and levels run, in one of which the recent rich strike was made, the vein shows well. The ore is a soft, reddish spar, yielding horn silver and chloride, and will mill well up in the hundreds.

WATERLOO.—This mine lies in a westerly course from Calico, and distant about one and a half miles. It was not long since purchased by the Oro Grande Mining Co., by D. Bahten, superintendent from Garrett and McDermott. Since coming into the possession of the company two shafts have been sunk upon the vein, 400 feet apart, each in ore of an excellent milling quality. From shaft No. 1 a cross-cut has been run 40 feet, exposing one of the largest ore bodies in this camp. The company are preparing to build boarding houses, whim, etc. The Mountain Brow is being worked under lease by supervisor T. H. Eckles and his partner Mr. Woolman. This mine lies parallel with the Josephine, and was in 1883 and the early part of 1884, worked by A. K. Sparkuhle and has yielded tons of as rich ore as ever were extracted from the district. The present lessees are doing well, and meeting with undoubted success. The location is within the zone of the King belt and north of and adjoining the Red Jacket. Much ore of a good grade is being extracted and milled. Exchequer lies north of and adjoining the Occidental, is owned by the Brison Bros. and Mr. Reed. Here we find one of the finest surface

showings in the districts. The ore outcrop is to be seen in many places on the surface and is of a high grade. A tunnel is now being driven in by the owners from the north hill side to tap the main ore chimney. Captain Brison is diligently engaged in the prosecution of the work. Jupiter lies north of and adjoining the Exchequer. This location is owned by J. W. Coleman & Co., who have been for some months steadily engaged in opening up and developing the resources of the same. The ores are similar to those of the Exchequer, and of about the same grade. The owners at this writing have made a shipment of several tons, after the working of which the design now is to sink a working shaft and open up the mine in a workmanlike manner.

SAM HOUSTON No. 1.—This mine lies in that part of the district denominated East Calico, and owned by Los Angeles parties, now worked under lease to Benefield, Whitton and West Nichols. The ores are of a high grade, and the lessees are undoubtedly doing well. The mine has every indication of being a fissure, as it carries a well defined foot wall and is upon a direct line and north of the Plutarch, which is owned by John McBride & Co., and upon which some 6 or 7 tributaries are now at work, among the number being George Clark and Gus McIlvain who have a lease of a portion of the ground and are now taking out ore which will mill upwards of \$500 per ton. The Plutarch is north of and upon the same vein or ore channel as the Taggart, which is owned by J. W. Taggart, F. M. Neel and others.

CUBA.—This mine was last year purchased by Gov. Daggett's Co. from Keyes and McGlinchey, and is now being worked most successfully by different parties, under tribute, who give one-fourth of the net proceeds, after deducting expenses of hauling and milling, which by the way, is the usual royalty exacted and paid by tributaries in Calico. Paradise Springs lie about 12 miles north and east of the town of Calico. Here there is an abundance of water, the springs affording something like 20 inches. The country rock is granite. The principal mine so far opened up is the Vulture No. 1, owned by A. M. Rae & Co. Upon this vein a shaft has been sunk twenty-five or thirty feet. The vein is encased between two well defined walls, is four feet in thickness, all pay ore, carrying free gold, with little or no silver. The mine is located one mile or thereabouts from the Springs. Work is being vigorously prosecuted on this vein by the owners, as they are now sinking a main working shaft with a view to a complete development of this property.

Trinity.

FROM NEW RIVER.—Trinity Journal, July 4: Mr. Murchie, late superintendent of the Mary Blane mine in New River district, passed through Weaver ville this week on his return to his home in Nevada City. The mine has been closed down, owing to the company failing to pay its laborers. Mr. Murchie complains bitterly, and with apparent good cause, of the shameful treatment of himself and other employees by the Mary Blane Co. It is to be hoped that matters will assume a better form ere long, and we are disposed to believe they will, as the company is composed of some of Eureka's best citizens, who can ill afford to rest under an accusation of refusing or neglecting to pay for work done for them.

POCKET MINING.—G. W. Ward showed us about an ounce and a half of gold this week which Mr. Riffe, himself and others had taken from a "pocket" on the ridge between West Weaver creek and Democrat gulch. The finding of this pocket demonstrates that such do exist in this section, and will doubtless stimulate others to searching in the same direction, thus encouraging a method of mining which has proven vastly remunerative in other sections.

Tuolumne.

SHUT DOWN.—Union Democrat, July 4: The Hyde mine has shut down again. Whether the parties who have the property bonded will resume operations or not is an open question. They started out with a disagreement among themselves, and matters have not since shaped themselves harmoniously, an unfortunate thing for the mine, which is likely to suffer in reputation from purely outside circumstances.

MILL RUNNING.—The Lamphier mill started up last Monday and is running steadily. It is likely to be a long time before it will be permanently closed down again. A small force is operating on the Green mine, and some very fine rock is being extracted. We understand that the mill will be started up next week. The Rising Sun mine was sold by the sheriff last Saturday to satisfy a judgment. F. D. Nicol, E. A. Rodgers and F. W. Street, attorneys for the lien holders, bid in the property at \$2,107.67. Edward Fisher, of San Francisco, has bonded the Fitzgerald mine at Quartz Mountain from the Fitzgerald brothers, and will proceed to open up the mine. The price named in the bond is \$9,000. County Clerk Fitzgerald is one of the owners of the mine. Fifty tons of quartz was recently taken from the croppings of the Riverside mine and worked for the purpose of making a test. We have not learned how the rock turned out. One hundred tons more of the croppings will be worked so as to make the test conclusive. Should the yield prove satisfactory, a shaft will immediately be sunk on the croppings. If not, work will be resumed in the tunnel, which is now in over 400 feet.

NEVADA.

Columbus District.

MOUNT DIABLO.—Candelaria True Fissure, July 4: The north crosscut on the sixth level is now in 32 feet and shows barren ground. The east drift on the sixth level is in 100 feet, and the east drift on the fifth level is in 168 feet. The intermediate between the fifth and sixth levels shows a few inches of \$70 ore. The stope between the fourth and fifth levels and west of the incline are looking well, and turning out considerable \$70 ore. The intermediate below the fourth level, near vein No. 2, shows two feet of \$50 ore. The west drift on the third level is giving a small amount of ore of good grade. The stope, near vein No. 5, and below the third level, shows a good bunch of \$60 ore. A little ore of good grade is being taken from the intermediate between the second and third levels and east of the shaft. The intermediate between the second and third levels and west of the shaft, shows a little improvement. The west drift on the second level is turning

out considerable ore of fair grade. The workings above the second level show no marked change.

Jefferson District.

GOOD ORE.—Belmont *Courier*, July 3: Henry Harrison informs us that the Harrison mine at Jefferson is looking well, and that good ore is being extracted. The little mill is running constantly and producing fine bullion.

Reveille District.

WORK.—Belmont *Courier*, July 3: Work in some of the mines of Reveille district is being pushed energetically ahead by George E. Clark, the Norris Bros., Joe Bianchi and others. Good ore is being extracted and shipped to Eureka for reduction. The ore from the mines of this district is of a high grade.

Star District.

SHEBA.—Silver *State*, July 3: The Sheba mine at Star is now owned by Peter Woolcock, of Mill City, who has leased it to William Woolcock, Joseph Phillips and Thomas Bray, all practical miners. The lessees are at work in the mine, and taking out some very rich ore. They expect to ship a carload shortly that will average \$600 to the ton. Old miners are of the opinion that the Sheba is one of the best mines in the country.

ARIZONA.

OUR GRAVEL BEDS.—Prescott *Courier*: These are the most certain "banks" in this country. They never fail to honor the demands of labor upon them. They exist in various places in this country; are as yet scarcely prospected and will, with proper working, be made to yield a great deal of gold. Those near Weaver and Walnut Grove are very extensive, so are those on the Upper Hassayampa, Turkey, Lynx, Big Bug and Black canyon creeks. Mr. Tracy, who owns one of these "banks" on the Hassayampa, takes some beautiful pieces out of it. His pay gravel is six feet thick and he will soon have it "faced" for a distance of 80 feet. He has wet and dry diggings and can always capture gold. The railroad, which will bring in men and means to work all our mines, will make placer mining one of the regular industries of this great country.

MOJAVE MINES.—*Miner*, July 3: John Hughes and William Davis are reported to be taking out \$800 ore from the Constellation mine near Cerbat. Capt. Layne shipped six tons of ore from the new strike on the Prosperity mine last week as a sample. He expects the ore will go over \$200 per ton. Messrs. Smith & Sherman, of the Golconda mine in Todd basin are developing a fine body of ore, and shipped another carload last week. On the Primrose mine the outlook still continues to improve, and Messrs. Maxson & Jackson are jubilant over their prospects. They shipped 12 tons of ore last week. Beecher & Co., of Kingman, have shipped during the past week twelve tons of ore from the Golconda mine, twelve tons from the Primrose, six tons from the Prosperity, and five tons from the Little Boy mine, all in the Todd basin. Messrs. James Nimon and Morrison are back again from Colorado, and have resumed work on their gold mine at the Music mountains. Their claim lies west of the ones owned by Thompson & Co. Messrs. Ridenour, Upsher and Moon shipped another carload of ore from the Hackberry North mine to Kingman last Monday. The ledge is looking better than ever. Messrs. Prisk & Pomeroy, of the Little Boy mine, at the head of Todd basin, shipped five tons of high grade ore last week. Ore from this mine will run from \$250 to \$1,500. The Music Mountain Gold Mining Company will soon start up again on the Ellen Jane mine. The company propose to sink the main shaft, now down 102 feet, another 150 feet, and the work will be commenced on an early day. Messrs. Ashbury and Lockwood left town on Monday with a load of provisions and supplies, bound for the Mocking Bird mine, at the foot of Stockton Hill, which they have leased. The Mocking Bird generally runs from \$200 to \$1,200 per ton, and there is no reason they should not get out lots of it. Capt. Layne, one of the oldest and best prospectors in the county, was in town on Monday. He brought in a box of free specimens from the Prosperity mine, in Todd basin, which show ruby and native silver in abundance. The new strike on this mine is high grade, 18 inches wide, and, if it holds out, Messrs. Layne and Wright have a fortune in it. All over the length and breadth of our county miners are doing better than ever before. Instead of our rich ores being worked out by former chloriders, it would appear as if they were only just being unearthed. The mining outlook of Mojave county has never been better than at present.

COLORADO.

CRESTED BUTTE.—Elk Mt. *Pilot*, June 2: There is enough ore passing through our town to run a smelter. Crested Butte will be shipping 50 tons of ore a day before snow flies, and still none of our capitalists will venture to erect a smelting plant here. With positively everything that is needed to make success certain, they shake their heads ominously, then go off where they can secure none of the requisites to success, invest, and—make a failure of it. Then they call us liars and thieves, and all because they could not tell the difference between good advice and bad advice. The Sylvanite Co. are putting in to the Avery smelter works chlorination process. The company will expand several thousand dollars and put the work in first class shape. They have purchased a Bruckner roaster which is now in transit, one piece of which weighs four and a half tons. Prof. Moritz, of Swansea, England, is in charge of the works. There are about 50 men at work in the Poverty gulch and Dark Canyon districts, nearly all of them taking out ore. The Florida lode, in Poverty gulch, is destined to be a producing mine ere long. It is located in the vicinity of the Augusta and Richmond, and is owned by H. V. Meloy, M. J. Gray, et al. At present Scott McCulloch has a contract to drive a cross-cut tunnel, and sink a shaft on the vein to connect with the tunnel. From present indications it will emerge from a prospect to a producing mine by fall. The ore is characteristic of that found in the Augusta and is increasing in quantity as work progresses.

IDAHO SPRINGS.—*Gazette*, July 2: Shipments of ore were made from Ute Creek this week, Mayor Griswold, who is working the Inman lode, Chicago

Creek, has one of the biggest and best lodes ever struck in that district. The ore at a depth of only sixty feet shows several inches of solid mineral, which shows ruby and brittle silver in profusion. A large amount of ore is being taken out and sorted, and a shipment will be made some time this month, which will astonish our mining men. Since our last article on the Freeland mine all the levels below the Freeland level have been extended several hundred feet; raises from one level to the other, for the better circulation of air, have been made, and all show ore of good grade, some of which runs several hundred dollars to the ton in gold. The concentrating works and smelting works are running steadily and turning out the usual quantity of bullion, which is making a net profit on the property of from \$10,000 to \$12,000 each month. The experiments which will be made with the Osbiston smelter, on Clear Creek, in smelting with coal, if found satisfactory, the whole Freeland smelter will be moved down on the line of the railroad, as wood is getting scarce, and coal will undoubtedly have to be used. The ore can be hauled down to the smelter for one-third of what coal could be hauled up for. The outlook of this great mine is certainly bright. In answer to the Financial and Mining Record, of New York, which desires us to enumerate the number of stamps in operation around Idaho Springs, we give the following: The Lilly Consolidated Mining and Milling Co., 25 stamps; the Barber Gold Leaf Mill, Soda Creek, 10 stamps; the Bully Pan Mill, Squirrel Gulch, equal to 10 stamps; Tarr & Co., Chicago Creek, 10 stamps; Mott Mill, 10 stamps; Osbiston Mill, 10 stamps; Champion and Donaldson, 50 stamps; Osborne & Co., Fall River, 10 stamps. Total, 135 stamps. This is a large number of stamps, considering the small number of gold mines in operation. The capacity of the concentrating works is about thirty tons a day. The sampling works treat and buy on an average of thirty tons a day, or from 800 to 1,000 tons a month. All these, with two smelters in operation, make this point the peer of any camp in the State. The Union Smelting and Refining Company, which has lately been organized with a capital of \$500,000, has secured control of the Campbell smelter and is remodeling it. It will start up in about a week. Mr. Ben. D. Allen, of the Public Sampling Works, is the manager, which insures its success. Mr. Allen will purchase all ores, and sample and pay the highest cash price for their contents. These works will employ about twenty-five men. About fifteen men are burning charcoal, four or five cutting wood, and a number employed hauling. Mr. Allen, who also has charge of the Gunn Tree mine, at Freeland, one of the big mines of that district, will soon have the engine and boiler in position. At present about twenty-two men are employed on the mine in doing development work, and the force will be increased as ground is opened up. This mine is capable of producing large quantities of ore, almost enough to keep the smelter going. Last month the sampling works purchased over 800 tons of ore, and this month will largely exceed that amount.

CRYSTAL CITY.—Activity has commenced in our mines and good reports keep coming in from the boys. Mines are showing up well in different parts.

MONTANA.

THE HELENA MINES.—*Inter-Mountain*, July 1: S. T. Houser, of Helena, who is now in the city, was talked with last night by an *Inter-Mountain* reporter concerning the general east side mining outlook. Mr. Houser, as is well known, is president of the Wickes Company, and is prominently interested in a number of other extensive mining properties in the Helena section. The east side mines, he says, are looking up, and more is now being done in that industry in that section than ever before. As a result Helena, which was somewhat dull for some months past, is now lively up, and that boom in the coming of which every true Helenaite has such implicit faith, seems now at hand. The Wickes mines and works are running about as usual, with the exception that a magnificent development was made a few days ago in the Alta, the ore body having been found to be 18 feet wide at the point where the 1,400-foot tunnel taps the lead, at a depth of 900 feet. This is a solid ore and is of an excellent grade. The works are producing from \$100,000 to \$120,000 per month. Work on the Bonanza Chief, the gold property in the Wickes vicinity about which there was so much excitement in Helena five years ago, has been resumed. The property had lain idle for the past three or four years, the machinery for working the ore at that time having not been of a kind suited to economy, there being a good deal of iron pyrites in much of the ore. This pyrites ore is now taken to the Wickes works where it is smelted along with the galena ores. It contains from \$50 to \$60 in gold to the ton, and this goes into the base bullion. They are also getting a good deal of free milling ore from the Bonanza Chief, and this will be treated in the works upon the property, to which some important additions are to be made. At the Legal Tender, a galena property in the same vicinity which produced a good deal of high grade ore, (some of it rich in ruby silver) two or three years ago, work has also been resumed recently with promising prospects.

OTHER MINES.—The Helena mine, one of the discoveries made this spring some four miles west of Helena, is working a small force. Levels run both ways along the vein from the bottom of a 60-foot shaft show from 18 inches to 4 feet of 40 to 50 per cent. galena ore, carrying about 60 ounces in silver. In the Ten Mile district some big sales are understood to be on the tapis, one being the Lee Mountain group, owned by John Caplice, of Butte, and others. Mr. Caplice is now in New York and it is expected that the properties mentioned will be purchased by a strong company in that city which has been negotiating with the owners for some time past. If the sale is made the 50-ton concentrator erected last fall near the Lee Mountain mine, will also doubtless go into the hands of the new company. The J. H. Russell group of mines in Ten Mile district, under bond for a large figure to C. A. Broadwater and St. Paul capitalists, and on which some 30 to 40 men have been at work for several months past, developing, will, it is expected be bought. The syndicate has already expended a good deal of money on the work, and the result has been such that they have secured an extension of the bond until January 1st, and will continue the work of developing. There is little doubt of the sale being made. There is a good

deal of other new work being done in Ten Mile district by the smaller mine owners and generally with satisfactory results. The old producing mines of the Helena vicinity, the Gregory, Glover, Drum Lummion, Homestake, and others, are keeping up their usual output.

BOULDER DISTRICT.—Cor. Helena *Independent*, July 2: One of the unmistakable "mother lodes" of the Boulder district is that upon which are the Comet, Kanawha, Australian, Bismarck, Wilbur, Virginia Belle, and Emmet locations. These are all in one direct line, and the formation is such as to justify the assertion that the lode on which they are located is the one principal fissure of that district. On the north side of that vein there is no mineral of consequence found, while on the south are numerous spurs of the character of the Von Armin putting into it. The great lode runs in a northeasterly and southwesterly direction, and these intersecting spurs run nearly east and west and not beyond the lode. The Virginia Belle, owned by B. C. Brooke and B. P. Mason, has been bonded for \$20,000, and in order to develop this claim a tunnel has been run 180 feet to the vein and a good body of galena opened. Some of the ore is reported very rich, and the average of it good. Parties who seem to be in a position to judge of the probabilities say that the mine is as good as sold. The Emmet is on the same lode and distant from the Virginia Belle only about a thousand feet, and is bonded at \$25,400, and ten men are actively engaged, night and day, in its development. The vein is about six feet wide, and shows a very good grade of galena ore, intermixed with carbonates, and the average is claimed to be about fifty ounces. The Wilbur, also on this lode, and next to the Bismarck, is bonded, together with the Herkshire, which lies parallel with it. On the Wilbur the deepest shaft is 62 feet, and at the bottom the ore is three feet and widening, and 200 feet away is another shaft 20 feet deep, in which the pay is three feet wide. From the deep shaft is a level which displays an ore body of four feet thick. The galena carries from eighty-five to ninety ounces of silver to the ton, and from \$5 to \$12.50 in gold. The Pilot is the same vicinity is also under bond, and the parties bonding are about to erect a hoist and open the mine. At present there is a vein nine feet thick, and it is claimed that the ore will concentrate to good advantage. Sam. G. Mackay is shipping ore from the old Belle of the Boulder to the Amazon works, and it is reported that returns are satisfactory. The McGregor Mining Co. has just about completed a fifty ton concentrator, similar in character to that at Corbin, and it is claimed that the company has a large quantity of concentrating ore already accumulated, and preparations are making for extracting ore from their McGregor mine. Developments in that mine have attained the depth of one hundred and eighty feet. Altogether the prospect of a busy and successful season for this district is good. The Helena Mining and Reduction Company are in good spirits over the appearance of the Alta lode in the sixth adit level, where, for the last hundred feet, the vein shows a width of 18 feet, all ore. A thousand feet of stopping ground of that character would be good enough. The Isabel lode on Nevada creek has been sold to Helena parties, and a mill is to be put up without delay. This lode carries gold only, and is very free, and there is no doubt that a good paying investment has been secured to the promoters of this enterprise. Milo Courtright has made several locations near Diamond City in Meagher county, and other parties are talking with him of making a grand consolidation of interests and putting the properties in the way of development. A mill is there which could probably be utilized in the prosecution of the work, and from examinations made, there is little doubt that if this is done another success will be inaugurated. A practical miner has been over the ground, and reports favorably as to the character of the prospects there. At one time a large amount of work was done on the quartz in the vicinity of Diamond, and high hopes were entertained of ultimate results; but when the celebrated White Pine stampede occurred, the picks of Diamond were left hanging in the air, and comparatively nothing has been done since except to work the placers, which have not yet stopped yielding. The Drum Lummion bullion produced this month will amount to about \$80,000, and that of the Helena Mining and Reduction Company will aggregate nearly as much. On the 25th of last month one of the boilers gave out, and as a consequence one of this company's furnaces has been idle about half the month, and the other has not done very effective work on account of insufficient blast, but in the meantime a large quantity of ore has been roasted, and from this time forward there will probably be no interruption, and the next month's product will doubtless be double that of June, or about \$150,000. A new boiler and engine has supplanted the old ones, and everything is ready for a long and successful run.

NEW MEXICO.

APACHE DISTRICT.—Deming *Tribune*, July 2: This comparatively new district is located 30 miles southwest of Deming, and nine miles a little south of east of Hachita, and is most readily accessible from the latter point, through which ore shipments are made to Separ on the line of the Southern Pacific railroad—30 miles from the mines. The district is about five miles square and includes a group of comparatively low mountains, known as the Apache hills. There are not, properly speaking, any mines in the district. There are two prospects in which the development will exceed 100 feet each, and quite a number of others upon which some work has been done—almost uniformly with encouraging results. The two prospects referred to are the Copper King and Mammoth. They are adjoining and parallel locations on either side of a porphyry belt which averages 150 yards in width. Both are found in spar line, the principal part of the work having been done at the contact with the porphyry. The belts of spar are each from 60 to 80 feet wide and the work in the Mammoth indicates that the ore deposits extend for a considerable distance, if not entirely through the spur. The lines of the porphyry are plainly marked for a distance of almost three miles, the general course being from northwest to southeast. To the west of the spar belt, in which the Copper King is located, a quartzite reef is discernible for a distance of five or six miles, along which some locations have been made. These are not far enough developed to give much indication of what will eventually be determined by the working of

them. It is at present a dry camp, no natural surface water being found nearer than Thompson's spring, seven miles away. Work in the mines is not yet deep enough to show water, and all that has been done has been at the disadvantage of hauling water for all camp purposes either from the spring mentioned or from Hachita.

ORE.—Silver City *Enterprise*, July 3: Richards & Swancout have struck a body of good ore in the Mangus, at Fleming. Colonel Hardee generously offers to donate five acres of land to any one who will build a smelter in this city. He has a splendid location. It has been given out cold from Black Hawk that the next party which undertakes to hold up the ore thieves will be met with bullets. We may expect a killing soon. Burr and Fairfield have secured an 800-foot contract on the St. Louis mine at Paschal. R. P. Samuel recently had the same contract at such a low figure that he was compelled to throw it up. Bremen's mill resumed operations on Monday last after having been closed down for nearly a year. The closing of the mill and the partial suspension of operations on the mine was caused by the heavy raids of the ore thieves, who got away with the rich metal while Mr. Bremen paid for the breaking of new ground. Mr. Bremen is now of the opinion that he has things in such shape that he can protect his property without going before the courts to do it. The mine never looked better than at the present time, there being a large amount of ore in sight, and enough already out to keep the mill pounding away steadily for a considerable time. The San Jose smelter, which was erected less than two years ago at a cost of perhaps from \$12,000 to \$15,000, was sold on Tuesday last at public auction. The plant was owned by Pope, Cole & Co., of Baltimore, general dealers in copper and lead, and who recently made an assignment.

OREGON.

CLEANUP, ETC.—Jacksonville *Times*, July 3: A cleanup is being made at the claims of Wimer & Sons and Deselles & Connell, near Waldo. A promising ledge has been discovered near tunnel 9, several miles north of Grant's Pass, and is being prospected. Swinden & Co. are about erecting an anastra to test the quartz now being taken from their ledge in Rock Point precinct. H. Kinney, of Medford, and others are prospecting a ledge in the Evans creek district, the ore of which promises well in silver. Green Bros., of Galice creek have bonded their ledge again, this time to an Oakland, Cal., Co. Will. Q. Brown represents the Californians. A. W. Sturgis, of Forest creek, suspended operations a few days ago, after having made a good run. He was unable to finish cleaning up, for lack of water. A great deal of prospecting is going on in the Evans creek district. Dr. Stanley, T. T. McKenzie, Blalock Bros. and others have located ledges that promise well. Neitz Bros. and Ed. Caton, who have been at the Yank ledge, returned yesterday. They report considerable prospecting being done there, but not much excitement exists. The main ledge has about all been located and a number of other claims have been taken up. So great is the extent of the original Yank that it has been traced many miles.

PINE CREEK GOLD.—Bedrock *Democrat*, June 29: Last Tuesday Mr. Henry Fowler, one of the original discoverers of the Pine creek mines came to our city and sold at the banking house of J. W. Virtue, 44 ounces of gold for which he got \$16 per ounce, amounting to the snug sum of \$704. Mr. Fowler and his partner in the discovery of the "Witman" mine pounded up 10 pounds of quartz in a mortar from which they realized the above amount. Mr. Fowler departed from our city yesterday on his return to the new camp feeling greatly gratified in the expectation that his fortune is now made in the discovery of his new mine. He and his partner will at once commence the erection of an anastra for the temporary working of the ore. He says that other ledges of equal richness have been discovered and located in the same belt of mineral. Crowds of prospectors are rushing into the new field and the district will soon be thickly populated. Placer claims on Pine creek show great richness and several parties will at once commence their working. The creek furnishes all the water necessary for their working. The camp is desirably located in every respect and easy of access. Two anastras will be erected at once in the new mines. The ore is free-milling and is wonderfully rich. On two of the new discoveries on Pine creek the owners are making \$25 per day each by the use of a mortar. The Pine creek mines are located in the high granite mountains that can be seen northeast of Baker City. Parties are daily outfitting in this city for the new mines. Over 2,000 men will be in Pine creek district within the next 30 days. Between 150 and 200 miners from Montana are on their way to the Pine creek mines.

UTAH.

REVIEW.—Salt Lake *Tribune*, July 3: The receipts of bullion in this city for the six months of the present year, excluding all receipts of ore, and not reckoning anything for such operations as make no reports save at the close of the year, were as follows: January, \$378,614.56; February, \$237,536.78; March, \$273,771.69; April, \$350,983.27; May, \$288,620.43; June, \$364,076.16; total, \$1,893,632.80. The above does not include, either, shipments of Horn Silver bullion to an unknown but considerable amount, from the smelters early in the spring. For the past week, ended with July 1st, inclusive, the weather has been sultry, but the activity in the movement of the metals has been fair. The receipts during this week in Salt Lake have been \$64,683.50 of bullion, and \$18,325 of ore, a total of \$83,008.50. The week previous the receipts were \$52,578.95, of which \$80,288.95 was bullion and \$12,350 ore. The Ontario shipped during the week 42 bars of bullion, valued at \$25,783.50, bringing the total for the year up to \$808,386.21, from which six monthly dividends of 50 cents each per share have been paid, amounting in aggregate to \$3 per share, or a total of \$450,000. Silver Reef furnished \$6,700 in silver during the week, of which two bars, \$3,450 came from Christy, and two bars, \$3,250 from the Stormont. The product of the Hanauer smelter for the week was nine cars of bullion, \$22,700. Riter bullion, eight bars, \$7,500, came in from Tintic during the week.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery. Williamson Bros' Hoisting Engines.
 Frank & Co.'s Woodworking Machinery. Atlas Engine Works Engines and Boilers.
 New Haven Mfg Co.'s Machinists' Tools. Payne's Vertical and Horizontal Engines.
 Bement & Son's Machinists' Tools. Otto Silent Gas Engines.
 Bickford's Power Drills. Clapp & Jones' Steam Fire Engines.
 Blake's Improved Steam Pumps. Pickering Engine Governors.
 Perry's Centrifugal Pumps. Judson Engine Governors.
 Perin Band Saw Blades. Tanite Co.'s Emery Wheels and Machinery.
 Sturtevant Blowers and Exhausts. Nathan and Dreyfus Oilers.
 Shimer Matcher Heads. Korting Injectors and Ejectors.
 Brainard Milling Machines. Disston's Circular Saws.
 Turbine Water Wheels. New York Belting and Packing Company's
 Bradley Cushioned Hammers. Rubber Goods.
 Massey's Steam Hammers. Lane and Bodley Saw mills.
 Schlenker's Bolt Cutters. H. W. Johns' Asbestos Packing. Paint. etc.
 Holloway Fire Extinguishers.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

JAS. LEFFEL'S TURBINE WATER WHEEL.

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE.

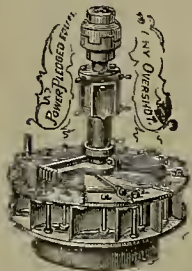
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES
FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.
 OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

The California

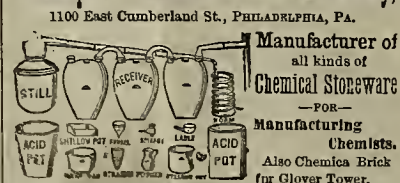
Perforating Screen Co.

All kinds of Quartz Screens,
slot or round holes; zinc, copper
and brass for

Flour and Other Mills.

Quartz Mill Screens a
Specialty.

147 Beale St., San Francisco.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.Manufacturer of
all kinds of
Chemical Stoneware—FOR—
Manufacturing

Chemists.

Also Chemical Brick
for Glover Tower.DEWEY & CO.'S SCIENTIFIC PRESS PATENT
AGENCY is the oldest estab-
lished and most successful on the Pacific Coast. No. 262
Market St., Elevator 12 Front St., S. F.

L. C. MARSHUTZ.

T. G. CANTRELL.

NATIONAL
IRON WORKS,N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound
Engines,FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.

AMALGAMATING MACHINES.

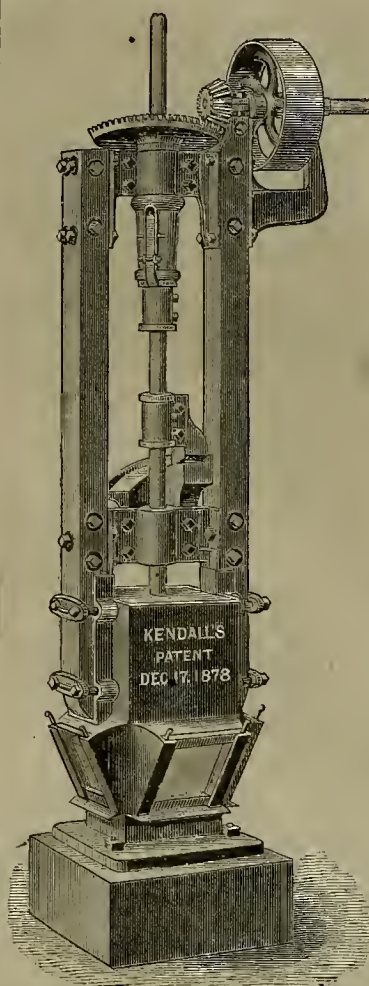
CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT
QUARTZ MILLS.

Having renewed our contract, on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.

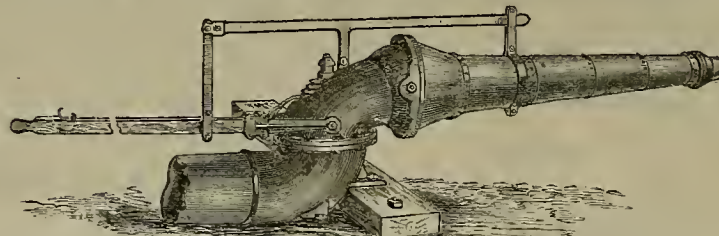


ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. H. Hoskin et al.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.THIS CUT REPRESENTS OUR
IMPROVED
HYDRAULIC
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

DEWEY & CO. { 262 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe,
Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process,
Ores Sampled,
Assaying in all its Branches,
Analyses of Ores, Minerals, Waters, etc.,
Working Tests (practical) Made,
Plans and Specifications furnished for the
most suitable Process for Working Ores,
Special attention paid to Examinations
Mines; Plans and Reports furnished.
O. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. H. KUSTEL.

★ METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by any
Process.
Assaying and Analysis of Ores, Minerals and Waters,
Mines Examined and Reported on.
Practical instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

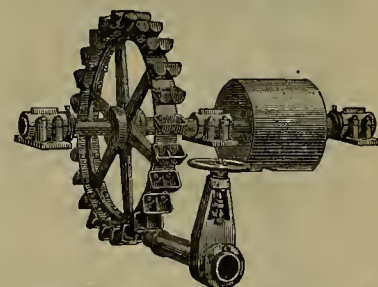
WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO.
ASSAYING TAUGHT.

Personal attention insures correct returns.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Orass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.
AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

SILVER PLATED

COPPER PLATES

FOR SAVING GOLD.

California Electro Plating Works,
657 MISSION STREET,
Between New Montgomery and Third, SAN FRANCISCO

KEATING & FAGAN, Prop's.

Metallurgy and Ores.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO. CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,
MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

THE DIXON CRUCIBLE CO.

JERSEY CITY, N. J.

—Manufacturers of—

DIXON'S BLACK LEAD CRUCIBLE 3.
DIXON'S LEAD PENCILS.
DIXON'S STOVE POLISH.
DIXON'S AXLE GREASE.
DIXON'S PLUMBAGO.
DIXON'S BLACK LEAD.
DIXON'S GRAPHITE.

J. G. ALLEN,

Sole Agent for the Pacific Coast

108 Davis St. (near California), San Francisco
Prices same as at Factory.

GOLD MEDAL AWARDED

—AT—

Mechanics' Fair, 1883 & 1884

—FOR—

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
1883
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

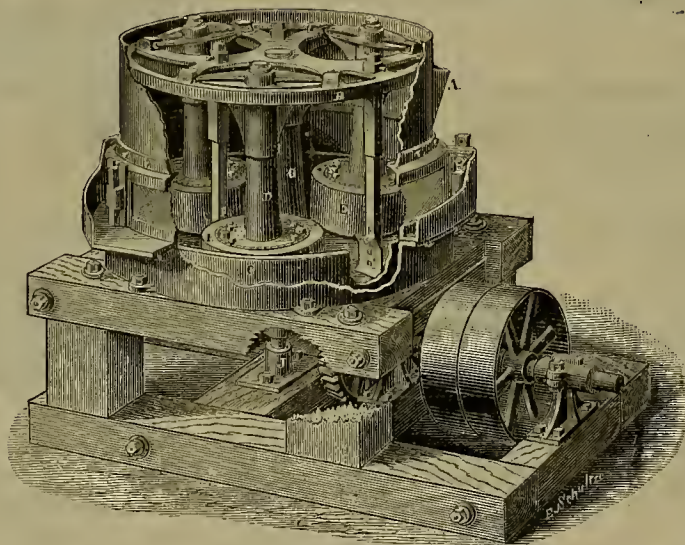
Engine Works

22 Fremont Street,
SAN FRANCISCO.

L. PETERSON,
INVENTORS. MODEL MAKER,

258 Market St., S. E. cor Front, up-stairs, S. F. Experiment-
al machinery and all kinds of models, tin, copper and brass.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy
in Saving Gold. Economy in Transportation of Machinery.
Economy in Cost of Erection of Mill at Mine. Econ-
omy in Time Required to Establish Plant
(one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of
continuous use at a number of mines in California has enabled the inventor to perfect and im-
prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,
45 Fremont Street, San Francisco, Cal.
FRASER & CHALMERS,
Cor. Fulton and Union Sts., Chicago, Ills.

Machinery Buyers, Attention!

Miners, Millmen, Steamboat men, and all others wishing Machinery, will find a rare oppor-
tunity for a bargain in the following lot offered for sale by H. D. BACON:

- 1 BOAT ENGINE Complete, size 12x11 inch.
- 1 UPRIGHT BOILER, 56x7x8 inch, with ash pan and doors complete.
- 1 CAMERON PUMP, 12 inch steam and 10 inch water cylinder.
- 2 WILCOX PUMPS, 3 inch steam and 2 inch water cylinder.
- 1 BAND WHEEL, 4 feet diameter and 12 inch face.
- 1 PLUNGER PUMP, 1 1/2 inches.
- 1 DECK PUMP, 1 SMOKE STACK.
- 1 Lot of 1/2 inch, 3/4 inch, 1 inch, 1 1/4 inch, 2 inch and 3 inch Pipes and Fittings.

All of the above will be found in good order, and can be inspected, and further information
may be obtained, at 222 Fremont Street, San Francisco.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.]

FOR WEEK ENDING JUNE 30, 1885.

320,995.—DARNER AND MENDER—Geo. F. Atkinson, S. F.
320,998.—ORE SEPARATOR, ETC.—Jos. Behm, San Jose, Cal.
321,003.—ORE ROASTING FURNACE—Wm. Bruckner, S. F.
321,005.—ROAD LOCOMOTIVE—Geo. G. Buckland, Tulare, Cal.
321,009.—AGITATING APPARATUS FOR PLANT WASHES—E. J. Delaney, San Jose, Cal.
321,090.—BEE-SWAX EXTRACTOR—J. D. Enis, Napa, Cal.
321,022.—ENDLESS ROPE TRACTION RAILWAY—A. S. Hallide, S. F.
321,038.—PIPE TONGS—Geo. B. Koons, Half Moon Bay, Cal.
321,130.—WIRE STRETCHER, ETC.—Ela Moore, Walla Walla, W. T.
321,051.—EXCAVATOR—H. Rengstorff, Mountain View, Cal.
321,054.—SCREW FASTENING FOR BOXES, ETC.—Eugene Ritter, Germany.
320,982.—R. R. SWITCH—J. R. Stephens, Portland, Or.
320,998.—HARVESTER FINGER BAR—W. L. Walker, Capay, Cal.
321,067.—RAKE FOR CONDUCTING GRAIN TO THRASHERS—J. T. Watkins, S. F.
321,135.—FRUIT DRIER—L. W. Parsons, Los Gatos, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT JAR.—Carlton Newman, S. F. No. 320,580. Dated June 23, 1885. This patent covers a new means of fastening and holding the lid or cover of a fruit jar to its seat. It consists of a bail passing over the top of the cover or lid, and bearing directly on its center, and a screw-band encircling the neck of the jar, and connected with the ends of the bail. This provides a simple, effective and economical fastener for the lids of jars. Mr. Newman, the inventor, is proprietor of the San Francisco Glass Works, where large quantities of jars are made every season.

COMBINED PAD-BUCKLE AND TRACE CARRIER.—Ogden Mallory, Auburn, Placer Co., No. 320,569. Dated June 23, 1885. This piece of harness consists in a combination of devices. It consists, broadly, in the union of a pad-strap buckle with a trace carrier. An ordinary buckle may be used with the trace carrier; but on account of a depressed center to the buckle, the pad-strap is adapted to pass in an approximately straight course. The advantage of having the course of the strap straight is that bending or kinking is prevented, so that the harness lies snugly, and there is no tendency to wear the strap.

FEED-WATER HEATER AND PURIFIER.—Geo. H. Malter, S. F., No. 320,077. Dated June 16, 1885. This apparatus consists of a chamber or vessel of considerable height into the upper part of which water is discharged in a spray; a centrally placed vertical perforated pipe, extending from the bottom up to a point about the center of the chamber, with branching horizontal perforated arms at the top, and an ingress-pipe through which exhaust steam is admitted from the engine. The space around the vertical pipe is filled with a material which will cause the lime or other substances held in the water to deposit, and a pipe from the bottom serves to blow off any free sediment from time to time. Within the vertical perforated pipe is a closed pipe extending up to some distance above the bottom, receiving clear water through its upper end and having its lower end connected with the feed-water pipe.

ANALGAMATOR.—Walter E. Koch, Soulsbyville, Tuolumne Co., No. 320,565. Dated June 23, 1885. An exterior cylindrical vessel, standing vertically, has a hollow shaft supported by a step at the bottom and a journal box at the top, said shaft being rotated by a pulley at the top. The lower end of the pipe has peculiarly shaped arms projecting from it and slotted, so that by the rapid rotation of these arms beneath the surface of a body of mercury a vacuum is formed which causes the material fed into the hollow shaft to be discharged through the slots in the arms, whence it rises through the mercury. Arrangements are made to prevent leakage inward of air, and there is a diaphragm in the tube to prevent a whirling motion of the mercury. Radial plates also prevent a resolution and movement of the body of the mercury.

Lost Papers.

If any subscriber fails to receive his paper promptly after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, ward against further irregularities.

PANORAMA visitors should be provided with Muller's opera glasses. 135 Montgomery street, near Bush.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCALITY.	N. NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.			
Alaska M. and M. Co.	Alaska.	11.	40.	June 30.	Aug. 6.	Aug. 22.	T. J. Hay.	306 Pine st.	
Aultman M. & Co.	California.	2.	40.	June 15.	July 20.	Aug. 10.	J. M. Baffington.	309 California st.	
Best & Belcher M. Co.	Nevada.	32.	50.	June 2.	July 9.	July 28.	M. Williams.	302 Montgomery st.	
Chollar M. Co.	Nevada.	16.	50.	May 11.	June 24.	July 15.	C. E. Elliott.	309 Montgomery st.	
Con Imperial M. Co.	Nevada.	22.	10.	May 20.	June 20.	July 15.	C. L. McCoy.	329 Pine st.	
Caledonia M. Co.	Dakota.	15.	15.	May 28.	July 10.	Aug. 5.	W. L. Oliver.	328 Montgomery st.	
Copper Mt. Con. M. Co.	California.	2.	40.	June 17.	Aug. 13.	Sept. 17.	A. L. Perkins.	310 Pine st.	
Con. Re. orna L. & S. M. Co.	Mexico.	8.	40.	July 1.	July 31.	Aug. 17.	T. S. Gifford.	321 Montgomery st.	
Entracht Gravel M. Co.	California.	18.	05.	May 26.	July 14.	July 31.	H. Kaniz.	209 Sansome st.	
Eudowment M. Co.	Nevada.	5.	50.	May 19.	June 22.	July 26.	E. M. Hale.	327 Pine st.	
Golden Gate M. & Co.	Nevada.	2.	25.	June 11.	July 14.	Aug. 1.	R. Hewston.	314 Montgomery st.	
Gould & Curry M. Co.	Nevada.	53.	40.	June 11.	July 8.	July 29.	A. K. Durbin.	308 Montgomery st.	
Gold Canyon M. Co.	California.	1.	23.	June 10.	July 18.	Aug. 4.	F. A. Berlin.	429 Montgomery st.	
Homeward Bound M. Co.	California.	4.	25.	June 12.	June 20.	Aug. 11.	D. A. Smith.	209 Post st.	
Johnson Gravel M. Co.	California.	1.	05.	July 1.	Aug. 5.	Aug. 25.	G. White.	313 Front st.	
Murchie M. Co.	California.	9.	10.	June 24.	Aug. 7.	Aug. 31.	W. L. Oliver.	328 Montgomery st.	
Mayflower Gravel M. Co.	California.	30.	40.	June 4.	July 20.	Aug. 11.	J. Morris.	328 Montgomery st.	
Monro M. Co.	California.	22.	50.	June 17.	July 23.	Aug. 11.	J. W. Sessions.	309 Montgomery st.	
Navajo M. Co.	Nevada.	11.	25.	May 25.	June 23.	July 20.	J. W. Pew.	310 Pine st.	
Pay Day M. Co.	Nevada.	3.	62.	June 6.	July 14.	Aug. 10.	W. Van Bokkless.	419 California st.	
Potosi M. Co.	Nevada.	18.	30.	May 13.	June 19.	July 10.	C. E. Elliott.	309 Montgomery st.	
Plymouth Con. G. M. Co.	California.	1.	30.	May 18.	June 23.	July 17.	A. Waterman.	309 Montgomery st.	
Savage M. Co.	Nevada.	53.	50.	July 1.	Aug. 4.	Aug. 24.	E. B. Holmes.	309 Montgomery st.	
Sierra Nevada M. Co.	Nevada.	82.	25.	June 9.	July 15.	Aug. 4.	E. L. Parker.	309 Montgomery st.	
Starlight M. Co.	California.	2.	05.	June 28.	Aug. 1.	Aug. 21.	C. E. Hayes.	310 Clay st.	
Silver Hill M. Co.	Nevada.	22.	10.	July 1.	Aug. 4.	Aug. 24.	E. B. Holmes.	309 Montgomery st.	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Best & Belcher M. Co.	Nevada.	W. Williams.	309 Montgomery st.	Annual.	July 13
Belmont M. Co.	Nevada.	J. W. Pew.	310 Pine st.	Annual.	July 13
Savage M. Co.	Nevada.	E. B. Holmes.	309 Montgomery st.	Annual.	July 16
Union Con. M. Co.	Nevada.	J. M. Baffington.	301 California st.	Annual.	July 16
Willow Creek M. Co.	Nevada.	R. Elton.	310 Pine st.	Special.	July 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Kossuth M. Co.	Nevada.	C. K. Sturtevant.	328 Montgomery st.	06.	Mar 16
Mc Diablo M. Co.	Nevada.	R. W. Heath.	318 Pine st.	20.	June 30
Navajo M. Co.	Nevada.	J. W. Pew.	310 Pine st.	25.	July 15
Plymouth Con. G. M. Co.	California.	W. Van Bokkless.	419 California st.	25.	Apr 8
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery st.	25.	July 15
Syndicate M. Co.	Nevada.	J. Stadfeld Jr.	419 California st.	10.	May 5

Mining Share Market.

Mining stocks are rather dull. The Boards were closed for several days lately during the holidays, and now business is going again there is not much of it.

The financial condition of the principal active mining companies having their business offices in this city is hereby appended:

Most of the June expenses of these companies are included in the statement:

CASH ON HAND JULY 1, 1885.

Utah.	1,341 10
Con. Cal. & Virginia.	53,623 40
Sierra Nevada.	3,344 78
Union.	12,118 40
Mexican.	14,068 40
Ophir.	22,240 35
Best & Belcher.	8,065 91
Gould & Curry.	3,541 98
Hale & Norcross.	6,067 63
Chollar.	3,835 04
Exchequer.	4,378 05
Crown Point.	29,438 51
Belcher (net on July 1st).	7,040 00
Overman (estimated).	28,469 10
Alpha.	9,105 92
Imperial.	6,890 00
Andes.	10,612 37
Scorpion (net on July 1st).	6,742 53
Alta.	22,207 10
Benton.	1,583 13
Bodie.	27,793 95
Mono.	4,563 46
Bulwer.	11,883 30
Manhattan.	179,922 00

MINES IN DRIFT.

Potosi.	\$ 24,217 70
Pav.	78,910 05
Grand Prize (total to July 1st).	16,854 43
Savage.	10,603 52

Bullion Shipments.

Con. California and Virginia, July 1, \$15,825; Grand Prize, 1, \$15,000; Syndicate, 1, \$7,219; Hale and Norcross, 1, \$2,712; Con. California and Virginia, 6, \$31,779; Zella Lease Co., June 23, \$1,344; Lexington, 23, \$21,984; Alice, 23, \$17,360; Moulton, 23, \$15,376; Dexter, 23, \$496; Alice, 24, \$14,360; Moulton, 24, \$18,448; Alice, 25, \$15,648; Moulton, 24, \$16,304; Alhambra Mill, July 5, \$37,440; Barber's Mill, 5, \$2,340; King, 3, \$3,895; Christy, June 30, \$1,670; Ontario, 30, \$25,783; Hanauer, 30, \$11,100; Stormont, 30, \$3,250; Queen of the Hills, 30, \$2,600; Tinto, July 1, \$7,500; Silver Reef (for June), \$30,406; Hanauer, 1, \$3,600; Queen of the Hills, 2, \$2,800; Hanauer, 3, \$3,750; Christy, 3, \$1,370; Vienna, 3, \$1,940; Lion, 3, \$272; Hanauer, 4, \$4,100; Queen of the Hills, 21, \$1,400.

During the 5 days ending July 5th there were shipped from Salt Lake City 11 cars of bullion, 284,763 pounds; 27 cars of ore, 806,980 pounds and four cars of lead, 105,384 pounds.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

SCORES of miners and prospectors are engaged at numerous points near the Carson & Colorado line between Candelaria and Bishop creek in taking out ore and shipping it below for reduction.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING JUNE 13.	WEEK ENDING JUNE 25.	WEEK ENDING JULY 2.	WEEK ENDING JULY 11.
Alpha.	1.30	1.85	1.20	1.80
Alta.	.50	.80	.55	.90
Andes.	.35	.60	.40	.60
Argenta.	.06	.10	.05	.05
Belcher.	1.20	1.60	1.20	1.60
Belding.	.40	.60	.40	.60
Best & Belcher.	2.45	3.75	2.30	3.65
Bulwer.	.35	.40	.35	.40
Bonanza King.	.40	.60	.40	.60
Belle Isle.	.10	.15	.10	.15
Bodie Con.	1.50	2.20	1.35	2.10
Benton.	.10	.15	.10	.15
Bodie Tunnel.	.10	.15	.10	.15
California.	1.30	3.25	1.00	3.00
Challenge.	.25	.30	.25	.30
Champion.	.45	.60	.45	.60
Chollar.	1.45	2.50	1.25	2.25
Confidence.	1.55	1.30	2.00	1.50
Con. Imperial.	.10	.15	.10	.15
Con. Virginia.	1.90	3.25	2.00	3.15
Con. Pacific.	.10	.15	.10	.15
Crown Point.	1.25	1.80	1.25	1.80
Day.	.50	.80	.50	.80
Eureka Con.	.50	.80	.50	.80
Eureka Tunnel.	.25	.30	.25	.30
Exchequer.	.25	.30	.25	.30
Grand Prize.	.40	.60	.40	.60
Gould & Curry.	1.40	2.20	1.45	2.25
Goshawb.	.70	.75	.70	.75
Hale & Norcross.	7.00	7.75	7.25	7.75
Holmes.	.10	.15	.10	.15
Independence.	.15	.20	.15	.20
Justice.	.15	.20	.15	.20
Martins White.	.80	1.25	.80	1.25
Mono.	.80	1.25	.80	1.25
Mexican.	1.25	1.75	1.25	1.75
Mc Diablo.	.10	.15	.10	.15
Northern Belle.	.85	1.00	.90	1.10
Navajo.	.85	1.00	.90	1.10
North Belle Isle.	.15	.20	.15	.20
Occidental.	1.50	2.25	1.50	2.25
Ophir.	1.00	2.25	1.00	2.25
Overman.	.40	.75	.40	.75
Potosi.	.85	1.05	.85	1.05
Final Con.	2.75	4.00	2.75	4.00
Savage.	1.50	2.25	1.50	2.25
Seg. Belcher.	1.35	1.80	1.25	1.75
Sierra Nevada.	1.35	1.80	1.25	1.75
Silver Hill.	.10	.15	.10	.15
Silver King.	.15	.20	.15	.20
Scorpion.	.15	.20	.15	.20
Syndicate.	.35	.40	.35	.40
Tioga.	.15	.20	.15	.20
Union Con.	1.15	1.80	1.15	1.80
Utah.	2.50	3.00	2.50	3.00
Yellow Jacket.	2.35	3.00	2.35	3.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 11.	1015	Hale & Nor.	6 1/2 @ 7
200 Alta.	350	100 Justice.	100 @ 10
250 Andes.	300	400 Mexican.	50 @ 5
50 Alpha.	250	200 Overman.	7 @ 10
400 B. & Belcher.	2 05 @ 2 10	1030 Ophir.	1 15 @ 1 25
100 Bodie Con.	1 40 @ 1 50	600 Potosi.	650 @ 1 10
500 Chollar.	1 30 @ 1 40	615 Savage.	2 50 @ 3 00
1030 Con. Cal.	1 65 @ 1 70	700 Sierra Nevada.	7 @ 10
50 Confidence.	1 10 @ 1 20	1400 Scorpion.	100 @ 1 10
2 15 Crown Point.	1 20 @ 1 25	35 Syndicate.	25 @ 2 50
150 Exchequer.	200	450 Silver Hill.	300 @ 1 10
100 Eureka Con.	5 50 @ 6 00	100 Union.	500 @ 1 10
200 Gould & Curry.	1 55 @ 1 60	100 Yellow Jacket.	1 65 @ 1 70

Gold Mines For Sale.

Two small gold mines for sale, in Kern county, California. Ore has paid by assay \$20 per ton. Worked to a depth of 60 feet. The vein is 15 inches wide. The mines are within seven miles of the Southern Pacific Railroad. The owner is not in a position to develop them without aid. The purchase price is very reasonable and there is a good opening for any one to take hold of the claims and work them. Address W. L., P. O. Box 236, San Francisco.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARRED C. HOAG—California.
J. J. BARTELL—California.
A. C. KNOX—Ventura and Los Angeles Co's.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
F. W. SMITH—El Dorado and Placer Co's.
W. B. TURNER—Oregon.
GEO. McDOWELL—Fresno and Tulare Co's.

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 9, 1885.

ANTIMONY—Per pound.	12 @
Hallet's.	12 @
Cookson's.	13 @
BORAX—Refined.	7 @
IRON—Clinganock toe.	25 00 @
Eginton, too.	23 50 @
American Soft, ton.	26 00 @
Oregon Pig, ton.	23 50 @
Clippard Gap, No. 1 & 2.	23 50 @
Clay Lane White.	26 00 @
Shots, No. 1.	25 50 @
Steel—English, lb.	16 @
Shot Diamond, ordinary sizes.	13 @
Flow.	8 @
Machinery.	10 @
Sanders Bros.	13 @
COPEL—	
Brass sizes.	25 @
Fire-box sheets.	28 @
Bolt.	22 @
Yngot Metal.	12 @
Ingot.	14 @
LEAD—Fig.	31 @
Bar.	5 @
Pipe.	7 @
Sheet.	8 @
Shot, discount 10% on 500 bag.	2 85 @
Block 3/4 bag.	2 05 @
Chilled, do.	2 25 @
TINPLATE—Oldcastle.	5 25 @
Charcoal.	5 75 @
ZINC—Certified.	9 @
Sheet, 7 1/2 lb. to 10 lb. less the scale.	9 @
QUICKSILVER—By the flask.	33 50 @
Flasks, new.	1 05 @
Lead, old.	85 @
NEW YORK PRICES—	
California Borax, refined.	73 @
Pig Iron, American.	17 75 @
Quicksilver.	42 @
Copper.	3 80 @
Tin.	21 @
Bar Silver.	1 06 1/2 @

CRYSTAL SPRINGS.

THIS DESIRABLE

Smith's Patent Belt Fasteners.



Are positively unequalled for fastening Leather, Rubber, or Cotton Belting. This ONLY Fastener that will run under tighteners, on patent rolls in flour mills, and Electric Light machines. Easier to apply than Lacing and far more Economical.

Patented Sept. 20, 1881; Aug. 15, 1882; June 16, 1884.

PRICE LIST.

No. 1—For large drive belts, per box of 100..... \$2 00
No. 2—For Cotton drive belts, per box of 100..... 1 75
No. 3—For Rubber drive belts, per box of 100..... 1 50
No. 4—For single Leather belts, per box..... 1 25
Combination Punch with guides and nippers..... 1 25
Banners for tacking fasteners out..... 35
TRY THEM! They will save you loss of Time, Temper and Money. Manufactured by

H. D. EDWARDS & CO.,

Nos. 16, 18 and 20 Woodward Ave., Detroit, Mich.

Manufacturers of Oak Leather Belting. Agents for J. B. Hoyt & Co., N. Y. Belting and Packing Co., Eureka Fire Hose Co., Cotton Belting Mill Supplies. FOR SALE BY Dunham, Carrigan & Co., San Francisco, Cal.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco

MINERS' HORSE WHIM.



ONE HORSE CAN EASILY HOIST OVER 1,000 LBS. at a depth of 500 feet. The Whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of this whim is bolted to bed-timbers, thus avoiding all frame-work. When required, these whims are made in sections to pack on mules.

120 in Actual Use.

EDWARD A. RIX & CO.,

MANUFACTURER,

19 and 20 Fremont St., - San Francisco.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT NO. 50.

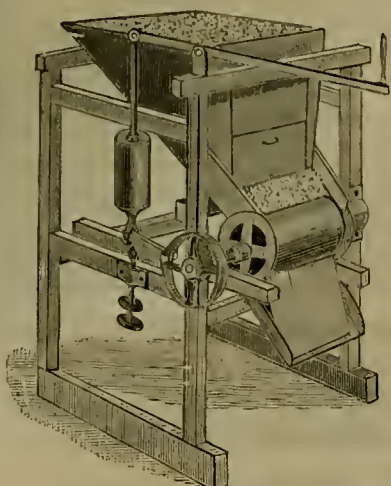
Levied..... June 1, 1885
Due in Office..... July 8, 1885
Amount..... 40 Cents per Share
Sale Day..... Wednesday, July 20, 1885

ALFRED K. DERBROW, Secretary.

OFFICE—Room 60, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required. In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

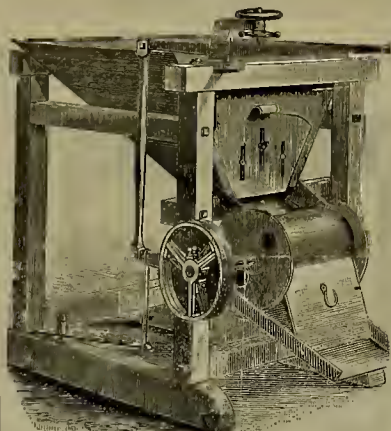
Golden State and Miners' Iron Works.

Sole Manufacturers.

327 First Street, SAN FRANCISCO, CAL

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for wet and sticky ore; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS.

39 to 51 Fremont St., San Francisco.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending June 30, 1885, the Board of Directors of the German Savings and Loan Society has declared a dividend at the rate of four and one-half (4½) per cent, per annum, on term deposits, and three and three-fourths (3¾) per cent, per annum, on ordinary deposits, and payable on and after the 1st day of July, 1885. By order, GEO. LETTE, Secretary.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

PATENT

LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn. The Respirators are sold subject to approval after trial and if not satisfactory the price will be refunded. Price, \$3 00 each or \$30 00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 5) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



HERCULES SLAYING THE GIANTS.

HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE

THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - - San Francisco, Cal.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

18 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



Chicago Prices Beaten!

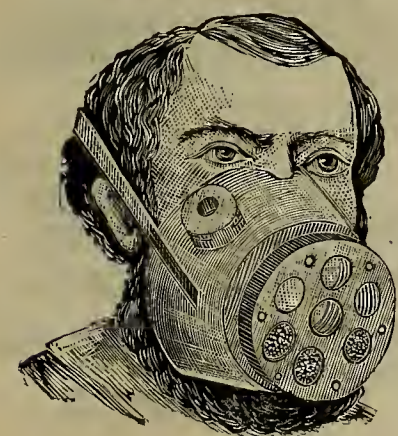
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Suet Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Shot Out and Shot Truvel Screens. Mining Screens a Specialty, from 1 to 15 (inch). Orders Promptly Executed.



Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry.

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco

BUILDER OF

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

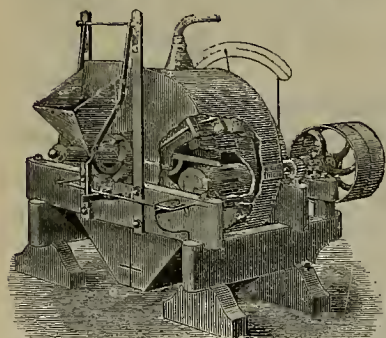
STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Tustin's Pulverizer



WORKS ORE WET OR DRY.

Awarded SILVER MEDALS in 1882 and 1883
By Mechanics' Institute.

MANUFACTURED AT

The Tustin Windmill Horse-power and
Pumping Machine Works.

308 Mission Street, S. F., Cal.

By W. I. TUSTIN, Inventor and Patentee.

Send for Circular.

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue.
17 and 19 Fremont St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast,

Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED AT MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

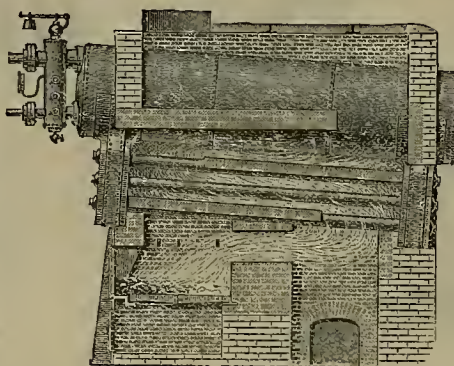
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Borax Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) W. M. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.

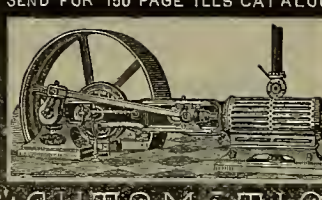


Send for Circular and Prices.

THE CUMMER ENGINE CO.

CLEVELAND OHIO

SEND FOR 150 PAGE ILLS CATALOGUE.



Awarded highest premiums at Cincinnati and Louisville Expositions of 1883, for "Best Automatic Engine." We will furnish anyone copies of the ORIGINAL ENTRIES of several engine builders who claim they were not competing with us. They all entered in the same class with us, and now by deceptive Circulars (one headed "Fact versus Falsehood") attempt to mislead. No premiums were offered for Condensing Engines.

AUTOMATIC

JOSHUA HENDY MACHINE WORKS Agents for the Pacific States, 49 & 51 Fremont St. San Francisco.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,
22 Cliff Street, New York.



JENKINS PATENT VALVES.

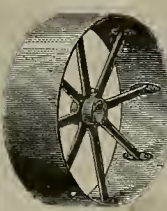
Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Modart Patent Wrought Rim Pulley

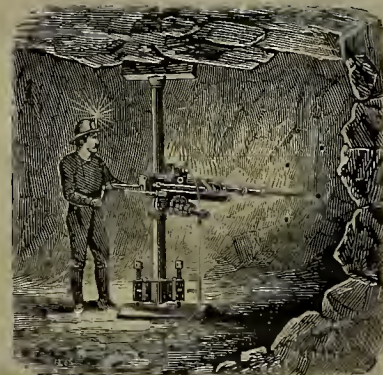
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

Send for Circular and Price List.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.



INGERSOLL ROCK DRILLS

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING

MACHINERY.

F. A. ROBBINS,

MANUFACTURER OF

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco.
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

Room 5, First Floor,
BOSTON, MASS.

PYROMETERS

GAUNTLET'S, HOBSON'S, and STEINER'S

PRESSURE GAUGES

Hot-Wall THERMOMETERS

ANEMOMETERS

SAFETY LAMPS

BAROMETERS

SALINOMETERS

Mining and Meteorological

Instruments of every description.

List and Description of our Ten Catalogues sent free on application.

JAMES W. QUEEN & CO.
924 Chestnut St. Philadelphia

San Francisco Cordage Factory.

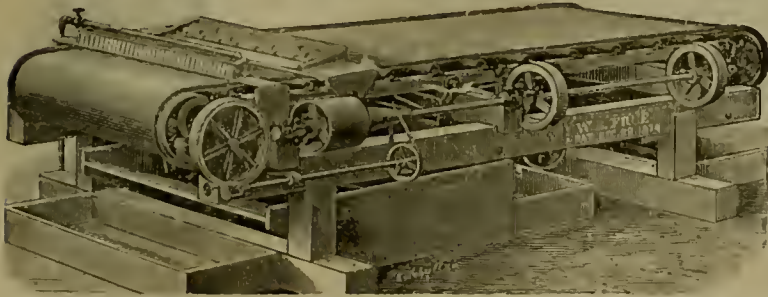
Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.
Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1871, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B. - We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

NATIONAL COMPRESSORS and ROCK DRILLS.

EDWARD A. RIX & CO., Agents,

18 and 20 Fremont St., - San Francisco.

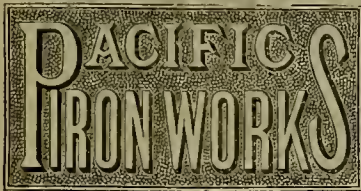
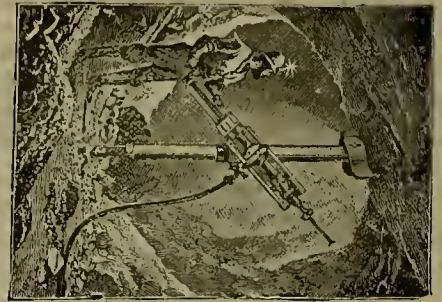
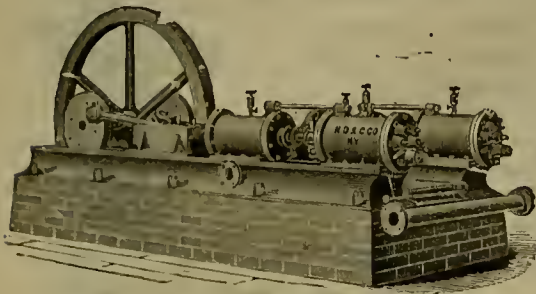
ON SEPTEMBER 1, 1883, I RECEIVED

THE LATEST IMPROVED NATIONAL DRILL.

— WHICH —

Anyone, upon examining, will proclaim to be far superior to anything yet offered to the MINING PUBLIC in the shape of a ROCK DRILL.

CALL AND SEE IT OR SEND FOR CIRCULARS.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING and REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

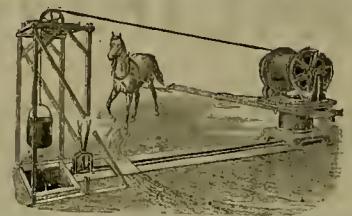
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



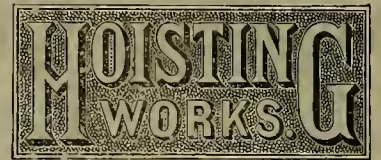
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....
Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —
HOMOGENEOUS STEEL, SOFT and DUCTILE,
SUPERIOR TO IRON FOR
LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1883.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS.

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

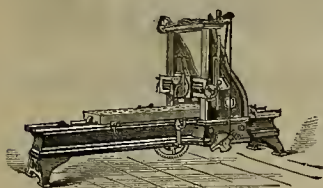
AG'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



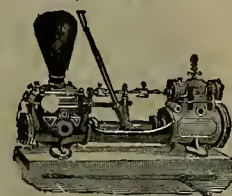
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

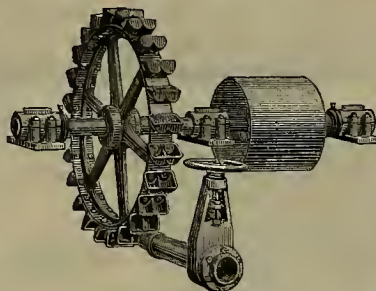
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE,

Flat and Round, of the best material and workmanship. Large Stock always on hand. Special sizes made to order.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

WIRE CLOTH. Brass, Copper and Steel, all kinds, and meshes from 1 to 10,000 to the square inch.

WIRE FENCING Of various designs for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Barbed Wire.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS,

BRANCHES—Sacramento, Los Angeles and Portland.

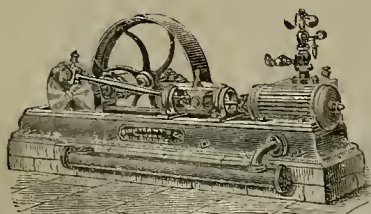
No. 329 Market Street, Cor. Fremont, San Francisco, Cal.

JOSHUA HENDY MACHINE WORKS,

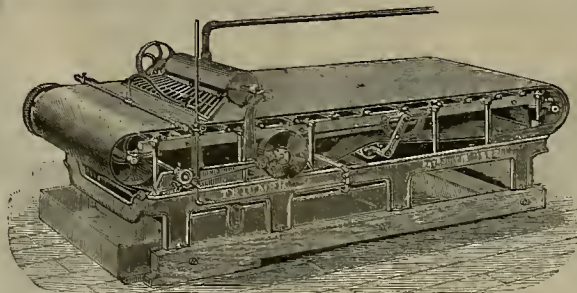
Nos. 49 and 51 Fremont Street, San Francisco, Cal.

DEALERS IN NEW AND SECOND-HAND BOILERS, ENGINES, AND MACHINERY OF EVERY VARIETY.

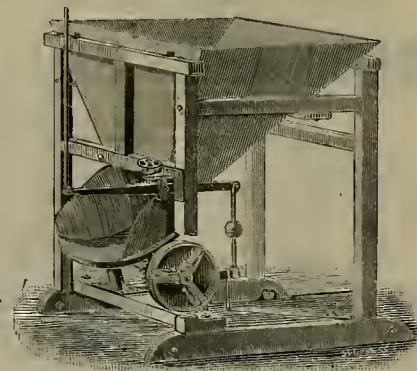
TRIUMPH CONCENTRATORS.



Stationary Engines.



"Challenge" Ore Feeders.



QUARTZ, SAW-MILL, AND HYDRAULIC MINING MACHINERY.

AGENTS FOR THE SALE OF THE.....

Celebrated CUMMER ENGINES, of Cleveland, Ohio,

BAKER ROTARY PRESSURE BLOWERS, WILBRAHAM ROTARY PISTON PUMPS,

HOT POLISHED SHAFTING, and P. BLAISDELL & CO.'S MACHINISTS' TOOLS.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

CABLE RAILWAY EDITION--THIRTY-TWO PAGES.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JULY 18, 1885.

VOLUME LI.
Number 3.

The California Street Road.

One of the best built and equipped cable roads in this city is the California street line, the third one built here. The company was organized in 1876, Hon. Leland Stanford being the moving spirit in the enterprise. In thoroughness and completeness of details the work on this road is of the first order. Plans for the

No wood is used in the construction of the work, and only the best quality of iron and steel has been admitted. There is thus seen to be an almost indestructible roadbed, as strong as stone itself, and containing nothing liable to decay. Ground was broken July 5, 1877, and the last rail was laid December 8th. During the time of this extension work, from 250 to 300 men were employed.

leys are on the same plane as the rope, and situated under the street.

The engine and machinery are placed in an excavation at the Larkin and California street crossing. This excavation is 31 feet deep below the surface of the street, 110 feet long and 30 feet wide. The engines are placed under the building and sidewalk, while the driving gear and other machinery is under the center of Cali-

This company is reconstructing the road-bed on Fillmore street west to Cemetery avenue, filling it in with cement the same as the balance of the road.

The building of the company at the corner of Larkin and California streets is three stories high and fronts 70 feet on Larkin and 80 on California. It contains the office of the secretary, superintendent and other officers.



THE CALIFORNIA STREET CABLE RAILWAY, SAN FRANCISCO, CAL.

work were begun in March, 1877. The work was soon mapped out, and in the following month orders were sent East for the rails. These rails were made from the pattern of Henry Root, constructing engineer of the road, and were designed to enable cars to run without the jolting experienced on many of the other street railroads. The top looks like that of a "T" rail, and the "fish-joint" is used. The rails are of steel made by the Cambria Works, Johnstown, Pennsylvania. The roadbed consists of a solid mass of concrete cement, through which runs the channel containing the rope. The ribs of this channel are composed of "T" rail iron, bent in the form of a "U." This series of ribs is enclosed by cement, which is filled up to the rail, and forms a perfectly solid body as wide as the track itself. The cross-pieces are of iron, and the space between the rails is paved with stone blocks, over which liquid cement is poured. As the blocks rest upon the foundation cement, the whole structure is knit together and forms one solid mass.

On this road they have 12,000 feet of double track, and it passes in that distance over two elevations, the heights being 265 feet and 235 feet above base respectively, the valley between being 125 feet above base. The gauge is 3½ feet, same as the Clay street. This road, like Clay and Sutter street, has been extended beyond the length of its original construction, which was 8,800 feet, and which was constructed in a very substantial manner, the tube being formed of worn-out 65-pound rails and surrounded by concrete.

The engine-house is located in a valley about midway between the termini of the original section. Some of the grades on this line are quite heavy, there being a rise of 67 feet and 75 feet respectively in the distances of 412½ feet. This is the heaviest grade in San Francisco, except one block on the line of the Presidio Railroad, which has a rise of 78 feet in the same distance. This company uses a heavier rope than the other lines in this city, viz., 4-inch circumference, and the driving pul-

leys are on the same plane as the rope, and situated under the street. The engines, of which there are two, were made by the Hope Iron Works of this city. They are of 250 horse-power each, and can be used either separately or together.

One is sufficient to do the entire work, and one will be kept in reserve to be used in case of accident to the other. They are made to run at 90 revolutions per minute, if required, giving a speed of about 8 miles per hour. Complete the engines weigh over 60 tons. All the bearings are brass. The engine cost over \$15,000.

Beneath the street is the machinery and wheels over which the wire cable passes. As the rope comes in from Kearny street it passes around a large wheel in a loaded car standing on a track inclining at an angle of about 30 degrees. This car, by falling, takes up any slack that may be in the rope. The rope also goes over a similar wheel before it goes out, taking up whatever slack there may be there. There is also a loaded car at each end of the line, so that by all these arrangements 100 feet of slack can be taken up automatically.

Tracks run all through the building on every floor, and elevators are used for transferring the cars from one story to another. The floors are cement, having gullies in which the water is collected when the cars are washed.

Like other cable roads this one had a marked effect on the property near its line of roadbed. Blocks of land increased largely in value and along the road the finest residence property in the city is located. The hill property was heretofore in little demand, but since this road has been running it is now more valuable for residence purposes than any in San Francisco. Many palatial residences have been built on the hill, which is locally known as "Nob Hill." The line is largely patronized and has been very profitable to its owners. The road is a pleasant one to ride over, the view from the summit of the hill being very fine, and many persons ride out to the cemetery and back on these cars for a pleasure trip. The engraving on this page is a view of this road, on the steep incline of California street, between Stockton and Powell.

Cable Railway Propulsion.

[COPYRIGHTED.]

The following paper was read by W. W. Hanscom, of this city, before the Technical Society of the Pacific Coast:

MR. PRESIDENT AND GENTLEMEN—In presenting for your consideration a paper on Cable Railway Propulsion, I must premise my remarks by the statement that the subject is so comparatively new in its practical results, and so little has been done in the development of the system outside of San Francisco and Chicago, that we have but little of the experience of others which has been published upon which to rely for the collection of data. The subject matter of this paper will be mainly a collection of such facts and experiences as have come almost directly under my own observation, and such conclusions as I have arrived at are from the grouping together and endeavoring to find from these facts what constitutes some of the more important conditions connected with the construction and operation of cable railways.

The record which I have of the great number of persons who have directed their attention to this mode of propulsion of cars at once shows that the subject is not new, and that it has only waited until the particular time and conditions should arrive when it would be practically developed. This time arrived and the conditions were propitious, when the Clay Street Hill Cable Road was built, and from the time at which this experiment passed into the domain of practical and commercial success an increased interest has been manifested in the pecuniary results to be attained, in comparison with the hauling of street cars by horses, and I need not enumerate the list of inventors whose patents have a bearing on this subject, and number several hundred, but pass directly to the features of the cable roads constructed and operated in our city.

The Clay Street Hill Railroad.

In the construction of the Clay Street Hill Road, it was necessary to observe the strictest economy, as it was an experiment, or at least so considered by those interested, and consequently it was left to further experience to determine, in case of success, what should be the character and kind of material and workmanship to be adopted in the construction of additional cable roads.

In observing the condition of the street along which this road was to be constructed, it was found that it consisted almost entirely of grades, except at the crossings, which were level. These grades being in some places as steep as 1 in 6 3/10, and the steep grades made a sharp angle when leaving the level crossings, with curves of very small radius connecting the various changes from grade to level and from level to grade. The street was straight, so that there was only vertical and no lateral deflection. This was the serious matter, as in leaving a level crossing for a steep upward grade, the strain on the cable would bring it upward and through the slot of the tube made for the connecting bar between the car and the rope. Consequently it would require a sheave above the cable to keep it down at these points, so that while sheaves were used to support the cable when the weight and strain were downward, they were also required at certain points to counteract the upward strain, and whatever arrangement or apparatus might be used to correct the cable with the car, that part which clasped the cable must pass above the sheaves placed under the cable to support it and must also pass under the sheaves which were placed above the cable at points which were required to be kept down. These sheaves therefore must be at such distance apart, vertically, in reference to each other and the track (over which the wheels of the car which carried the gripping apparatus were to run) that when the car would be immediately over one of the sheaves which was under the cable, that the bottom parts which clasped the cable would be some little distance above the sheave, so that a slight variation of the car or gripping apparatus in height would not bring the grip and sheave in contact. Also when the car is directly over a

vertical part of the gripping apparatus which passes upward through the slot of the tube and connects with the car, must be so located that it will pass to one side of the sheave above the cable, and this is arranged by projecting the part which clasps the cables sideways from the vertical part, which is shown by the drawing. (See Fig. 1.)

It will be seen that when the cable is held in the clasp, (or, as they are called, the jaws of the grip), it is lifted above its normal position in the groove of the lower sheaves, and also that it is carried down away from the sheave, which is used to keep the cable down where sharp angles occur at upward change of grade.

This drawing shows the upward tendency of the cable in crossing a street and going up a grade; it being lifted from the lower or carrying sheave, and brought up against the under side of the top or depression sheave. (Fig. 2.)

This accedes to the conditions so far as a line is concerned, when there are no horizontal deflections occurring, and there are none on the Clay Street Hill Road.

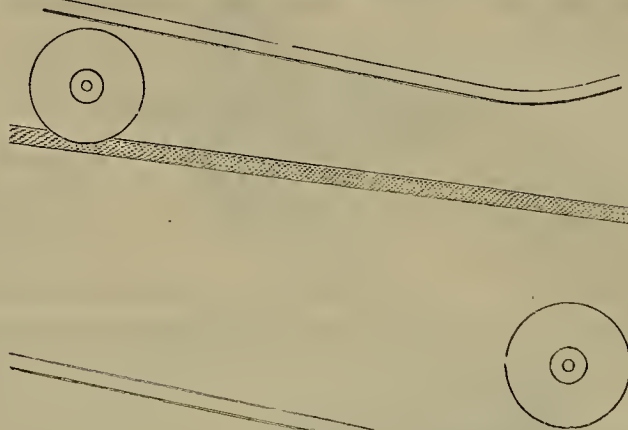


FIG. 2.

The form and size of the gripping arrangement being determined upon, such space between the lower and upper sheaves must be allowed that the grip will easily clear each, and some additional clearance space for variations which may occur in the height of the grip by the wear of the wheels, or variations in the level of the track in reference to the tube, added. Then the diameter of the sheaves being fixed, this fixes the depth of the tube, and the width will be fixed by the width of the grip and sheaves and necessary clearance.

The Underground Tube.

In constructing the Clay Street Road, wood was used to a large extent. Cast iron frames were made to conform to the desired cross-section of the tube, and placed about three feet apart, they having ribs, cast on them, so that planks two inches thick could be laid from one to another, and held in position by the ribs, thus forming a tube of wood with supporting ribs of cast iron. (See Fig. 3.)

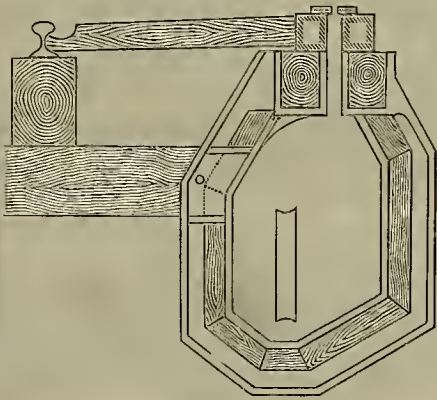


FIG. 3.

Ties extend laterally from these cast iron ribs, upon the outer ends of which are placed stringers which carry the rails. The castings, as shown, are open at the top, so that the vertical part of the grip may pass through, and close on each side of this opening, extending from one casting to another, are short car-lines, which are bolted at each end to the casting, thus keeping them at the proper distance apart and maintaining them in proper position. On top of these, and extending over several of the castings, are laid wood scantlings, which form the slot, and to protect the top from wear are placed iron straps fastened to the scantlings by wood screws. The surface of the roadway between the slots and the rails on each side is formed of wood plank, as shown. This forms the general construction of the tube from one end of the road to the other, except at the point where the cable is made to enter the engine house to be connected with the driving machinery.

Along the straight portions of the tube the lower sheaves are about nine inches in diameter; those above the cable being about seven inches, as it was considered necessary to keep the distance between the surface of the street and the upper, enlarged part of the tube as small as con-

sistent with strength to support the traffic of vehicles on the street, and also that the distance between the cable and the part of the car from which projects downward the vertical bar or shank (which has the grip on its lower end) shall be the minimum.

Change of Direction of Cable.

At the ends of the road are placed large sheaves, around which the cable passes to return, there being four tracks and two tubes, and the diameter of these large sheaves, which are placed with the axes vertical, is equal to the distance between the centers of the two tubes or sets of tracks, which is about eight feet. Experience in the use of wire cables had shown that where the cable makes any great change of direction, as a right angle or more, and even much less, the diameter of a sheave over which the cable passes should be about 100 times the diameter of the cable. In this road the cable was a little less than one inch in diameter, and the sheave about 96 inches. In order that the cars might be transferred from one

any traffic which may pass over it, as it may be in the middle of the street; therefore, the thickness of this cover, and the fact that the axis or shaft of the sheave is vertical, it requires journal bearings, both top and bottom, and this, added to the thickness of the cover, will carry the groove of the sheave some distance below the line of the cable in the tube, so that the cable at the point of leaving the tube to enter the chamber containing the large sheave will be deflected downward over a sheave somewhat larger than those supporting the cable in the tube, say 30 inches in diameter. (See Fig. 5.)

This large sheave is carried on a frame having wheels which run on a track prepared for it and of such a length that it may have a movement of 10 feet or more. A chain attached to the end of this frame or carriage passes over a sheave at the rear end of the chamber, and has a weight attached which maintains a tension on the cable passing around the large sheave, and will take up any stretch that may occur in the cable, and yet in case of excessive strain will yield and prevent rupture of the cable. A similar arrangement is at each end of the road.

At the point where the cable enters the engine-house the cable is deflected vertically over two sheaves eight feet in diameter, and thence at right angles to a horizontal direction, when they enter the engine room, passing over a driving drum; thence over an idle sheave; thence over the driving drum again and backward to a sheave under the street, under which it passes and upward over a second sheave to the direction of and into the tube, when it continues on its route. These sheaves and driving drum are all eight feet in diameter. The driving drum is geared to the engine so that the cable has a speed of 528 feet per minute, or six miles per hour. There are 11,000 feet of cable employed in one piece, and it makes a total revolution over its route in about 21 minutes.

Changing the Cars at Ends of Road.

In changing the cars at the ends of the road the dummy is disconnected from the car and first transferred, then the car follows and is connected again to the dummy, and the train is ready to start so soon as the cable has been taken into the grip. This grip is so constructed that the cable is admitted between the jaws from the bottom side, and, as by opening the jaws the cable falls out, dropping away from the grip down into the carrying sheaves under the cable, it becomes necessary, in order to get the cable

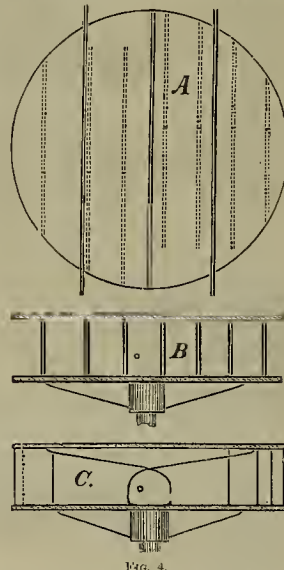


FIG. 4.

within the jaws again, either to raise the cable or to lower the jaws until they shall have brought the cable within them, and then raise the grip bringing up the cable to such a height that the bottom of the grip will sufficiently clear the sheaves. This grip is so constructed, that by a hollow screw at the top passing through a nut which is supported by a frame and encircled by a hand wheel, the turning of the nut will lower the hollow screw, and with it the gripping jaws, until they are low enough to take the cable, when the jaws are partially closed, so that while they will prevent the cable from dropping down it will still freely pass through and not draw the train until sufficient pressure is put upon it, which is done by means of a screw drawing a wedge between a frame and bar, thus forcing the jaws against the cable with any desired force, the power by this arrangement being as 480 to 1; in other words, one pound applied to the screw by the man operating the grip gives a pressure of 480 pounds on the cable, less the friction of the moving parts.

That the cable may be spared abrasion in moving through the jaws of the grip when the dummy is standing still and the cable passing along, four rolls, having their circumferences grooved to suit the rope, are so arranged that they are a little in advance of the jaws and support the cable before the jaws come in contact with it. A spring is placed behind these rolls, so that they may yield when the jaws are brought together to grip the cable.

The cars are of such size that they will seat 14 persons, and weigh, unloaded, 2,500 pounds each; the dummies weigh 2,850 pounds each, and have seats upon them for 16 passengers.

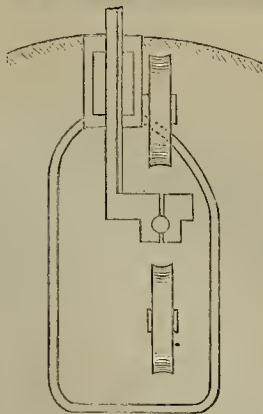


FIG. 1.

sheave which is above the cable to keep it down, the top of the part which clasps the cable must be a sufficient distance below the sheave that it will not touch in passing. In order that these requirements may be met, the

As the large sheave at the end of the route lies in a horizontal position, or nearly so, a large pit or chamber is required, and the covering of this must be of sufficient strength to sustain

As this road was extended after having been in operation about five years, some changes were made in the construction of the tube and in the cast iron frame, which was extended laterally, so that it now comes under and supports the rails, and has its base extending the same distance, the web being perforated in the center to the shape of the tube, and also openings between the central, and each side-rails or flanges being formed all around the openings and the outside of the frame. The tube in the extension is formed of concrete, and as it passes through the openings of the frame it forms a

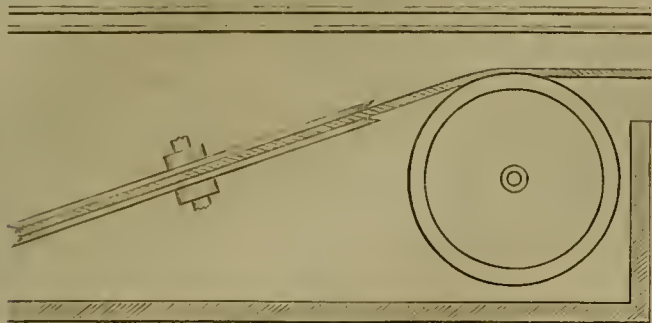


FIG. 5.

monolithic structure, the length of the road to which this mode of construction is applied. The slot is formed by channel irons six inches deep, with two-inch angles top and bottom bolted to the casting, and wood carlines are placed from frame to frame only to support this wood plank which forms the street surface between the rails. (See Fig. 6.)

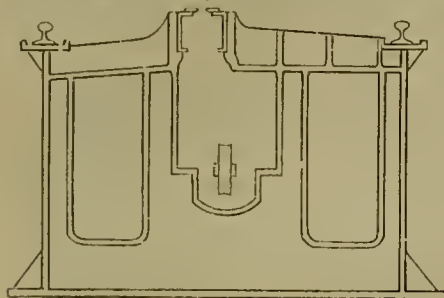


FIG. 6.

Sutter Street Road.

I have thus stated generally the most important features of construction in the Clay Street Hill Road, and in referring to the other roads will only allude to the more prominent conditions which involve changes in construction and operation, when they vary from the Clay street road. The next road to be operated by cable in this city was the Sutter street road, which had been operated by horses, but in 1876 was converted to a cable road. The more prominent change was in the construction of the gripping apparatus, which was arranged so that the jaws which take and hold the cable are moved vertically, so that the cable enters between the jaws of the grip from the side instead of from the bottom, as does the one in use by the Clay street road. These are distinguished from each other by the direction from which the cable enters the jaws. That of the Clay street entering from the bottom is called a "bottom grip," and that of the Sutter Street entering from the side is called a "side grip." (Fig. 7.) The side grip is so constructed that it cannot be lowered like the Clay street grip to take the cable, but has a fixed position when placed on the dummy. As the cable will normally lie directly under the jaws of the grip, either the jaws or the cable must be moved sideways to allow the cable to be brought up to a height which will allow it to enter the open jaws of the grip. As the readiest means of accomplishing the raising the cable, a sheave is so placed in the tube that the cable will be raised by it to a height corresponding to the opening of the jaws; but as without lateral movement of the grip it would strike the sheaves, the rails and iron forming the slot are deflected to carry the dummy and with it the grip to one side sufficiently to pass the sheave, and immediately again the track and slot is deflected into its normal direction, thereby bringing the opening of the jaws over the cable before the cable has sagged or dropped sufficiently to prevent it entering the grip.

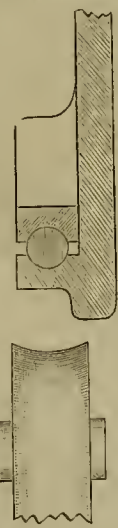


FIG. 7.

In the latter constructions of the grip, the points at which it is supported on the car are so arranged that it may vibrate from this point laterally, so that the dummy need not be carried bodily sideways; therefore only the irons forming the slot are deflected. Wherever it is desired to let the rope out of grip and take it up again the road is formed in this way, these points being determined upon in advance. (Fig. 8.)

Different Constructions.

The plan for switching from one track to the other is different from that in use on Clay street. A tube is constructed leading across from one main tube to the other, and, following the curve of the rails which transfer the car and dummy from one main track to the other, the tubes are joined at the point of intersection. The slots of the tube join similarly, and a tongue is placed at the junction of the two slots to cover the large opening into the tube at this point, and is also used to direct the shank of the grip into the proper slot.

These dummies and cars are not turned round in the operation of switching, as by the method by turn-tables on Clay street, so that the cable lies on the same side of the tube, or rather the same side of the slot, in both of the main tubes. Of course, in switching or passing from one main tube to the other, the rope is dropped from the grip, and as the dummy passes on to the main line the cable is brought up so that the grip may run on to it, as before described. At points where the car and dummy are transferred through a switch, it is necessary to have a falling grade, so that, after dropping the cable, gravity may assist in carrying the dummy through the switch and on to the other main line. Where the street is officially level, latitudes has been allowed the cable companies to make a grade to suit their desires.

At the point where the cables enter and leave the engine-house, there is an intervening space between the two large sheaves which deflect the cable from and into the tube and engine-house. The cable is dropped from the grip just before reaching these sheaves, and a slight grade is given the street in the direction in which the car is moving, so that the car and dummy will start themselves or be carried over by gravity.

The driving drums are different from those

in use on Clay street, where the drum has clips on its periphery in principle of action like Fowler's for driving wire ropes; while in Sutter street there are two single grooved drums in line with each other, one being slightly higher than the other. (See Fig. 9.)

These are so placed that the cable coming in from the street will lead fairly on to the highest, which is in the rear, or farthest from the street. Passing around this, the cable is led

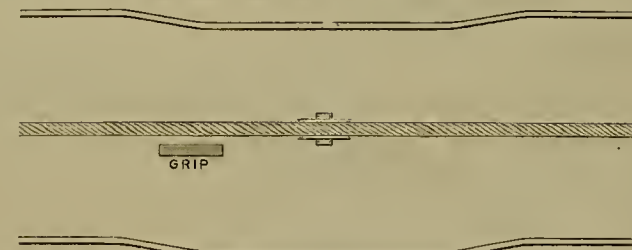


FIG. 8.

wrought-iron, reaching out and supporting the rails, which was copied in the later construction of portions of the Sutter street road above alluded to. In the case of the California street road, however, the main element of the wrought-iron works was made of old rails. (See Fig. 10.)

At the location of the engine house, ground area being limited, the driving drums for the cable were placed under the street, one under

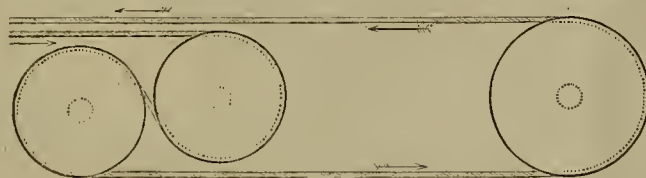


FIG. 9.

forward and up, over, around and down under both of the drums, forming the figure eight nearly. Thence the cable goes backward and around a vertical sheave, which is carried by a carriage which can be moved on ways or rails provided for it. After passing around this latter sheave it goes forward again over the two driving sheaves or drums to the sheave in the street, by which it is again deflected into the tube.

The movable sheave around which the cable passes before reaching the street is arranged with a chain and weight, so that a definite amount of tension can be placed upon the cable, proportionate to its size and the work it has to do. This road has one other feature not in the Clay street road. That is, horizontal curve. The Larkin street cable passing a right angle from Polk into Post and from Post into Larkin

and back again on the return track for deflecting the cable around these curves, which are from 40 to 50 feet radius; a series of horizontal pulleys, having no grove—but straight faces with a flange on the lower edge, are placed on the inner side of the curve about three feet apart, so that the deflection from one pulley to the next is slight. These pulleys are about 20 inches in diameter, and are set in iron cases which carry the bearings for the upper and lower journals of the upright spindles or shafts. The cable runs against the faces of these pulleys, and they are set far enough to one side of the slot so that this grip in moving along would easily pass them; but to avoid positive contact between the grip and these pulleys, a bar of iron is placed around the curve, just above and a little in advance of the faces of the pulleys, and at a point on the shank of the grip, which would come opposite this bar, is placed a piece of iron called a wearing piece, which, being made smooth, comes in contact with and slides along the bar, thus keeping the jaws of the grip from contact with the pulleys.

The method of applying power to the grip used on this road is by a long lever, its short arm of which forms one part or joint of the knuckle or toggle lever, while the power is applied on the Clay street grip by means of a screw, or rather to a nut working on a screw, the nut being enclosed in and fastened to the hub of a hand wheel.

The construction of the tube for this road was originally similar to that first used on the Clay street, that is cast-iron frames and a tube of wood, but later the construction of the tube has been made by the use of wrought-iron

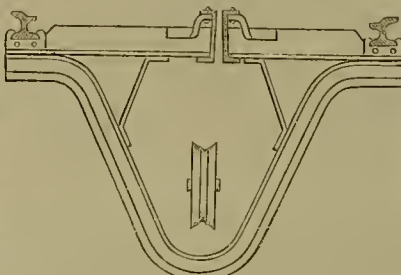


FIG. 10.

frames reaching to and supporting the rails, and making a skeleton tie for the rails, slot irons and tube, which latter is formed of concrete.

California Street Road.

The California street road, which was the next one built after the Sutter street, is similar in its conditions to the Clay street, but having some steeper grades, and as it was intended for heavier traffic a larger cable was used being one and one-quarter inches in diameter.

The tube is constructed of a frame of

Geary Street Road.

The Geary street road is similar in general conditions to the Sutter street, except that it has no curves, the road being straight from end to end, and the angles at these changes of grade are so slight that no depression sheaves are used to keep the cable down.

The grip used on this road is a "bottom" grip, but is operated by a lever applying the principle of the toggle joint.

The cars are transferred at one end of the road by a switch like Sutter and California streets, but at the other by a turn-table. The turn-table being of a diameter sufficient to hold one car is placed with its center of revolution in a line with the center of the outgoing track. The incoming track is curved, and the straight portion running onto the turn-table forms an angle with the outgoing track of about 30 degrees. This economizes space, and dispenses with the second table as used on Clay street. The driving drums in use on this road for moving the cable are different from any other road, there being two, and each having several concentric grooves so that the cable is passed around the two drums until a sufficient number of wraps are made to prevent slip. In this case no tension sheaves are used to give adhesiveness to the cable around the drum. Four or five wraps of the cable are all that is necessary. The tension sheaves, for taking up the stretch and slack of the cable are on movable carriages, and are drawn backward by a long screw.

The Union street or Presidio road Ferries road has the steepest grades of any road in the city, and has one horizontal curve, where the line passes from Montgomery avenue to Union street. In this case the cables are led away from the curve of the track, passing around large horizontal sheaves to change the direction of the cable from one street to the other, and the grades at the curve have been so modified that the cable having been let out of the grip, the train passes the curve by its momentum, assisted somewhat by gravity.

The driving drums are the same as used on Clay street; also the grip.

The transferring of cars and dummies at the termini are by switches, turn-tables being used only at the engine house for turning the cars on and off the road.

The Market Street Road.

The Market street road, the latest built, has some features different from all others. The construction of the entire railroad bed is the same as California street, except in the form of iron work of the frames for the latter, which is of the same kind of materials as are used on California street. The cars carry the grip instead of having a dummy, as on all the other roads.

The driving drums are the same as are used on California and Sutter street roads. At the junction of Market and Haight and also at McAllister streets, the Market street cable is dropped, and the cable running in Haight and McAllister streets is picked up, as the car is carried by its momentum around the curves into either of these streets, assisted by the gravity due to a grade modified for this purpose. At the curve on Market and Valencia streets an auxiliary cable is used for bringing the cars past the engine house. This cable is used only on one track coming east, the cars going west having to drop the cable and are carried around the curve by gravity. The speed of this cable is one-half that of the main cables, and it is driven by a grooved pulley or sheave on the line shaft which carries all the other driving drums.

The cables on Market, Valencia and Haight streets are driven by the same engine, while a separate engine is used for operating the McAllister street cable. At Haight street, the curve from Market street is passed the same as on the Union street road at Montgomery avenue and Union street, but at the junction of McAllister and Market after dropping the Market street cable, the McAllister street cable is picked up before reaching the curve, and grip holds the cable while passing it, the horizontal pulleys around which the cable passes being arranged similarly to those heretofore referred to at the corner of Post and Polk, and Post and Larkin streets on the Sutter street roads.

At the termini of these roads, the Market, Valencia, Haight and McAllister streets, which comprise the Market street Company roads, the cars are transferred from one track to the other by a turn-table somewhat similar to that used at the end of the Geary street road, with this difference: On Geary street the dummy or car is not turned around, but either end runs foremost, so that in changing the turn-table from the incoming to the outgoing track the table is moved through only thirty degrees.

On the Market street cars the grip is placed on the truck at one end of the cars so that the car requires to be turned half way round at each end of the route. The table in this case has to be moved through 180 degrees, and there are two parallel tracks across this turn-table, each equidistant from the center, the distance between the centers of the tracks being equal to the distance between the centers of the main tracks, so that when the table has been moved so that a car is in position to go off, the other track on the table is in position to receive a car from the incoming main line. As these turn tables are large and heavy they are turned by gearing driven by the main cable, through a grooved pulley, which being connected with the gearing is brought against the cable with sufficient pressure to give the desired

(Continued on page 38.)

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MOORE.—Amador *Ledger*, July 11. All indications point to this becoming one of the gold producers of the county in a short time. As soon as the water was extracted the beginning of last week, work was commenced in extending the drift north at the 180-foot level. In the previous working of the property, this drift was turned in an easterly direction; but the present management concluded to continue its northerly course at the point where it was deflected. After running about 10 feet an immense quartz ledge was cut. We have been informed that this vein is 25 feet wide between the walls; 9 or 10 feet of good milling ore appears next to the hanging wall, and 5 feet of pay rock next to the footwall, with about 10 feet of barren quartz between. Many years ago this same vein, worked at a point nearer the surface, paid \$7 per ton in free gold. A contract was let this week to extend the tunnel at the 180-foot level 200 feet further. The ore-body has steadily improved as the tunnel has advanced.

MISCELLANEOUS.—The South Spring Hill shaft has reached the 700-foot level, with a 25-foot sumpt below that level. The mill is running steadily, with plenty of ore to keep it going for an indefinite period. Ten stamps of the Amador Queen mill were started this week for a short time. The Amador Canal is unable to supply water to keep the mill running to its full capacity at present. The Potosi mill near Drytown has been running for over a month, under the management of A. N. Peterson, of Sutter creek. One clean-up has been made, which was satisfactory to the lessee, C. H. Thomas. The 10 stamps were kept going on a mixture of quartz and dirt, crushing nearly 40 tons per day. Only two men are required to keep the mill supplied with rock. The Mahoney mill has been started on ore from the Wabash mine, situated between Sutter creek and Amador, and owned by C. Hammack and L. T. Lewis. The appearance of the plates indicate a profitable run.

CANAL MATTERS.—The Amador Canal Company has a force engaged in repairing flumes near the head of the ditch. This work necessitates shutting off the water for several hours each day, and the water supply for the mines has run short in consequence. The McLaughlin ditch above Volcano is being enlarged. A contract has also been let for extending the ditch nine miles, so as to tap Panther creek, thereby securing a new water supply. Tim Hanley has secured the contract, and the work will take three months to complete.

Butte.

STRUCK IT RICH.—Griddle *Herald*, July 10: After many years of hard scratching, during which he has many times been flat-broke, that old pioneer Dr. Burwell has at last "struck it." 'Tis a claim lying close to the famous Perschbacher mine, in Magalia district. Two weeks ago he was offered a certified check for \$100,000 for the property and declined to trade. In a few months he will again be on his feet.

MIocene.—Oroville *Mercury*, July 11: We have been to the Miocene mine. The Martin elevator has been operated there but one day, yet it has been demonstrated that it is all that is claimed for it. Just as fast as ground is worked out the excavations can be filled, and every particle of debris retained on the ground. The Miocene ground is exceptionally advantageously situated. Between it and the river there are several deep cuts which can be used as dumping ground, and made to safely and everlastingly hold all the dirt that two monitors can wash out in ten years. The working of this elevator must be seen to be appreciated. All water and debris which is at first washed into the bed-rock flume, just as it leaves the lower end of this flume, is washed by the main pipe into the elevating tube, the upper end of which connects with a flume that is 25 feet above the ground. This flume can be carried in any direction, and the debris from the mine deposited in a given place with absolute certainty. This company can deposit 10,000 cubic yards of earth in the cuts and canyons below the mine, and there it will remain. Mr. Davis thinks the mine will pay by this process. We have lately visited the Oro River Mining Co.'s mine. It is a part of Feather river channel, five miles above Oroville. The work is under the superintendency of Wm. Mower and C. C. Belding. The plan is to wing-dam the river ore 230 feet and by clearing that distance, secure the gold in the bottom of the stream by means of washing. Twelve men are at work, and they are progressing finely. A partition or "crib" will extend about 230 feet up and down the center of the stream, which is about 100 feet wide, and at the upper end of this partition a head dam will be built, extending from the partition to the east bank of the river. This will dry half the channel in width and the length of the partition, making it easy to secure the gravel on the bed of the river thus dried. The water accumulated in that portion of the channel will be pumped out. The company hopes to have the wing dam completed and be ready to begin mining during the next two weeks. Old miners say the river there was very rich in early days, and as but little of the channel was ever cleaned, it is reasonable to suppose that much gold remains there yet. The managers are working with a will, and are confident that they will reap a rich reward. They are spending a good deal of money, and expect to take out five times as much as they put in. We hope that they will not be disappointed. If their venture is successful it will lead to a boom in river mining in Butte. The gold is there, and we believe that this company will find it.

Inyo.

MAMMOTH DISTRICT.—Cor. Inyo Co. *Register*, July 10: In what is called Pine City, there is an arastra at work, and it is my impression Mr. Albright, the proprietor, is doing very well; but the primitive way he has of roasting the ore I do not think equal to the extracting or saving all the precious metal it contains. The character of the quartz is good, and it contains free gold and gold sulphurets; also quite a percentage of silver. If the arastra gets much more than the free gold it will do well. We also visited the new camp of Lisbon,

about two miles further up, the mine being in the same formation and mineral belt. Here a few earnest workers and owners are erecting a good five-stamp mill, and they are doing their work well, working as if hopeful of a fine success—and may be assured that they have the good wishes of everybody to that end. The ore is about the same class all along, although in this Lisbon mine I believe it is of higher grade than is being worked in the arastra. The work done shows ore to a considerable depth, and working from their lower tunnel they will have rock to last them some time. To the mill, not over 300 feet below, a tramway will be built. The mill is run by steam; plenty of wood is near at hand. The great drawback is the 10,000 feet elevation and the heavy fall of snow. The snow shoes standing up by the cabin door gave us a little chill. We were told of some exciting trips out for provisions in the winter; but of course they can be well prepared to stay in and the mines can be continually worked. We were told of fine prospects in the vicinity and on the head-waters of the San Joaquin, only a few miles away. Also, we found on the way down that the old Minnietta mine, on the south side of Long valley, close by Convict lake, was being examined, and its worth may be proved before long. The formation is the same in my judgment as at Mammoth. The Minnietta mine is in the Laurel Hill district, as is the Maxwell mine, which also gives evidence of merit and shows considerable development.

SILVER MOUNTAIN.—Inyo *Independent*, July 11: John Eddy has a few men at work in the old Silver Mountain mine, in Coso district. This mine was worked over 20 years ago, and a good deal of money was then expended upon it, but the work was abandoned before the mine was developed. There is at least 300 tons of ore on the old dump, and the work now doing by Mr. Eddy has already developed a good deal of ore in the mine. If present indications continue very little farther Mr. Eddy says he will build a mill. Wood and water are plenty.

NORTH UNION.—Hawley & Company have lately put a force of men at work in the North Union mine at Cerro Gordo. For a long time past a little work had been doing at the mine, but now work is pushed vigorously. A good deal of ore had formerly been taken from the mine, but at great disadvantage, as it had to be handled too much to get it to the surface. The men lately employed are running a tunnel that will allow the ore to be got at easily; the prospect for the mine is very good.

NEW FIND.—About five miles from Panamint Junction, on the road east of Darwin, Ned Mantin recently discovered a three foot ledge of gold ore that promises well. John Eddy reports having examined some of the ore, and thinks it would go over \$400 per ton. Mr. Eddy says he will soon crush a lot of the ore in the mill, and that will determine the value of the claim. At Lookout Frank Fitzgerald has a large quantity of ore at the furnace, and is all ready for a run, except that help is scarce. Very few unemployed men are in that region now, perhaps not one.

Kern.

KRAMER CAMP.—Cor. Los Angeles *Herald*, July 11: Kramer was discovered about a year ago, and derived its name from a railroad station by that name on the A. & P. road. It is 40 miles east from the town of Mojave in the midst of the great Mojave Desert, and within 4 miles of the A. & P. road. The great drawback to the camp is the total lack of water, even for drinking and culinary purposes. The miners there at present get their water used for drinking purposes from the railroad depot; but as there are but four or five persons there little water is required. The water used for cooking their meals is obtained from a saline spring a few miles from the mines, which is owned by a gentleman residing in Los Angeles. The spring affords but little water, however, not more than 30 gallons per day, and that being too salt for drinking it is of little value. Only a little over a year ago the locality was uninhabited save by the depot agent, a Mr. Quinn, who in the sandy solitude around him was truly monarch of all he surveyed. But the prospector came; his solitude was broken up; some copper ledges were discovered and located, which were quite rich in that metal; but the low price of copper and the numerous disadvantages attending upon mining in the desert greatly discouraged effort, and the camp came near being abandoned, and doubtless would have been but for the perseverance of Wm. Kilgore of your city, and J. R. Maxey and J. L. Coffman of Ventura county. And to Mr. Maxey, I believe, belongs the credit of discovering gold there. This he did some months after the location of the copper ledges, and the discoveries then and since made are very rich in the precious metal. Moreover, the surface indications of the camp as well as the prospects and formation are all of the most encouraging nature; and little is as yet said or known about it. I here predict a future for Kramer as bright as that of any gold-mining camp in all California. The ledges are large and straight, with a nearly east and west course, slightly north dip, but almost perpendicular. The prospects run by the horn-spoon process from \$10 to \$500 per ton. These figures, however, are the extremes; the mean, of course, is something less. But of the best prospecting ledges there it may safely be said that they will mill from \$25 upward to the ton. The Coffman, a ledge 4 feet wide and probably the largest as well as the richest ledge in camp, prospects very high. It has been sunk on 25 feet, and I honestly believe it will mill \$25 taken clean from wall to wall. I am a miner of nearly 35 years' experience, and am fully aware of the magnitude of the above estimate; but I believe it clearly within the bounds of reason, large as it seems. It is the property of the Coffman Bros. and Maxey. The remaining ledges worthy of special mention are the Tip-Top, owned by Wm. Kilgore; the Golden Era, owned by G. J. R. Maxey; the Free Gold and Hope, owned by Maxey and the Coffman Bros.; and the Silver Age and Mint, owned by G. Cummins, Garrison and Sutton. All of these mines are good property, if situated where water could be obtained for the reduction of their ores, or even if there was a mill convenient and reasonable shipping rates could be obtained. But I know of no gold mill in this vicinity, and silver miners here inform me that rates on gold ore to San Francisco are \$18 per ton. Buyers of ore charge \$5 per ton for sampling, \$14 for working, \$18 for shipping, and then discount the product \$8 per ton. So you see there is worse than nothing left for the poor miner, and Kramer with its 25 ledges and probably fifty or more valuable mines, must lie idle and keep 1,000 men out of employment until their rich ores can be milled at a profit. Quite a number

of the Kramer ledges have been sunk on to depths varying from 10 feet to 40 feet, and the result in every instance but one has been a marked increase in the richness of the ore obtained, the prospects in some of them—notably the Silver Age, Tip-Top and Mint—having more than doubled in a few feet—another most favorable indication, certainly.

Los Angeles.

THE ALPINE PLACERS.—Los Angeles *Herald*, July 9: Considerable inquiry has been caused in our community by the recent notice of the Alpine gold placers. Since that time news have been received from L. D. Gavitt, who has charge of the dry washer, that its success exceeds his most sanguine expectations. This will be good news to all our placer miners who are working in dry districts, for it obviates the water difficulty which has always been the great obstacle to success. The owners of the Happy Thought mine, who are now present in the city, are so elated that they will hold a meeting at the Sportsmen's Headquarters, corner of Washington and Main streets, this evening at 8 o'clock, for the purpose of organizing a joint stock company. As soon as this is effected, an active mining campaign will be commenced, new machinery will be added and stock put upon the market. When this is done the company will open an office and notify the public by an advertisement in the daily papers. It is evident from the statements of those who have been on the Alpine placers that the development of these mines will help not only that section, but all the country.

Mariposa.

MT. RAYMOND MINES.—Mariposa *Herald*, July 10: It begins to look as though there would shortly be a revival of the excitement concerning the Mt. Raymond mines. A party of experts were up there last week and we are told that they are more than pleased with the outlook. The ore taken from there last summer was sent to England and tested and the result was highly satisfactory. The only question was whether the ore body was large enough to justify the expense of reduction works. The visit of the experts last week was to decide that point, and their report will be favorable. It is reported that smelting works will be put up at Fish Camp right away.

Mono.

CON. PACIFIC.—Bodie *Free Press*, July 13: During the past week have been engaged in cutting out a station for winze on the vein west of No. 3. Progress, 9 feet.

MONO.—At the Mono the joint cross-cut on the 400 level has been extended during the past week 9 feet. Winze No. 2, 550 (Lent shaft) level, 400 feet from the Bodie line is down 25 feet. Five men employed.

STANDARD CON.—For the week ending July 11th the north drift on 400 level was advanced 12 feet. East upraise on same level has advanced 10 feet. Drift on 440 level has advanced 9 feet. North drift on 560 level has advanced 15 feet. Drift on 500 level has advanced 8 feet. Drift 280 level has advanced 12 feet. The mine continues to look well.

BODIE CON.—The joint Mono and Bodie cross-cut on the 400 level of the Mono has been extended during the past week 9 feet. The east cross-cut 700 (Lent shaft) level is now in 100 feet. The south drift on the same level is in 52 feet. The upraise above the 300 level is up 29 feet. The upraise above the 400 level is up 11 feet. Twenty-eight men employed.

WAGES AT QUIJOTOA.—*Beef and Bullion*: The announcement that the rate of miners' wages at Quijotoa has been reduced to \$3 a day will surprise very few. Arizona is the only considerable portion on the Pacific Coast where the \$4 rate is still general. The example of Tombstone and Quijotoa will soon be followed in all other camps in the Territory. Miners must prepare to accept the inevitable. There are very few mines that can afford to pay \$4 a day for labor.

BIG BUG.—Prescott *Courier*, 12: As was recently stated in this paper, Schofield & Co., of Big Bug district, are tunneling into two pretty good gold mines—the Poland and Hamilton. The tunnels will be long ones, so as to secure large supplies of rock for the mill, which has made a couple of very successful "runs." This mill, some of our readers may remember, was recently erected by Messrs. Church & Gray. It consists of a battery, shaking tables, jigs and concentrators. It is said to be a cheap and simple contrivance for saving gold. If we are correctly informed, the use of quicksilver is dispensed with, and the cost of running the plant is very light. Considerable free gold and three carloads of concentrates are results of two short runs. Another mill, similar to this, is about ready to work in Turkey Creek district, and we know a mine owner who has about concluded to have Messrs. Church & Gray put one up for him. The Del Pasco 4-stamp mill (old style) is doing good work on Del Pasco rock, which continues to yield gold in paying quantities. It pleases us to be able to keep repeating accounts of Mr. Dawes' success at Alexandria, Peek district. The silver he ships in here comes out of Peck mine tailings. Concerning operations of the Rescued mining Company, we need only state that the mine is opening up finely and that they hope to have the mill ready for running about the first of next month. Placer mining, owing to scarceness of water, is almost at a stand still, in consequence of which gold dust is pretty scarce.

YOUNG AMERICA.—*Mountain Messenger*, 13: Work at the Young America quartz mine, under the supervision of Supt. A. C. Busch, is progressing rapidly and satisfactorily. The mill building is enclosed, and the supports for the ramway are all in place and the wire rope stretched. The rope will be spliced, the buckets attached and the inclined way to carry the load which is to take up the stretch of rope and at all times keep it taut, will be completed in a few days. The superintendent thinks they will have water enough to run during the rest of the season, as the lake is still filling. This mine is highest in the country, being 7,000 feet above sea-level—2,000 feet higher than the Buttes mine. It is thought that the mill will be running by the first of August.

Plumas.

LUCKY S.—*Greenville Bulletin*, July 11: Benj. Harvey, Superintendent of the Lucky S mine, was in Greenville Saturday. He reports good progress. They had just "cleaned up" after crushing 32 tons of ore, which averaged \$19.92 per ton. A larger

force of men has been put on, and work will be prosecuted with energy.

THE GLAZIER.—This is a placer claim about 5,000 feet long, situated on the north fork of Feather river. Several men are now employed working on good pay ground. The channel has been followed 75 feet already, and the entire length prospects well. No cross-cutting has yet been done, hence the width is not known, but is believed to be between two and three hundred feet. Fortunately for the owners, the mine is so located that an immense quantity of water can be applied with very little expense.

HOPKINS CREEK QUARTZ.—*Plumas National*, July 11: Capt. Donahue of Hopkins Creek was in town this week, and showed some very rich quartz taken from his ledge, which he informs us is about twenty feet wide. Cap. certainly has a prospect for a fine mine; he is a stayer, and will develop it if anybody can.

San Bernardino.

THE CALICO M. & R. CO.'S MILL.—*Calico Print*, July 11: On the morning of the 4th the new 5-stamp quartz mill, built by the Calico Mining and Reduction Co., was set in operation for the first time. The mill is a few yards above the Jaggett Sampling Works, and the stamps of the former are operated by means of the engine contained in the latter. The first day or two was spent in testing and adjusting the new machinery so as to run without any necessary friction. The stamps have been reducing ore a greater portion of the week, but possibly it may be necessary to put in another boiler, in order to operate the engine at full speed. This will be determined by further tests.

Shasta.

STRUCK THE LEDGE.—*Shasta Democrat*, July 11: It is reported that Derby & Co., who bonded the Whitton & Small mine on Squaw creek, have struck the ledge with their tunnel and found a strong vein of rich quartz, which insures the purchase of the mine. Selden Mead, Mr. Bentz, Chas. Boardman and Jim Mead, while on a recent prospecting trip on Scott mountain, struck a quartz vein to feet wide that they affirm prospects well in silver. The find is within about three miles of the Altoona quick-silver mine. They have located and recorded two locations and did \$100 worth of work on each. The boys feel sanguine that they have struck a good silver mine.

FRENCH GULCH MINES.—*Republican Free Press* July 11: F. W. Wheeler, of French Gulch, was in Redding Wednesday and gave us the following reliable items: The shipment of bullion from French Gulch for the month of June amounted to \$22,250. Hall & Espy, two railroad men off on a vacation, made a rich strike this week on Boswell gulch, four miles from the Gulch. They have a tunnel in 70 feet, and are down a few feet on a five-foot ledge, with rock from \$15 to \$20 to the ton. The Washington mill is crushing on rock from the company's mine, but expects to shut down soon for want of water. The Scorpion boys recently had 72 tons of rock run through the Niagara mill which panned out \$1,900 in bullion. The Niagara is running all the time, and has been crushing some very rich rock. Wheeler & Son are opening up a new mine. They are down 15 feet and have a foot ledge between the porphyry and slate. It looks very favorable. The Highland mine is again being opened up. Some 9 or 10 men are employed in running tunnels and sinking shafts. Over on Deadwood McDonald Bros. & Franck are down 125 feet and have drifted 100 feet west on the ledge, which shows a large body of high grade ore. Fifteen men are employed. The Watt mine, formerly known as the Lambert, is being worked by 23 men, who are taking out a large quantity of low grade ore—say \$12 to the ton. Gipson & Co. have a ledge from a foot to 15 inches wide and very rich. George Kline has just had 500 tons of ore crushed at the McDonald mill, which averages from \$12 to \$15 to the ton. His mine, bonded about three months ago by Shattuck & Co., is worked by several men, and the rock taken out is good.

Trinity.

NEW RIVER.—Cor. Yreka *Union*, July 9: New River news is rather scarce. I was over there a week ago, and found the camp very quiet. The mines are suffering from the lack of crushing facilities, and it will doubtless be some time before there is any chance for the place to look lively, although there is not the least doubt that the mines will eventually prove a success. I was kindly shown over the "Hard Rock," at present the most promising and best developed mine in the district. This is owned by Messrs. Ladd and Clements—the latter an old Salmonite. There has been an incline shaft sunk 180 feet in depth, and the rock throughout is of the most promising character. On Methodist creek there is a good deal of work being done in the shape of quartz prospecting, and several different parties are working steadily testing their finds. I also saw some quartz from the claim of Donaldson & Hagenah on Plummer creek. This claim has some very rich rock, and the owners are now testing the ledge by sinking on it.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, July 11: The winze is now down exactly 32 feet below the 3,000 level, and timbered in fine order throughout, as a handsome, roomy, double compartment winze. It has been sunk by the aid of a hand-windlass thus far, but a hoisting engine will be placed in position to-morrow or next day, driven by compressed air, to do the hoisting work. In chambering out for this engine on the east side of the winze station, on the 3,000 level, the rich ore body or vein is found to extend further in that direction than was supposed. This indicates very significantly that the ore vein which is being followed down by the winze, bears and widens toward the east, and is more than liable to develop into a genuine bonanza in that direction. In view of this fact the incline will be turned a little more to the east to-day. It has thus far been sunk at an angle of 60 degrees, which proves to be more to the perpendicular than the vein is. The sinking of the Combination shaft deeper below the 3,000 level is actively commenced, with four six-hour shifts of miners, 12 on a shift, or 48 men in all during the 24 hours. It is already down 10 or 12 feet, and good regular progress will hereafter be made. When it reaches its proposed additional depth of 200 feet, on the 3,200 level, the shaft should nearly or quite intersect the Hale and Norcross ore vein or

body, as on the 3,000 level it is 180 feet distant, and the general average Comstock pitch eastward has been nearly 45 degrees. The lateral drift north from cross-cut No. 2 is now in about 80 feet, and the face is in very promising vein matter. The sinking of the shaft deeper will be kept pace with by the deeper sinking of the wire, and, as they near each other, through the east inclination of the wire, the development of the ore body will be reduced to a minimum certainly, a practical demonstration—a consummation most devoutly to be wished.

CROWN POINT.—The old bonanza stopes and workings continue to yield about 350 tons per day, and the Belcher which is being worked through this mine, yields from 100 to 150 tons per day, which is worked at the Rock Point mill, just below Dayton, on the Carson river. All this ore from the three mines mentioned is of low grade, being merely the leavings or gleanings of the old high grade bonanzas which were worked out years ago.

CON. CALIFORNIA AND VIRGINIA.—During the past week about 900 tons of ore were extracted from the 1,750 level on the company account, assaying from battery samples \$26 dollars per ton. On the 1,700 level the upraise is continued at the rate of about 20 feet per week. The yield of ore from the Jones contract section, on and above the 1,300 level, is about 100 tons per day, battery samples averaging \$18 per ton.

BEST AND BELCHER.—On the 1,000 level the cross-cut west, 100 feet south of the Con. Virginia line, has been advanced 45 feet in very favorable looking and working ground.

BULLION.—Water impedes progress in the west drift on the 150 level, yet a fair degree of advancement is made, with favorable vein material in the face of the drift.

ALTA.—Good bunches of fair grade ore continue to be met with occasionally in the explorations above the 900 level, which is being saved for milling.

GOULD AND CURRY.—Cross-cut No. 1 east, next to the Savage line, on the 1,000 level, was advanced 60 feet last week, showing no new or interesting features in its face.

UNION CON.—The joint Union and Mexican lateral drift north on the 500 level was extended 65 feet last week, and is in favorable working ground.

SIERRA NEVADA.—On the 220 level the main north lateral drift was extended during the last week nearly 90 feet, the ground working very favorably.

YELLOW JACKET.—The upper workings continue their regular yield of low grade ore, with no new features to record.

OVERMAN.—Yielding about 50 tons of ore per day from the old stopes of the 226 level and above it, supplying the Vivian mill.

Cortez District.

COMING TO THE FRONT.—*Silver State*, July 7: S. Wenban, owner of the Wenban mine in Cortez District, passed here yesterday homeward bound. He has been west ordering machinery for new reduction and leaching works. He intends to build works capable of treating from 60 to 80 tons of ore daily, as there is any quantity of ore in sight in his mine. Cortez is among the oldest mining camps in Eastern Nevada. It was discovered in 1863 by prospectors, who went up the Humboldt to Gravelly Ford, and then struck south into the mountains. A small mill was ordered for the camp soon after it was discovered, but the machinery did not arrive for a year after. Freight from Sacramento was 25 cents per pound, and only brave men dared to venture out there. Mr. Wenban has stuck to the camp from the first, although at one time the mines had completely given out, and there was not a pound of ore in sight in the district. Now the mines are paying well; there are thousands of tons of ore in sight in them. Mr. Wenban is a rich man, and is going to erect large reduction works.

Columbus District.

MOUNT DIABLO.—*Candelaria True Fissure*, July 11: The north cross-cut from the west drift on the sixth level has been stopped, and a drift started on a ledge of low grade ore giving assays from \$6 to \$17 per ton. The east drift on the sixth level, is in 106 feet. The intermediate drift, between the fifth and sixth levels and west of the incline, has advanced 4 feet during the past week, and shows a narrow streak of \$40 ore. The slope above the west drift on fifth level shows a narrow ledge except in one place where there is a bunch of rich ore. The intermediate stope between the fourth and fifth levels, is showing much the same as at the date of the last report. Some ore of good grade is being taken from several places on the third level. The intermediate, east of the shaft and between the second and third levels, shows a small bunch of \$80 ore. The remainder of the mine shows no change of note. A bullion shipment of \$18,875.54 was made on the 8th inst., making a total on June account of \$42,733.32.

Eureka District.

LOCAL MINING NOTES.—*Eureka Sentinel*, July 11: The Members mine on Adams Hill made a shipment of 12 tons of ore the other day. The Phoenix mine on Ruby Hill made a shipment of 2 tons of ore on Thursday last. The Whippoorwill mine on Prospect Mountain is reported as looking and yielding well. A ton of very rich ore was brought in from Tybo the other day to the Eureka Con. furnace. Frazier & Molino sent down to the Richmond works during the past week 17 tons of very good ore. Active prospecting work is being carried on in an unusually large number of mines on Prospect Mountain. Some half dozen mines on Adams Hill made good ore shipments to the reduction works in town during the past week. The Lord Byron mine on Prospect Mountain shipped 19 tons of ore during the past few days to the Richmond works. The Silver Lick mine on Adams Hill made a shipment of 13 tons of ore to the Richmond furnaces during the past week. Considerable prospecting work is being done in the Secret Canyon mines, and in one or two cases ore is being extracted for shipment. The East Oakland mine on Prospect Mountain made a shipment of ore the past week; 17 tons were sent down to the Richmond furnaces. The Jackson mine on Prospect Mountain shipped to the Eureka Con. furnace during the past week 68½ tons of ore, which is of good quality. The Morning Star and Lone Pine mines on Adams Hill continue their shipments of ore to the Richmond works. The former shipped 22 tons, the latter 7. From the Colorado mine, on the west side of White Pine Mountain, some 16 miles west of

Hamilton, 1,800 pounds of rich ore was brought in to the Richmond works last Wednesday. From the Hamburg mine on Prospect Mountain 72 tons of ore were shipped to the Richmond reduction works during the past week. It is said that the property has in it a great deal of ore in sight. The Silver Connor mine on Prospect Mountain, which declared a dividend last Wednesday of \$1,000, continues its shipments of ore. Thirty tons were sent down to the Richmond works since Monday last. The Eureka Con. mine continues its large outputs of ore, and prospecting work is being actively carried on in numerous places in the property. The Williams pitch on the seventh level is looking very well. The depressed times in town are driving many business men who are owners of idle mining properties hereabouts to working the same. Joe Mendes' mine, the California, was idle for a long time, and it was on account of the dullness of trade with him that he resumed work in the property. As a result, he has a good-sized body of high grade ore.

Pine Grove District.

MILL RUNNING.—*Yon Co. Times*, July 10: Pine Grove, which during past years has produced \$7,000,000 in gold, is still in a quiet way running its mill, and has never yet attained a depth of 300 feet from the surface, we understand, on account of the heavy flow of water above that depth. The Moss mine and mill at Kinkead are in full blast and constantly shipping bullion in which gold largely predominates. Farringtons are working a mine in that vicinity which is paying handsomely, and for which they were recently offered \$350,000.

Pahranaagat District.

BAR 3.—*Pioche Record*, July 11: The third bar of bullion was brought in from Pahranaagat on Thursday by Eugene Howell. Its value was \$8,483 and was 95½ fine. Taking into consideration the limited milling facilities of the company, there is extra good work being done. Mr. Howell came up for the purpose of seeing if some sort of arrangements could not be made whereby the 10-stamp mill at Hiko could be leased from the Valley S. M. Co. It is to be hoped that he will succeed in securing a lease of the mill.

ARIZONA.

WALLPAC.—*Tribune*, July 11: The shipment of ore from Kingman for the month of June was 220 tons, 470 lbs, an increase of about 50 tons over the month of May. Ewing & Goshorn are having a carload of ore hauled in from the Altata mine at Chloride, which they will ship to the Argo smelter. Musser's team brought in a load of ore from the Sunlight mine at Chloride Wednesday. There is now over a carload of this ore stored in Taggart & Co.'s warehouse ready for shipment. A carload of 21,480 pounds of Golconda ore was shipped to the Pueblo smelter on the 7th. This mine is now making regular shipments of ore, and will soon be up among our largest shippers. The largest load ever hauled into Kingman by an eight-mule team was brought in Tuesday from the Primrose mine in Todd Basin by Beecher and Co.'s team, and weighed 13,467 pounds. This ore was extracted by Charles Maxson and James Jackman. One ton of this was taken to the sampling works from which they obtained about \$200. As soon as the ore is all hauled in they will ship it to Pueblo. John Barry has been appointed superintendent of the Arizona Northern Mining Company, vice H. S. Carpenter, resigned. It is understood that under Mr. Barry's superintendency considerable work will be done on the mines, and there is a strong probability of the mill starting up in about a month. If this should be done it will once more make Cerbat one of the liveliest camps in the county, and perhaps add much to the material wealth of the country. Chamberlain sampled a carload of Crescent ore Tuesday, which was taken out on the lease of Peters & Vial. The ore which Messrs. Peters & Vial have been taking out is said to be the best ever extracted from the mine. We are glad to hear it, for the boys worked for months in very unfavorable ground without a pound of ore in sight, but the Lord was on their side, and one day about six months ago they struck it rich, and have been taking out good ore ever since. Through their perseverance twenty men are now working where not one would have been had they thrown it up in disgust, as nine out of ten men would have done eight months ago.

TAILINGS.—*Prescott Courier*, July 5: The talk is that Mr. T. J. Eaman will work tailings now at the Tuscumbia mill. Mr. Chase says he has orders from Mr. Callen to make a ditch to carry water to the Antelope placers. California parties seem to want a lease on the May Bean mine, Peck district. The buried treasures of Arizona are great indeed, but it will take capital to free the gold, silver, lead, copper, etc., from their matrixes. We haven't got capital enough to even give the deposits a prospecting, much less a thorough working. Let us, then, encourage capitalists to bring or send their money here, where they are sure to be rewarded. Such very rich mines as the Tip Top, the Peck, Tiger, Lane, Black Warrior and Del Pasco, have paid from the grass roots down, but it will take means, good management and costly machinery to force pay out of the poorer classes of ores, in ten or a dozen mining districts in this county of Yavapai, as elsewhere in the Territory. Our ledge-owners can render this encouragement by not holding their prospects too high. Ask fair prices when purchasers come along; take the money and develop some other property. Were there large reduction works here development would be easy, as then the miner could take out ore and sell it on the spot. As it is, ores that will bear the expense of mining, shipment to Colorado, charges for treatment, etc., are not any too plentiful, hence the uselessness of mining for them, under existing circumstances. It is said there is no use of talking about works until we shall have railroad facilities; but, as the mines are less than 100 miles from the A. P. Railroad, well-directed capital would enable us to work scores of mines that are now idle.

COLORADO.

OPHIR NOTES.—*Cor. San Miguel Journal*, July 11: Eugene Hathaway, one of the old-timers of the San Juan, has just struck a fine body of rich gray copper and chloride ore on the New Hope, a valuable mine situated in Water Fall Basin. Tom Fipps came down from the Valley View the other day, and reported that the workings on that mine were show-

ing up splendidly. Mr. Fipps brought down an average sample of the ore he is taking out. It is rich in gray copper and sulphurets. J. P. Murry is in town from the Tidal Wave, and reports that things are booming up there. General M. J. Alkire is shipping large quantities of ore from the Suffolk, one of the most famous gold producers in this vicinity. W. R. Weeks is driving a cross-cut on the Golden Bell, and expects to cut the lead within five or ten feet. H. W. Butler will soon set four or five men to work on the Butler mine, situated near the Silver Bell. A few days ago I visited the Patterson and Trenton, two fine gold claims owned by Gillin & Douglass. These mines are situated on the west end of Yellow Mountain, and cross each other at an angle of 45 degrees. The Patterson shows some four or five feet of splendid gold quartz, which will probably run \$30 in gold. The work on the mine at present consists of a ten-foot face which was put on as assessment work for the present year, and a twenty-foot drift with a sixteen-foot shaft sunk from the bottom of it. There is a large quantity of fine gold ore displayed in the bottom of this shaft. The Trenton, which crosses the Patterson in a southwesterly direction, and is supposed to be an extension of the Fulton, shows eight feet of fine-looking quartz. The pay streak is about twenty inches in width, and will run at the lowest figure \$20 to the ton. The work on the mine consists of a ten-foot face on the vein. Both of these mines would prove a paying investment to a company with sufficient capital to put a stamp mill on the river below. As they are situated low down the mountain, a short and inexpensive tramway could be erected by which the ore could be transported to the mill and work be continued the year round.

CARBONATE BELT.—*Elk Mountain Pilot*, July 10: The country lying between Rock creek and Roaring Fork, in what is known as the Carbonate belt, is attracting attention this summer as a desirable field for prospectors. On Snow Mass and Avalanche mountains the lime formation similar to that at Aspen is found, and we would not be surprised if some startling discoveries were made there before fall. Prospectors are going in from all directions, and the best way to reach there from here is to go down Rock creek to Crystal, which is near the belt.

POVERTY GULCH.—The Black Hawk mine in Poverty Gulch is being worked by Frank Betts, one of the owners. The work on this property has been on a tunnel on the vein, which is in 115 feet and is run on the foot wall. This spring, however, Mr. Betts made a cross-cut from the breast of the tunnel to find the hanging wall, and after driving a cross-cut 16 feet came to the hanging wall, and at the same time discovered a streak of mineral 30 inches wide next to it. It is a sulphide of copper and galena that will run 60 to 80 ounces in silver and 35 per cent. lead. The Maryland lode in Dark canyon is to be worked this summer. The Richmond Co. have changed their work from that property to the Tip Top and Lady Joe, which are showing up well. McCullough & Howe are working the Florida with good success. The Domingo Co. are making arrangements to ship their ore in a few days.

CRYSTAL CITY.—The Belle of Titusville is keeping up its representation as a good property on Rock creek. The Gothic smelter has purchased 40 tons, and the mill run from one lot gave 297 ounces in silver, and from another lot 143 ounces in silver. The starting of the Gothic smelter will be a great benefit to such properties. There is quite a rush into the carbonate belt from Aspen by way of lower Rock creek and hundreds of prospectors are flocking into the mineral belt between here and Aspen. Very encouraging reports are coming in. I. H. Newman has struck a large body of ore upon a new location on the large contact down at Bull-dog creek, which shows over 4 feet of ore. The Governor Tabor is showing up splendid, and the boys are taking out some fine carbonate ore. The August Flower is coming to the front in good shape and ore getting richer.

IDAHO.

FROM LOST RIVER.—*Cor. Wood River Times*, July 11: In the way of mining there is little doing at present, but there is every indication of better times soon, for ore of a paying grade has been found in numbers of the claims, and there is a world of lower grade copper and lead ores on Lost river, which will some time make one of the greatest mining camps in the West. The present depression of business, and low prices of copper and lead, cannot last forever; and when a change comes for the better, the mines of Lost river will readily come to the front. Some very rich strikes are reported about the head of Antelope creek and near the Champagne and Lava creek districts. The ore is of high grade, and a new and promising district is being opened. The smelting furnace at Cliff will soon start up on galena ore from the Mammoth, the Alice, the Independence and other mines. At Houston though, times are rather quiet, and hard for capitalists of the single blanket order, drinks being cash on delivery, stud poker non est, and "jawnbone" no longer current at the boarding-house. Still, the outlook is quite promising for a substantial boom late in the season.

SMOKE DISTRICT.—*Wood River Times*, July 11: John Rafter who is just in from Smoky, says the mines are looking terribly well, and that the people of Hailey will be astonished at their output, as soon as the wagon road is finished. The mines show better with every foot of descent.

THE MOUNTAIN VIEW GROUP.—Willis McBride, who recently came up from Salt Lake City to superintend the work on the Mountain View group, at Bullion, is in town. He has three men stopping, with about three tons on the dump, and expects to make a first shipment of ore to Hailey within two weeks. The result of that shipment will determine the scale upon which operations will be conducted, the owners being determined to keep the expenses within the income of the claims.

THE HUMBURG MINE.—S. Graham Felsenthal, superintendent of the Humburg mine, in Lee's gulch, was in town to-day after some assay certificates. He reports the Humburg looking exceedingly well, and making regular shipments to Hailey. The latest was five tons of rich ore (the Humburg ore is always very high grade) shipped yesterday. He is working 12 men, and will increase his force as he can work men to advantage. The Humburg is owned by the same capitalists who control the Queen of the Hills, King of the Hills and other valuable mining properties in this region.

THE ORO FINO.—*Owyhee Avalanche*, July 10: Work will soon be commenced in extracting the rich ore recently found in this celebrated mine. The ore will mill nearly \$1,000 per ton, as was demonstrated last week when a clean-up was made from 30 tons as it came from the mine, which yielded \$24,689.14, or over \$800 per ton. This mine has lain idle for a number of years. It will now be worked. The ledge is large, and there are thousands of tons of free-milling ore below water level that will mill \$50 per ton. A pump will soon be placed in to relieve the mine of water, when work will be commenced in earnest.

MONTANA.

GRANITE MOUNTAIN.—*Inter-Mountain*, July 11: C. D. McClure & Co. have bonded the Granite Bell, an extension of the Granite Mountain mine, for \$50,000. Last Tuesday the Drinn Lummon mine at Marysville sent between \$45,000 and \$50,000 worth of bullion into Helena, the result of a week's run. Some fine specimens of ore from Western Montana have recently been placed on exhibition at Helena. They are from the Mattie Stone and Belle Stone mines on the Thompson river, which are owned by W. H. Anderson. The ore assays \$23 in silver and 50 per cent. in copper. The Livingstone Enterprise says that the three months' bond taken on the Homestake mine at Cooke expired last Saturday, and an extension is asked owing to the fact that the weather in the district has prevented full examination of the property. Another syndicate of Butte capitalists ask to bond the property for \$100,000 for three months, pay \$5,000 down, and put in C. W. Mather as superintendent of development work. If the terms of the present bond are not fulfilled, the owners of the property, rather than grant an extension, feel like taking up the second offer. In the new gold diggings in Welcome Gulch, Missoula county, two big nuggets were found last week, one weighing \$20 and the other a little more. Three large astras are expected to be completed and put in operation in the upper district of Emigrant Gulch, within a very few days. The Homestake mine near Helena last Wednesday sent 400 ounces of gold and silver retort into Helena valued at \$4,800. It was the result of a two weeks' run with five stamps. A large body of very rich ore was struck last week in the Iron Rod mine, in the end of the west level at the depth of 350 feet. The mine had been under water for some time past.

NEW MEXICO.

MISCELLANEOUS.—*Silver City Enterprise*, July 11: Only one carload of ore was shipped from Whitewater last month. The shipping of iron ore from Santa Rita to the Benson smelter will soon be resumed. The Carlisle mine has been temporarily closed down, pending the improvements in the concentrating machinery. As soon as this is accomplished the mine and mill will again be started up. O. R. Smythe will soon commence the shipment of Last Chance ore from the mine to the Benson smelter. There is now about 3,000 tons of ore on the dumps of the mine which will be assorted before shipment. It is likely that the McNair furnace near Brenen's mill will start up shortly. Parties are now looking around with a view to securing sufficient amounts of the right kind of ore as a basis of operation. In case they succeed in securing a sufficient quantity the smelter will fire up and be kept in constant operation. The mining machinery which left this place about three weeks ago for the Peacock M. Co. in the Mogollons was 14 days on the road. One of the wagons, upon which was loaded a heavy roller, tipped over a short distance this side of Alma. The roller was solid iron, and beyond it occasioning some delay no further damage was done.

GOLD HILL.—*Cor. Silver City Enterprise*, July 11: A three-eighths' interest in the Lone Hand was purchased by Messrs. Mitchell and Davis at private figures. Messrs. Henry, Cusenberry and Briant, the retiring partners, leave the property in good shape for working by the present owners. Clark, Derbyshire & Co. commenced work on the Grand Tower last Monday. They will for the present work but three men, but as soon as practicable will put on an additional force. Standard continues to work without interruption. In the east drift 10 feet additional has been made, showing up a 14-inch vein of rich mineral. West drift has advanced 8 feet during the week, and is also in good ore, extracting the usual quantity of mineral. No shipments will be made for some time, as the boys have ample funds on hand for all necessary purposes. Messrs. Lewis, Cottrell and others interested in the Under Dog location, have about completed arrangements for a four-months' working bond with Messrs. Caples and associates. The sum agreed upon is \$5,000 for the claim. Major James Carter, one of Lordsburg's representative men here, is curbing his will, sinking it deeper, and preparing for active work of some kind. Rumor has it that the Major contemplates erecting the first quartz mill in the district. Treasure Box is advancing steadily. The shaft is now 25 feet deep in gold ore. A galena and talc vein is coming in on the hanging wall and enlarging as depth is attained. The vein is 28 inches wide. Messrs. Howland and Hilp, should they secure any property here which promises favorably, will erect a mill immediately. There are a number of good properties here, which, however, they have failed to secure.

OREGON.

CLEANING UP.—*Jacksonville Times*, July 11: Wimer & Sons have finished cleaning up at their extensive claim near Waldo and did very well. Klippel, Denef & Co. are putting a wing-dam in Applegate, with a view of mining the bed of the river. Considerable prospecting is going on in Jackson and Josephine counties. Some good will surely result from it. I. M. Dyer, inventor of what is known as the cannon-ball quartz mill, is in Southern Oregon for the purpose of introducing his machinery. Ed. Caton and Neitz Bros. started yesterday on their second trip to Galice creek. They intend to locate both quartz and placer claims. Harvey Shepard has discovered a promising quartz ledge a short distance south of Ashland. Considerable work has already been done on it. Another mining expert has been examining the Schumpf quartz ledge in the Willow Springs district, which will no doubt prove valuable property some time. Geo. H. Chick received his amalgamating pan and fixtures last week for the Morse & Jacobs quartz mill at Henley, Cal.

Cable Railway Propulsion.

(Continued from page 35.)

power. The cables used by this company are the size of the ones used on California street (1 1/2 inch in diameter).

On McAllister street where the road crosses to Fulton street, there are four curves of about 45 degrees each, with the horizontal pulleys arranged similarly to those on Post, Polk and Larkin streets of the Sutter street road.

General Features.

These facts concerning the general features of the various roads are incidental to important questions, that of the economy in construction, maintenance and operation of the cable system of propulsion for street cars.

In order to direct an intelligent inquiry into the subject, I have divided it into three general heads:

- 1st.—Construction.
- 2d.—Maintenance.
- 3d.—Operation.

Each of these divisions, of course, have many details, but for the purpose of this paper I have made them somewhat general.

Under the head of Construction, I have placed the construction of:

- 1st.—Road bed and tube.
- 2d.—Driving machinery.
- 3d.—Gripping apparatus and cable.
- 4th.—Cars.

Under the division of maintenance I have placed:

- 1st.—Road-bed and tube.
- 2d.—Driving machinery.
- 3d.—Gripping apparatus and cable.

Under the division of operation I have placed:

- 1st.—Power for driving the cable.
- 2d.—Power for driving the cars.
- 3d.—Power for hauling passengers.

Construction.

In the construction of the road-bed and tube, it will be noticed that we have advanced from the first experiment of wood and iron to concrete and iron, with stone paving for the surface of the street and with steel for rails. Probably we have gone to the extremes in this respect as far as cost is concerned, for we have constructed the tube and the road-bed of the most lasting materials, with all the strength to support the heaviest traffic which will ever be allowed over the streets of any city, the surface being composed of materials which are best known, by experience and judgment, to resist the wear to which they may be exposed; and these materials have been used in a generous manner. The increase in economy will consist in the reduction of material to the minimum required to meet local conditions, and an exercise of careful judgment in the manner and distribution of labor in the combining and placing in position the materials of construction. The apparent cost of similar forms of construction of the road-beds and tubes of the cable roads in this city vary so much that it would be delusive to have estimates of the cost of a projected road upon the generally reported statements concerning the cost of those already built. The conditions to be observed for the street surface are that the grades of the street shall not be disturbed, or that no protuberances or depressions shall be made to interfere with traffic of teams or vehicles, and that the strength of the tube shall be sufficient to easily support the heaviest weight which may ordinarily come upon it without disturbing its shape.

In the construction of the driving machinery, some basis for consideration may be had by a comparison of the weights of the moving machinery for the roads in this city, when they are each compared with the weight of the cables which they propel and support. It may be taken for granted that the weight of supports and foundations for the moving machinery will be proportionate to the weight they have to carry.

The weights of moving machinery include the moving parts of the engines, shafts, flywheels, pulleys, sheaves and gears in the engine house; also, the deflecting sheaves, which change the direction of the moving cable, and the carrier sheaves, which support the cable in the tube along the street.

Machinery and Cables.

The approximate weights of moving machinery and cables on the various roads of San Francisco are as follows:

Name of Road.	Weight of Machinery, lbs.	Weight of cable, lbs.
Clay.....	22,000	15,400
California.....	100,000	63,000
Sutter.....	240,000	68,000
Geary.....	60,000	37,800
Union.....	80,000	30,500
Market, Valencia & Haight.....	240,000	164,412
McAllister.....	160,000	68,000

To compare the weight of moving machinery with the weight of cable, let the weight of cable be 1, then the weight of moving machinery will show as follows:

Name of Road.	Weight of machinery, lbs.	Weight of cable, lbs.
Clay.....	1	1.428
Market, Valencia & Haight.....	1	1.459
McAllister.....	1	1.47
California.....	1	1.538
Geary.....	1	1.587
Union.....	1	2.622
Sutter.....	1	3.529

These figures are somewhat suggestive. As the cost of machinery of this character is generally sold in the market by the pound, it is comparatively easy to estimate the cost of the driving machinery, and as the cost will be generally in proportion to the weight, due consideration should be given to this division of the construction account.

Construction of Grips.

In the construction of the gripping apparatus there are several considerations which have much influence on the cost: First, is the work which they are required to do; second, the conditions under which this work has to be performed; and third, the promptness with which they can be manipulated. In referring to the first condition, the work which the grip has to perform depends to a large extent on the grades over which they have to act. Allowing 20 pounds per ton for the friction of cars, then a grade of 1 in 100 or one per cent doubles the strain on the grip. The steepest grade on the roads of this city requires as much power to be developed by the engine in hauling one train over it as would be required to haul 18 trains on a level.

While the amount of work put on the grip calls for strength and power, the requirements of passengers and care for human life necessitate a construction which will admit of prompt action, and this is a very important feature in their construction.

There may be conditions existing under which it would be greater economy for the grip to break than to withstand the strain to which it is liable to be exposed, but as a general proposition it is a fallacy to assume anything of the kind. It is a condition of things which should not occur, and will not with competent engineering ability.

The first consideration is to construct the grip to meet the actual requirements as to work, promptness, ordinary wear and convenience in handling.

Cables.

In the construction of the cable much is yet to be learned. The principal condition is that it shall be sufficiently strong, after considerable wear, to withstand probable extraordinary strains; at the same time it shall not be unduly large, which adds to the weight and cost. Having an exterior surface, which is hard, so as to withstand the abrasion of the jaws of the grip, yet the flexibility of the cable shall be of such a degree that it will easily bend in passing over the sheaves and drums which change its direction.

The greater the diameter of the cable the more friction and abrasion, and power required to bend it around the sheaves which it passes. Various kinds of cables have been used on these roads—both of iron and steel, and large and small—and with various degrees of hardness. So far, the crucible steel cable has been adopted in preference to any other, possessing hardness and strength with flexibility. It is probable that changes in the lay or twist of the strands in making may effect an improvement in working.

In the construction of cars there is at present but little difference, in general views. Whether a dummy and car should be used together, or each car have a grip attached to it, is a question which will be answered differently by different local conditions, a prominent condition being all intelligent provisions for the safety of passengers in boarding and alighting from. As the larger part of accidents on these roads occur by the negligence of the injured, all means consistent with convenient access to the departure from the cars and dummies should be provided to prevent accidents.

In the maintenance of road-bed and tube, the present method of uniting concrete and iron leaves not much to be desired, the rails and paving being the only parts that require renewals during many years. The rails and slot irons should be so put down that they may be taken up and renewed without detriment to the tube or unnecessary disturbance of the materials of which the tube is constructed.

Driving Gear.

Concerning driving gear and the moving machinery connected with the cable, the engines which may be used are so well known that any style, kind, or power may be obtained to meet any condition which would arise under local circumstances. In the various arrangements for carrying and deflecting the cables we have some differences in detail, but in plan all are similar. This is a matter that has not received the consideration that its importance demands. As a large portion of the power expended is exhausted in wearing out the driving machinery and carrying and deflecting sheaves, these should have careful study that they may do the work assigned them with the greatest economy of wear and friction.

The first table shows the comparative weights of driving and carrying machinery and the cables which they carry. For the maintenance cost may not always be in proportion to the weight, but the more weighty it is made the more is the wear and the more attendance and lubrication is required, as well as the increased cost of construction.

Gripping Apparatus and Cables.

The third division under maintenance is the gripping apparatus and cables. These are mutually dependent one on the other. In the grip the wear comes on the jaws which clasp the cable, and these are now made removable, so that they can be made of the least possible weight and easily renewed, they being composed of soft cast-iron, that having with the experience so far proved the most economical of any material yet used. As the contact or connection between the grip and rope is entirely one of friction, it becomes a question of how great an abrasion or wear of the jaws of the

grip can be allowed in saving the wear of the cable without costing more than the wear of the latter. When cables are newly laid they cause a much more rapid wear of the jaws of the grip than after they have been in use some time. The cause is that when new the exterior wires composing the cable are comparatively sharp cutting edges, but they are gradually worn down or flattened by the action of the grip jaws upon them, and, in addition a coating of tar is put on the cable, which fills up the interstices, and by frequent applications the surface of the cable becomes so smooth as to resemble a bar of iron in passing rapidly along. This condition reduces the wear of the jaws and their life is increased from 200 to 400 per cent, and even more. There are two advantages in this filling of the cable with tar, one of which is to lubricate the cable to a certain extent, so that when taking hold to start a train the slip of the cable through the grip causes the train to start more gently and at the same time the wear on both grip jaws and cable. The tar alone on the cable would not effect this purpose, but by the addition of a small quantity of oil the surface of the tar is prevented from adhering to the grip or to the sheaves over which it passes. The maintenance of the cable is one of the great expenses in the operation of cable roads, or rather it has been, from several causes, first of which is the excessive wear or action upon it by the jaws of the grip, especially when a road is first built and new men have to learn the road and get experience in the handling of the grip in starting and stopping. Whatever kind of cable may be used the abrasion may be increased very largely by this action of the grip, and the experience with cables in this city has demonstrated that the life of a cable may be doubled nearly by the manner of applying the grip to the rope.

Another cause is the construction of the grip for relieving the cable from frictional contact when the car or train is standing still and the cable allowed to pass through the grip. The grips are usually so constructed that the cable is supported and guided by grooved rolls when the jaws are loosened, the rolls keeping the cable from coming in contact with the jaws. Some of them, those called "side" grips, support the cable by rolls under the cable, the jaws having a vertical movement.

The rolls being stationary, so far as vertical movement is concerned, when it is desired to start the car, the upper jaw is forced downward on to the lower jaw. In one grip in use in this city, the upper jaw extends over the friction rolls, so that the cable is forced against the rolls, and the lower jaw being shorter than the upper in this case, the lower jaw has to be at such a height that the cable will be compressed between it and the upper jaw as well as between the upper jaw and the friction rolls, so that the cable must lie partially on the lower jaw, whether compressed or when moving freely through the grip. Another grip, the rolls are placed so far apart that both upper and lower jaws are considerably shorter than the distance between the friction rolls, and the upper jaw in being forced down on to the lower jaw, carries the cable with it, and when raised, the cable travels entirely on the rolls, being free from the lower jaw. In the grip in use on the Geary street road, the grip opens at the bottom, and not having any friction rolls, the cable lies and moves on the jaws of the grip when the car is standing still. On roads where frequent stops are made, the wear of the cable increases. Other things being equal, the wear of the cable will be in proportion to the number of stops made, and its life inversely.

So far, the greatest factor in the destruction of the cable is the grip, and experience shows that skill in operating it adds to the life, and consequently economy of maintenance of the cable. The length of the jaw, which embraces the cable, is not known yet to affect the life much, but it seems that a jaw having a length of 8 to 10 diameters of the cable, is sufficient to prevent any pressure from bruising the cable, and yet will hold any load that has yet been taken up the steepest grades in this city. The practical requirements for economy of maintenance of cable, are that the grip shall be so constructed that friction rolls shall support the cable free from the jaws when it is passing through them, and the frictional contact shall be between the jaws entirely when propelling a car; that the operator of a grip shall be a man of intelligence, who can apply the grip to start the car quietly, and have the least amount of slip of the cable through the jaws. It does not follow that the one who starts the car the easiest or most gently will wear out the jaws the soonest. Experience has proved the contrary. Lastly, continuous care of the cable, in keeping it well filled with tar and properly oiled.

Operation of Cable Roads.

Under the head of operation, I have placed the power required to propel—1st, the cable; 2d, the cars; 3d, the passengers. In order that a comparison may be made, I have taken indicator diagrams from the roads in San Francisco and the table herewith shows the amount required for driving the cable alone—I mean by this, without any cars being on the road; but included is the friction of the engines and driving machinery; also the friction of the carrying and deflecting sheaves, as well as the power consumed in bending the cable around the sheaves. I have not attempted to segregate the power required for driving the cable from that required to move the engines and driving machinery without the cable on, because all this

power is in constant use, is a constant expense, and the fuel expense for driving a certain amount of cable at a certain speed, depends upon the ability of the constructing engineer to design, and a proper direction of the labor having the care of it when in operation. For the purposes of this paper I have reduced the work done on the various roads, to the number of pounds of cable moved one mile per hour with one horse power.

Name of Road.	Horse power to drive cable.....	Pounds of cable moved 1 mile per hour with 1 horse power.....	Proportionate power required for driving cable, Clay St. being 1.....
Clay.....	22.6	4,084	1.00
Sutter, estimate.....	83.6	4,538	.90
Geary, estimate.....	58.0	4,538	.90
California.....	84.0	4,743	.861
Union.....	39.0	4,788	.852
Market.....	201.0	6,221	.656
McAllister.....	60.0	9,063	.45

In this table the power for moving the cables of the Sutter street and Geary are estimated by taking the average of the work done on the Clay, California and Union street roads.

For the power to haul the cars I have allowed 20 pounds per ton at all speeds. This would give for the various roads an approximate power for each train, consisting of dummy and car, and on Market and McAllister, for the car alone:

Name of Road.	Weight of Car and Dummy.....	Horse Power for each car.....	Average No. of Cars.....	Total average power for cars.....
Clay.....	4,900	.80	12	9.60
Sutter.....	7,500	1.50	12	18.00
California.....	8,600	1.40	14	19.60
Geary.....	8,400	1.34	19	30.86
Union.....	8,600	1.42	10	14.20
Market and Haight.....	9,600	2.07	44	91.00
McAllister.....	9,600	2.07	18	37.00

The following table gives the approximate average speed of each road, the average distance that passengers are carried, the total number running hours each day, and the average horse-power required to haul 1,000 passengers on each road:

Name of Road.	Average speed.....	Average distance that passengers are carried.....	Total hours running time each day.....	Average power for each 1,000 passengers carried.....
Clay.....	6	1.5	17 1/2	.0971
Sutter.....	7 1/2	1.5	10 1/2	.361
California.....	6	1	19	.178
Geary.....	7 1/2	1	19	.177
Union.....	6	1	17 1/2	.194
Market.....	2 1/2	2 1/2	20 1/2	.412
McAllister.....	1	1	20 1/2	.163

This table shows that the power required to convey passengers by themselves is a small factor of the total power required in operating cable roads. It is assumed here that the average distance which each passenger is carried will be about half the length of the road.

The following table will give the total daily average power for operating the cable roads in this city, and also the per cent of power required for moving cable, for moving cars, and (assuming numbers) for moving passengers:

Name of Road.	Total Power.	For Cable.	For Cars.	For Passengers.
Clay.....	22.6	22.6	0	0
Sutter.....	83.6	83.6	0	0
California.....	84.0	84.0	0	0
Geary.....	58.0	58.0	0	0
Union.....	39.0	39.0	0	0
Market.....	201.0	60.0	140.0	0
McAllister.....	60.0	37.0	23.0	0
Total.....	740.0	391.2	347.0	0
Per Cent.....	100	52.8	46.9	0
Number of Passengers.....	4,000	15,000	8,000	17,000
Power per Passenger.....	1.85	2.6	2.9	2.2

These results are the average percentages for estimated average number of cars and passengers. The following table gives the average number of feet of cable for each car, except Market street, to which should be added

the cars which are switched from the McAllister street road.

Name of Road.	Number of Cars.	Feet of Cable.	Feet of Cable to each car.
Clay	7	11,000	1,571
Shutter	18	37,736	2,096
California	14	25,806	1,844
Geary	19	27,000	1,421
Union	10	21,000	2,100
Market	44	65,763	1,472
McAllister	18	27,183	1,510
Average	130	215,579	12,014
	18.5	30,797	1,716

This table shows the average distance apart of cars to be 1,716 feet for average running, but on holidays and Sundays these distances have been reduced about 45 per cent, so that cars have run 1,000 feet apart, average. I am aware that in some instances they have run much less distance than this, but at eight miles per hour the speed would be 704 feet per minute, or an interval of about 1 1/2 minute between cars, allowing for stops. Of course, if traffic demanded it, this number of cars could be kept on the road. That would be one car to each 1,000 feet of rope, and taking the totals from the table above, there would be added 85 cars; and if each car carried the average number of passengers, they would be increased 48,000, or 65 per cent, so that 65 per cent would be added to the power required for hauling the cars, which would be 231.26 + 150.51 = 381.77 for cars, and 65 per cent for passengers would be 19.26 + 12.51 = 31.77 horse power. Then the total power would be

For cables	548.2
For cars	381.77
For passengers	31.77

Of which 55 per cent would be for cable, 29 " " " " " cars, and 4 " " " " " passengers.

This is taking the average of all the roads, but if we take the road which has the least per cent. of power expended in moving the cable, the Geary street, and add cars so that they may be only 1,000 feet apart, we shall have 8 more cars—an increase of 42 per cent., and also an increase of 42 in the total power for hauling cars and passengers, thus:

For moving cable	58.	11.1
For moving cars	52.34	
For moving passengers	2.84	

Total H. P. 113.18
Of which 51 per cent would be for moving cable, 46 " " " " " cars, and 3 " " " " " passengers.

This is within the capacity of the road as it is in this case assumed, carried 14,200 passengers; while it has actually many times carried from 20,000 to 22,000 passengers in one day.

Therefore we may conclude that it is practicable to utilize 50 per cent of the total power expended in moving the cars and passengers. That this is much within the bounds will be admitted when it is seen that the comparative power expended in moving the Geary street cable is .90, and that of McAllister street is only .45, or one-half.

There is one other point which I will refer to, and that is the comparative power required over grades or level roads. While the average will remain about the same, the fluctuations will be much greater, and the consequent maximum strain on the cable will be greater over grades, and this variation of work calls for an engine that will keep a uniform speed under more severe conditions than usually obtain even in rolling mills, for if the speed of the engine in the mills varies somewhat, human comfort is not affected by it; but in cars moved by cable, any variation in the speed of the engine may be easily detected by the surging movement which is given to the car. There is no difficulty in providing engines that will run at a uniform speed under all the changes or variation of work that may come upon it.

There are other points of importance which might be referred to in this paper, but it has already extended beyond the primary intention. Our future experience will be guided and aided by the past, and the divisions of the subjects which are but little understood at present, will become as familiar as household words.

TELEGRAPHING FROM MOVING TRAINS.—One way in which messages are received or sent from moving trains is by induction. A wire is buried in the center of the track. Operating instruments are then placed in the car in connection with an induction coil formed by wrapping copper wires lengthwise through the car, and passing them underneath through an iron pipe. The pipe is suspended from the car about six inches above the ground and directly over the buried wire. It was stated that the entire practicability of this plan has been demonstrated. Nearly a year ago 12 miles of the Harlem railroad was equipped with this system, and the result of the experiments has in every way been satisfactory to the inventors. It was found that the weather had little effect on the working of the system, and even with half a foot of snow on the ground no difficulty was found in carrying on communication between a moving train and a telegraph office.

USEFUL INFORMATION.

A Safe Without a Door.

A spherical safe without a door is the latest novelty in that line. It is very different in construction from other safes, being composed of two spheres, one within the other. The inner sphere revolves within the outer, which is simply a massive protecting case. As the outer shell is only two-thirds of a complete sphere a considerable opening is left in front, and into this is fitted from the inside a part of the smaller sphere, which is the safe proper. This inner sphere revolves upon two pintles. It can also be moved back and fourth so that its outside diameter corresponds exactly to the inside diameter of the outer shell, the joint being formed by a series of steps, when brought forward it makes a very tight fit.

The safe is solid metal throughout, having only one thickness of material, and the shell consists of but three pieces, the back and front, composing the outside, and a piece comprising the principal part of the inner sphere. The outside is made in two parts, so that the safe proper, which is larger than the opening, can be placed within it. The parts are screwed together, after the manner of a hose coupling, and locked in position by bolts from the inside. The thread, of course, is the entire circumference of the shell, and is probably the largest ever cut. The jointing surfaces, at and near the outside, are too hard to be cut by a steel tool, and are ground so accurately that there is absolutely no space between them. The safe section is one piece of metal, four to four and one-half inches thick, slightly flattened at the front. The safe is the invention of and is manufactured by Wm. Corliss, the famous builder of steam engines.

He claims that they are burglar proof for the reason that they cannot be forced and robbed of their contents in the space of time that burglars are supposed to have, and by use of implements possible for them to employ. These very strong boxes weigh 10,000 pounds, and are so much appreciated in the home of the inventor, Providence, that 25 banks and firms in that city use them.

HOW INSECT POWDER KILLS.—Regarding the method of action of this powder upon its victims, the fact should be borne in mind that the lungs or breathing apparatus of the insect are very different to those of the vertebrate animal. Instead of lungs, as we have, set apart in one portion of the frame, for the definite object of supplying oxygen to the blood after the latter has become in need of it, the insect has a central tube, connected with the air by a row of orifices on each side of its body, from which smaller channels radiate to every part of its circulation. The animal lung demands two systems, as it were, of circulation—the arterial and the venous. The insect has but a single circulation, and the whole of its blood is being constantly and fully brought into contact with fresh supplies of air. Hence the instant and powerful effect of any toxic substances with which the air may be impregnated. Thus an insect may be almost instantly killed by the vapor of chloroform, or ether, or prussic acid. These facts are powerful arguments for the theory that it is the volatile constituents of insect powder which are fatal, and not the actual contact, necessarily, of its particles.

ARTIFICIAL CREAM.—Cheap artificial cheese is now largely made from oleomargarine. Oleomargarine, which forms the basis of butterine, is a clarified oil obtained from beef suet; and, although its somewhat tallowy taste is objectionable, it is an animal product of considerable nutritive value. In the "creameries" of the United States the cream is so effectually withdrawn from milk as to leave the latter too poor for conversion into a salable skimmed milk cheese. The skimmed milk is artificially charged with fat in the form of oleomargarine. An emulsion of skimmed milk and oleomargarine is made, and this artificial cream is added to the skimmed milk. This fluid, thus enriched with fat, can be made to yield cheese of fair quality. An oleomargarine cheese will not "ripen" well, oleomargarine lacking in a great measure those soluble fats, the composition of which feeds the green and red mould of old cheese, and gives it its peculiar piquancy.

TO MAKE FLY POISON.—The fly poison so generally used is made as follows: Syrup of quassia, 100 parts; alcohol, 25 parts; water, 300 parts. For use, moisten a piece of cloth or filtering paper in the mixture; place a little of the mixture in a plate and with it the piece of saturated paper or cloth.

The syrup of quassia can be had at the druggist's. It is made by macerating, during 24 hours, 100 parts of quassia wood with 500 parts of water, then boil for half an hour. Set aside for 24 hours and press. Mix the liquid with 15 parts of molasses, and evaporate to 20 parts. A weaker decoction of quassia does not kill the flies.

PAPER SLIPPERS are the latest form in which paper is introduced in new inventions. An Englishman has patented a system of manufacturing slippers, sandals, and other coverings for the feet out of paper. Paper pulp, or papier mache, is employed for the upper, which is moulded to the desired form and size, and a sole is provided of paper or pasteboard, leather

board, or other suitable paper material, which is united to the upper by means of cement, glue or other adhesive material. The upper is creased, embossed or perforated at the instep and sides, which renders them somewhat pliable, and prevents their cracking while in use.

PROGRESS OF WATER GAS.—The gas companies that 10 years ago denounced water gas as highly dangerous to the public, and supported their absurd assertions by the reports of some of our well-known "professors," in order that they might defeat the introduction and competition of cheap water-gas, having in a great measure succeeded in this object, quietly themselves commenced the manufacture and distribution of the "deadly water-gas," that they had so long denounced. There are few people, probably, that know the progress made in the introduction of water-gas in the past 10 years. Most of the Pennsylvania cities, Baltimore, New York and several of our other large Eastern cities are now lighted to a great extent with an enriched water-gas; but the present enormous consumption will sink into insignificance when the cheap unenriched water gas is distributed for fuel. The success of the new incandescent fuel gas-light, to which we have already made references in these columns, promises to bring about this change soon. We may then expect to see our gas costing consumers say 50 cents per 1,000 feet, used generally for fuel, and at the same time furnishing a much better light than we now have. Of all investments now before the public, gas-making appears to be the most profitable and the least liable to loss.—*Eng. and Min. Jour.*

AN AIR BRUSH FOR PHOTOGRAPHERS.—The attention of photographers has lately been called to an ingenious device known as the air brush. A little holder is charged with India ink, and by a bellows operated with a foot pedal after the manner of a sewing machine, the fluid is blown upon a faintly outlined portrait the result giving a picture superior in many respects to the best crayon drawing. A life size portrait may, according to this method, be produced in a few hours, whereas formerly by the use of the stump and pencil as many weeks were required.

THE JUICE OF THE TOMATO PLANT DESTRUCTIVE TO CATERPILLARS.—A correspondent of the *Fruit Recorder* says he has boiled leaves and stems of tomato plants until the juice is all extracted, and find the liquor deadly to caterpillars, lice, and many other enemies to vegetation. It does not injure the growth of plants, and the odor remains a long time to disgust insect marauders.

GOOD HEALTH.

Baths and Bathing.

The utility of bathing frequently cannot be doubted. It would be difficult to convey in a limited space a sufficiently complete idea of this most powerful means of preserving and restoring health. No wonder the ancients, and especially the Romans, carried the practice to such an extent. Why it should have fallen into disuse in modern times it is difficult to determine, and the more so, as it is such an agreeable remedy and preventive of disease, by lessening and regulating the heat of the body and the circulation of blood, tranquilizing the irritability of the nervous system, and especially of cleansing the skin, thereby removing a primary source of disease. It invigorates the whole system, and to an increase of bodily strength it adds exhilaration and a delightful serenity and cheerfulness of mind.

We make no attempt to establish a dogmatic system to persuade readers that they will find in water a universal remedy, acting in some mysterious manner. We have only to refer to the elementary teachings of physiology for a knowledge of the uses of water in the animal economy.

It enters the blood vessels, both by being absorbed from the mucous membrane lining the digestive passages when taken as a drink, and by permeating the skin in baths. Happily there is no dissension to the fact of the great benefit arising from the use of water in the form of baths. This is a point on which doctors do not disagree. It cannot be doubted that a regular and judicious use of baths is a preventive of many diseases; that they have cured many diseases is well known, and it is highly probable that many forms of serious and distressing sickness, with which many persons are afflicted during a long course of years would be almost unknown among us, and the pain from incurable diseases greatly mitigated were baths in general use. There would be less suffering, more cheerfulness and vivacity, and greater length of days, and a more complete enjoyment of existence.

All medical science tends to establish this proposition, that whatever the cause of disease may be, the most effective preventives are those which regard the body only, irrespective of the external circumstances of climate, atmosphere, vicissitudes, miasma localities, contagion, etc.; and if the body is properly guarded, the abodes of the most frightful diseases may be visited with irregular impunity. It is because the body is neglected that it does not better resist the morbid actions of external agents, and becomes diseased. Like a complicated machine,

which, if exposed, soon becomes clogged with dust, and thus compelled to discontinue its movements unless constantly guarded against impurities, the human body needs constant attention—much more than a mere artificial machine—since of all organized structures it is by far the most complicated.—*Exchange.*

OVERWORKED BRAINS.—The nearest thing to an indication that the brain has been working rather more than is good for it is the persistence in the mind, during the period of rest, of the thoughts which have engaged it during its condition of activity. After a good spell of hard work the brain-worker is often tormented by finding it difficult, all at once, to turn off the steam. His work-day thoughts will intrude themselves, in spite of every effort to keep them out. Each worker has usually a way of his own of endeavoring to get quit of these unwelcome guests. Thackeray generally succeeded in exercising the creatures whom he had been calling into existence by the simple expedient of turning over the leaves of a dictionary. A great lawyer was in the habit, in similar circumstances, of plunging into a cold bath, and averred that a person never takes out of cold water the same ideas that he took into it. Perhaps the best mental corrective of this condition is to employ the mind for a short time in a direction most contrasted to that in which it has been overworked. In this way a mathematician might find advantage in unbending his mind on a page or two of a novel while the novelist could chase away the phantoms which haunt him by dipping into a discussion on the "quantification of the predicate." The cure, in fact, must be sought for on a principle the very opposite to that of the famous homoeopathic doctrine of "similars."—*Chambers' Journal.*

CANCER AND EPITHELIOMA.—Cancers vary in structure, depending much upon the part attacked by the disease. There are different kinds of epithelioma. The cancer variety is deemed malignant; other forms may be painful, but not dangerous; they are called *benign*, although they may grow and become very inconvenient. Epithelioma, as its name implies, affects the epithelial tissue which lines the mouth and the whole intestinal canal. The case of General Grant is regarded as an epithelioma of a malignant type. Strictly, a cancer is always malignant; it may be hard or soft; in the latter case it is deemed more active, therefore sooner accomplishes its dread work. A local cancer, one that is due to injury or irritation in a particular part of the body, may be cured if treated early in its existence. Cancer due to hereditary taint is practically incurable. A tumor may appear in one locality and by judicious treatment be removed, and apparently cured; but the disease is likely to appear somewhere else before long. Tumors of one kind or another are very common, and often frighten people, who think they are cancerous. Comparatively few tumors are really cancerous. On their first appearance, especially if they be soft and have rapid growth, they should be examined. Habit and nervous conditions have more to do with cancerous disease than most of us suspect.—*Science of Health.*

WRINKLES.—Wrinkles have two causes: one is age, and the other is care, sorrow, low spirits, etc. To cure the latter you must remove the cause. The wrinkles which come from old age cannot be entirely prevented, but they may be palliated by cheerfulness and good habits of diet, exercise, fresh air, plenty of sleep, etc. As for the preference for hot or cold water for the skin, we may say both are useful. Hot water softens and cleanses the skin and promotes the circulation of the capillaries; cold water, with a friction, fortifies it, so after a hot bath a dash of cold water is very useful. Hard water is injurious. Soap should not be used on the face, except in rare cases, as it injures the skin more or less. Oiling occasionally is useful. The best cosmetic for the face is out-of-door exercise.

A SANDBAG FOR THE SICK ROOM.—One of the most convenient articles to be used in the sick room is a sandbag. Get some clean, fine sand; dry it thoroughly in a kettle on the stove. Make a bag, about 8 inches square, of flannel, fill it with the dry sand, sew the opening carefully together and cover the bag with cotton or linen. This will prevent the sand from sifting out, and will also enable you to beat the bag quickly by placing it in the oven or even on top of the stove. After once using this you will never again attempt to warm the feet or hands of a sick person with a bottle of hot water or a brick. The sand holds the heat a long time; and the bag can be tucked up to the back without hurting the invalid. It is a good plan to make two or three of the bags and keep them on hand, ready for use at any time when needed.

THE PLEASANT ODOR OF CEDAR, according to Mr. B. Lewis, appears to be as persistent as the wood itself. Slivers taken from white cedar stumps found 12 feet under water at low tide, near the Narrows entrance to New York harbor, had the odor of newly-grown wood, and a piece not twice the size of one's finger perceptibly scented a drawer for more than a year. "It is certain," says Mr. Lewis, "that the coast where the trees, of which these are the stumps, grew, has since undergone a depression of eighteen to twenty feet, an event which may have occupied as many centuries."

MINING SCIENTIFIC PRESS

A. T. DEWEY. W. B. EWER.
DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

Advertising Rates. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG

SAN FRANCISCO:

Saturday Morning, July 18, 1885.

TABLE OF CONTENTS.

EDITORIALS.—The California Street Road, 38. Cable Railway Propulsion, 34-39. Passing Events: A Quarter of a Century, Our Cable Road Edition, Coal at San Francisco, El Dorado County Mines, 40. The Clay Street Road, 41. Freeing Cable Roads from Snow and Ice; the Wingard System of Street Railroads; Cable Roads and Real Estate, 42. Crossing Cables, 43. Cable Roads in the East, 44. The Market Street Cable Road, 45-49. The Isaac's Method of Building Cable Road-beds, 49. The Park and Ocean Railroad; The Cable System Abroad, 50. The Sutter Street Railroad; New York's Mistake; The Presidio and Ferris Cable Road; The Geary Street Cable Road, 51. The Rasmussen System; Taylor's Endless Chain Grip for Cable Roads; Peterson's Safety Guards for Cars, 52. The Chicago Cable Road; The National Cable Railway Co.; The New Road in Los Angeles, 54.

ILLUSTRATIONS.—The California Street Cable Railway, San Francisco, Cal., 38. View on the Clay Street Hill Railroad; Passenger Car and Dummy, with Gripping Attachment, Wire Rope and Side Section of Tube, 41. The Hallidie Cable Grip; Isometrical View of Road-bed, with Grip and Part of Shank, 42. Section Through Dummy and Road-bed, Showing Cable and Gripping Attachment, 43. Cable Cars for Proposed Road in New York, 44. Ferry Terminals, Showing Cars of Three Lines in Course of Arriving, Turning and Departing, 45. Main Line Engine House and Machine Shop; Section of Angle Sheaves, Drivers and Tension Apparatus, 46. Root's Patent Forward Truck, with Grip, Brake, Lever and Fender; Patent Rear Truck, Showing Track Brake, 47. Root's Patent Grip; Section of Road-bed, Showing Foundation Piers, Tube, Patent Car, etc., 48. J. D. Isaac's Patent Cable Road-bed, 49. Profiles of Lines of Cable Railways in San Francisco, 50. Cars and Dummies of the Sutter Street Cable Road, 51. Taylor's Endless Chain Grip for Railroads and Other Purposes, Fig. 1—Peterson's Rotary Safety Guard for Street Cars; Fig. 2—Peterson's Guard for Cable Dummies, 52. Dummy and Car on the Chicago Cable Railroad, 54. Car and Dummy of the Geary Street Cable Railroad, 50.

USEFUL INFORMATION.—A Safe Without a Door; How Insect Powder Kills; Artificial Cream; To Make Fly Poison; Paper Slippers; Progress of Water Gas; An Air Brush for Photographers; The Juice of the Tomato Plant Destructive to Caterpillars, 39.

GOOD HEALTH.—Baths and Bathing; Overworked Brains; Cancer and Epithelioma; Wrinkles; A Sanbag for the Sick Room; Odor of Cedar, 39.

MECHANICAL PROGRESS.—An Interesting and Important Discovery; An Improved Converter; Dies for Making Hatchets; Dyeing, 56.

SCIENTIFIC PROGRESS.—Life Everywhere; Glacial Action; The Natural Gas Wells of Northwestern Ohio; The Sun and Moon; To Avoid Electric Induction; A Photograph of Lightning; Birth of a Volcano; Curious Effect of Asphalt Pavements; Observations of Solar Protuberances; Cocaine and Fish, 53.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 53-57.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 61.

Business Announcements.

Wire Ropeway—J. M. Thompson, S. F.
Cable Railways—Pacific Construction Co., S. F.
Wire Rope—J. A. Roebings Sons Co., S. F.
Wire—California Wire Works, S. F.
Pumping Engines—A. L. Fish, S. F.
Triumph Ore Mill—H. W. Rice, S. F.
National Compressor—Edward A. Rice & Co., S. F.
California Machine Works—Wm. H. Birch, S. F.
Situation Wanted—C. J. Periam, S. F.
Mining Property—G. B. McConn, Buena, Ariz.
Assessment Notice—Grosh Con. M. Co., S. F.

See Advertising Columns.

Passing Events.

Most of our space this week is occupied with descriptions of the cable railway system, and the various cable roads in operation. There is much of interest to engineers in the details, and the public generally will appreciate being able to understand much that is not very plain to the casual passenger.

Lead miners will be pleased to find that lead is beginning to rise from the depressed state it has been in so long. It has reached \$4 per hundred, and it is thought the price will go higher. The 8000 tons of the Richmond mine, now held by injunction, is thought to have

something to do with this advance, as it cannot be sold for a long time.

They have cut down the miners' wages at Quijotoa, Arizona, from the \$4 per day figure, and it is stated that that price will not be paid much longer in the camps where it still prevails.

The mining situation is unchanged. Some few mines are producing bullion which have not done so for some time, notably the Hale & Norcross, Con. Virginia and California, Grand Prize and Blue Jacket, all in Nevada. Work is progressing steadily everywhere, with little change to note.

A Quarter of a Century.

The MINING AND SCIENTIFIC PRESS is now a quarter of a century old. Established in 1860, it early took standing as an authority on mining matters, and has maintained its position ever since. When the paper was first published the precious metal mining field of the United States was of comparatively small dimensions, and there was not one man engaged in mining where there are one hundred now. The principal mining being done was in California and Nevada. The mines in Idaho and Montana were in limited fields, and Utah, Colorado, Wyoming, Arizona and New Mexico were scarcely considered. In Oregon and Washington Territory very little mining was going on. The main search was still for surface diggings, and the possibilities of doing much in silver, lead and copper were only beginning to be thought of. Since then the PRESS has seen the mining area gradually widen in every direction; cities and towns depending on the mining industry have grown up on all sides, some to live and thrive, and others to decay as the mines were worked out. It has seen the beginning and end of hundreds of "excitements and booms," seen the era of speculation in stocks grow to immense proportions and dwindle to almost nothing, and lived to see its predictions fulfilled that legitimate and steady work on the mines themselves was best for the owners and the people.

It has passed through the experiences of times of depression and activity, seen the prospectors and miners flocking by the thousands to new fields afar off, only to return in time to the old camps where they knew hard work would bring them out in the end.

It has seen hundreds of metallurgical processes come to the front, be tested and pass out of sight, and has seen the many which have proved successful from their inception to their general adoption. The errors pointed out and the information given on these and kindred subjects have saved millions of dollars to the coast.

The PRESS has recorded from week to week the gradual progress of development in the prominent mines of the coast, and kept faithful record also of the discovery and growth of the various mining camps. During all these years it has been the earnest and steadfast advocate of the progressive industrial classes and of the interests to which it has been and is devoted.

It is no small thing in a comparatively new region such as this coast, where there has been so much that was ephemeral, for a technical journal to attain an age of 25 years. Not a single regular issue of the paper has been deferred since its present publishers took possession, over 21 years ago, and in no case have the publishers been charged with lack of faith in any particular. Its present standing has been reached by steady work and regular yearly advance and progress.

We have with us now on our subscription lists some who were among our early patrons. We have in our advertising columns names that have been there constantly from 15 to 20 years, a token of appreciation of results that speaks for itself more than words of self-praise.

We have endeavored in all these years, while pursuing a conservative course, to bring before our readers all that would interest them in their special lines, taking care at the same time not to bring into prominence schemes, methods or appliances of a doubtful nature. We have always considered this the best course and shall continue it.

Popular science, mechanics and local industries have occupied much of our space and have always been a feature of the paper. With the advance of industrial progress in late years we have kept pace, and our readers have had the experience of extensive reading and com-

pilation in this branch. It is a matter of pride to the publishers and proprietors of the MINING AND SCIENTIFIC PRESS that its record is clear and that it has never been mixed up in any way in furthering the designs of mining speculators whose only intention was to foist upon the public, property which was not what represented. The reputation of this paper in this regard is well-known and established.

Those who have been our readers long will notice that this week our usual mining miscellany is curtailed to give space to descriptions of those triumphs of modern engineering—the cable roads. To those into whose hands this number may fall, who are unacquainted with its usual make-up, it may be said that in the regular editions a much larger proportion of the contents is usually devoted to the mining interests. Those who are disposed to support a faithful mining advocate may rest assured that the MINING AND SCIENTIFIC PRESS will be continued with unrelaxed energies, and that the years of experience of its editors and publishers will enable them to provide what is wanted. Its field of usefulness is larger now than ever.

Our Cable Road Edition.

Our space this week is mainly devoted to consideration of cable railroads. Roads on this plan were first built in this city, and there are more of them here now than anywhere else, though the system is gradually being introduced in other places. Elsewhere they have not been quite so successful as in San Francisco, owing to the fact that the projectors have endeavored to evade the patents and have experimented with all sorts of new plans and so-called improvements. The result of having disregarded the experience gained in San Francisco much useless expense has been entailed.

We have six main-line cable roads in this city and several branches. All these roads are in daily operation. They are always preferred to the horse-cars by the public. On most routes they go where horse-cars could not be run, and then equal speed up or down hill is of course a very great advantage. Once in operation, these roads are run much more cheaply than when operated by horses, although the first cost of the road is of course greater with the cable system.

These roads, without exception, have been profitable from the beginning, no cable road yet built having been a losing operation. In every instance, however, the stock is worth from twenty-five to sixty per cent more than its cost, which is a very important point for capitalists. The experience gained in this city is being utilized elsewhere, as a matter of course. Most of the patents granted on improvements on cable roads have been taken out by San Francisco inventors. Here the plan was worked out to practical results, until now San Francisco has the reputation of having the most complete, convenient and speedy street-car transportation system in the world.

Coal at San Francisco.

We received in this city during the month of June, 71,144 tons of coal. The coal receipts at this port are constantly increasing. It is brought here in ships and steamers from various places. We receive coal from Carbon Hill, Coos Bay, Cedar River, Green River, Renton, South Prairie, Seattle, Nauaimo, Wellington, and we also import Anthracite, Australian, English, Scotch and Welsh coals.

The receipts of coal for the first half of this year amount to 515,658 tons, against 439,311 tons during the first half of 1884, showing an increase of 76,357 tons in 1885. Of our receipts this year 317,465 tons, or over three-fifths, have come from our coast collieries. During the first six months of last year our California collieries produced 38,118 tons, but this year they are shut down.

The increased importation of coal for the past half year, over a similar period of last year, 76,357 tons, is a very gratifying circumstance, being a marked evidence of an increased population, and an enlargement of manufactures. The principal factors in supplying our market with coal are our coast collieries, this being the first year where it can be said that the output of British Columbia and Washington Territory can be increased to such an extent as to make California independent of foreign supplies. Still, prices never reach so low a standard as to entirely exclude foreign importations, hence our colliery managers must restrict their output to maintain covering rates. This policy, for the moment, is not being adopted, as some new companies are introducing their products, and in bidding for public favor and soliciting trade heretofore held by others, they disregard entirely the cost of their importations. This cannot last long. Importers of foreign grades are suffering severely from this cutting of prices, and are left no alternative but to meet the market with serious losses. Foreign shipping interests are suffering from light freights inward on coal, and losing

rates outward on grain. The stock of coal on hand is somewhat greater than at this time last year, the railroad companies carrying very large supplies.

El Dorado County Mines.

[From our Traveling Representative.]

Mining matters in El Dorado county are very quiet at present. More or less prospecting is continually going on with highly satisfactory results in many instances. In a number of districts old mines that have a rich "has been" record are being worked again, and by judicious economy are showing up in good shape. Contracts for development and a general revival of work on numerous mines is the order of things in this rich but sadly neglected county. Quartz mining—that is, legitimate quartz mining—is in its infancy, so to speak, in El Dorado. It is a mistaken idea that hundreds of old miners in El Dorado county would, if there was anything worth having, have had it ere this. The simple facts of the case are about as follows: The county is full of old-time miners—men whose first pick was struck in its placers. These men and a majority of recent newcomers are away behind the times in their knowledge of modern quartz mining and in many cases are "has been" 49ers in experience and ambition. As a rule, California placer and seam-belt miners do not take to quartz; hence, much ground that would open up into quartz bonanzas is overlooked or purposely neglected by those men.

Phenomenal Advantages.

El Dorado county possesses more advantages that tend to lighten the cost of labor of the prospector than any one county in the State. Water ditches cover her every divide; timber is abundant. Good roads traverse the entire county. Quartz mills—the monuments of early extravagant mining companies—dot her hill-sides. Croppings and float indicate the existence of and assist the intelligent to locate the vein. The climate is unequalled, and owing to the year around water supply, work need not stop when once started. What the county needs more than any one thing else is men educated to quartz mining—men who are modern and progressive in their ideas and who combine the scientific with the practical. Practical, intelligent mining here, even with limited capital, will prove tenfold as remunerative as the more sand-than-sense methods would do even in a better mineral field. The past records of many districts are anything but savory to mine speculators. This, however, is merely history repeating itself in mines and mining, for what camp or district that ever amounted to anything has a record all the way through that is enviable? Mining men who visit any county for the purpose of looking up mining property to invest in should hear every man's story and believe nobody until he has seen and satisfied himself as to the property he intends buying.

Chances for Good Investments.

Any man familiar with quartz mining and having even a limited capital will find El Dorado county a most desirable field to obtain paying and business propositions in quartz mines. While there are a great many patented claims, and hundreds held by relocating and assessment work, yet there are many good chances for the location of mines; especially is this the case in quartz mining. The "stick-to-'em" qualities of this placer and seam-belt miners leave the quartz man almost a free field. Now that mining matters are listless and dull, money tight and new fields attracting the ever-changing and notional miner elsewhere, the present time is a good one to investigate the merits of El Dorado's mines. The opportunity now presenting itself for the purchase of good mining property at reasonable and, in many cases, "dirt cheap" prices, will seldom, if ever be had again. Of course, there are many worthless diggings, and "tenderfeet" mining sharps and their representatives will be "took in" and done for in every instance, as heretofore. All the reform in mines and mining matters will not kill all "wild cat" rackets, hence the fact that a few fools and their money parts here occasionally should not deter business men from looking into real mineral merit and paying investments. Next week I will send you a sketch of a few mining districts. The capitalist desiring to visit El Dorado should either come via Sacramento and Auburn to Greenwood and Georgetown or via Shingle Springs to Placerville, as from these places he can reach the principal mining districts of the county. The trip is only one day from San Francisco, and the cost is too trifling to mention.

F. W. S.

"THANKS."—We are greatly indebted to Mr. A. S. Hallidie for assistance rendered in preparing some of the matter concerning cable railroads, in this edition of the PRESS. He has very courteously answered many questions and placed certain data in his possession at our disposal. Mr. James Gamble has favored us in a similar manner. Mr. W. W. Hanscom and Mr. H. S. Smith have also assisted us materially, as have other gentlemen well informed on the subject of cable railroads. We feel under great obligations to them all.

The Clay Street Road.

The Clay street road in this city was the first cable road built, and it was upon it that Mr. A. S. Hallidie first submitted his invention to a practical trial. It ran successfully from the first, answering all requirements, and has been considerably extended from its original route. A description of the Hallidie system of cable railroads, now in use by the Clay Street Company, will best explain the *modus operandi*.

Clay street is a central street in the city of San Francisco, and for a number of blocks near

The general arrangement of the system in use by the Clay Street Hill Railroad is as follows: An endless steel wire rope, three inches in circumference, 11,000 feet long, is stretched the whole distance, lying in iron tubes, supported every 39 feet on 11 inch sheaves. This rope is supported at every change of angle at the lower crossings on sheaves four feet in diameter, passing around a horizontal sheave eight feet in diameter at the lower end of the line, and at the engine house around two angle sheaves, each eight feet in diameter, which lead the rope on the grip pulleys, also eight feet in diameter, which are driven by one 14x28 engine. The steam is furnished by one boiler, 16

feet and the traveling rope, is made by means of this gripping attachment, which is herein after described. The cars are made to seat 14 passengers, and the dummy 16, but not seldom as many as 44 have ridden in the car and 26 on the dummy—70 in all; and the roads with broad gauge larger cars and more even grades have, in one load on car and dummy, carried as many as 100 passengers. It is true they were crowded, but this is always the case on holidays. The traction car, or "dummy," with the gripping attachment, is attached to the passenger car firmly, so that there can be no danger of accident. The passenger car is amply provided with brakes. In addition to the usual

wards, and the lower or supporting pulley, also the gripping device attached to the dummy and to the rope.

Fig. 2 is a transverse section through the dummy and road-bed; the tube, supporting pulley, rope and gripping device are shown, and the general mode of construction of the same.

Fig. 3 is an isometrical view of the road-bed—a portion of the tube being removed to show the gripping device attached to the rope; the lower end of the shank is only shown (it is broken off in the drawing), being sufficient for the purpose; the construction of the tube and tube frames is clearly shown, and the appearance of the rails and slot and surface of the street when paved,



VIEW ON THE CLAY STREET HILL RAILROAD.

the lower terminus of the road is very densely populated. The street is only 40 feet wide from house to house, and between the sidewalks is occupied by two lines of gas pipe, one line of water pipe, a street sewer, and at the cross streets by water cisterns.

The lower terminus of the road is at the intersection of Kearny and Clay streets. The summit of the hill is 307 feet above Kearny

feet x 54 inches, using 3,700 pounds of coal per day. They have also duplicate engine and boiler, which are held in reserve.

The grip pulleys being furnished at their circumference with jaws that grip and release the rope automatically, by the pressure of the rope in the jaws, prevents the rope from slipping; and being set in motion by the engine, actuates the endless rope, while traveling up one tube

car brake, there is another attachment operated in the same manner as ordinary brakes, which forces a broad band of wood down on each track immediately under the car. This arrangement is shown in Fig. 1. Strong iron drags are provided, so that if an accident should occur in going up the hill, they will immediately catch in the street, and prevent the car from going backwards. When it is neces-

Fig. 4 shows the gripping attachment used by the Clay Street Railroad Company and the Presidio and Ferries Railroad Company. A vertical slide works in a standard, and is moved up and down by a screw and hand-wheel. This screw is shown on the cut of dummy, Fig. 2. The small upper screw going down through the large screw operates it. At the lower end of this slide is a

PASSENGER CAR AND DUMMY,

WITH GRIPPING ATTACHMENT, WIRE ROPE AND SIDE SECTION OF TUBE

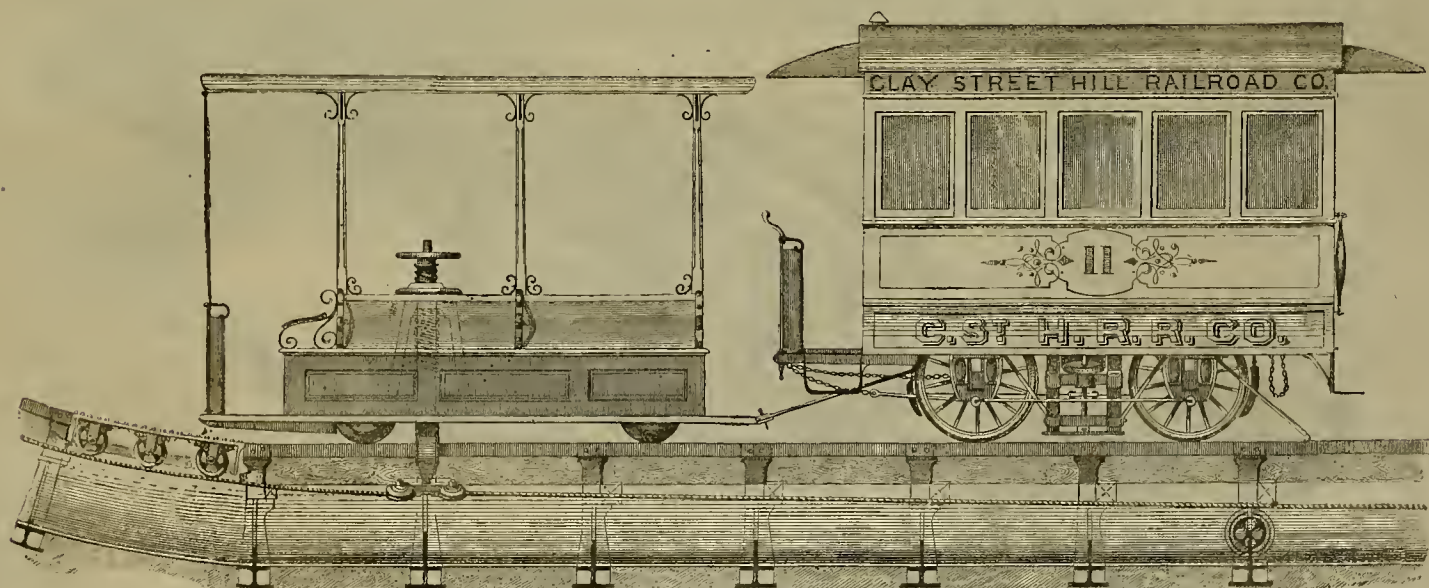


Fig. 1.

street. The incline on Clay street has a double track, and is 5,197 feet long; the rope runs into the engine house at Leavenworth street. The ascending grades are as follows: From Kearny to Dupont, 45 feet; from Dupont to Stockton, 45 feet; from Stockton to Powell, 62 feet; from Powell to Mason, 42 feet; from Mason to Taylor, 48 feet; from Taylor to Jones, 67 feet. Then the grade descends, as follows: Jones to Leavenworth, 15 feet; Leavenworth to Hyde, 50 feet; Hyde to Larkin, 50 feet; Larkin to Polk, 45 feet; and then an ascent of 15 feet from Polk street to Van Ness avenue. The distance between each street is 412½ feet. Clay street runs at right angles to the above streets, which have widths varying from 45 feet to 68 feet 9 inches. All the street crossings are level. The steepest grade is 1 in 6.15.

and down the other.

In addition to the sheaves that support the rope in the tubes, at the upper side of each crossing where the incline makes an angle upwards, there are sheaves in the tubes that keep the rope down and from striking the upper part of the tube.

There is an opening in the upper side of the tube. This opening runs the entire length of each tube, forming a long slot three-fourths of an inch aside. This slot is not immediately over the center of the tube, but on one side, to keep sand and dirt from falling on the rope, to clear the upper sheaves, and enable the foot of the gripping attachment to pass by and under the upper sheaves, and over the lower sheaves in the tube.

The connection between the cars on the

sary to back down hill, these drags are raised up out of the way by the conductor.

The "dummy" is also provided with powerful brakes. The "dummy" and car are connected with a suitable coupling, so that the weight of the car going down comes on the rope and is utilized to draw up the other cars on the other track. The brakes are not usually employed when coming down except when it is necessary to stop, as the car runs down with the same speed as the rope as long as the gripping attachment is in connection with the rope.

By referring to the engravings, the system will be more clearly understood. Fig. 1 is a side view of road and car and dummy; the tube is in longitudinal section and shows the arrangement of the rope; the upper pulleys for keeping the rope down where the grade changes up-

wedge-shaped block. The wedge actuates two jaws horizontally, which open and close according to the direction in which the slide is moved, closing when the slide is moved upwards. These jaws have pieces of soft cast iron placed in them, which are easily removed when worn out. These pieces of iron are of proper shape and size inside to grip the rope when they are closed over it.

On both sides of these jaws, and attached to them, are two small sheaves. These sheaves are held by means of rubber cushions, sufficiently in advance of the jaws to keep the rope off from the jaws, and at the same time to lead the rope fairly between them, allowing it to travel freely between the jaws when they are separated, without touching them. When it is required to grip the rope, this slide is drawn up

by means of the small screw before described, and the wedge at the lower end closes the jaws over the rope, at the same time forcing back the small guide sheaves on to the rubber springs. The standard containing the slide, etc., is enclosed and retained in an iron bracket, shown on the dummy (Fig. 2), and raised and lowered bodily through an opening in the tube from above the surface of the street to the rope in the tube by means of a screw and nut, with hand-wheel attached. The iron bracket is secured to a traction car, called a dummy, as shown in Fig. 1 and 2.

The dummy is coupled to the passenger cars at the bottom of the incline, and uncoupled at the top, and *vice versa*. Horses can then be coupled to the cars if desired. As before stated, the rope is constantly in motion, running between sheaves placed in the tube. The slot of the tube is on one side of a vertical line drawn through the center of the tube, and referring to the cuts it will be seen that the foot of the gripping attachment projects on one side, giving it an L shape, enabling the jaws to pass under and over the rope sheaves in the tube. In order to stop the car, the jaws of the gripping attachment are opened slightly; when they release the rope, the guide sheaves take it, and the car stops.

The shank of the standard containing the slide, which works in the slot of the tube, is one-half of an inch thick and $7\frac{1}{2}$ inches wide, there being one-eighth play on each side. All the essential parts of the gripping attachment are made of steel.

The rope runs $17\frac{1}{2}$ hours per day, at a speed of 6 miles per hour. The cars start every five minutes, except in the afternoon, when they start every three minutes.

The road has a gauge of 3 feet, 6 inches. An ordinary 30-pound steel T rail is used on Clay street, which is set flush with the street and presents a neat, smooth appearance. The stretching arrangement at the lower end has a counterbalance of 3,300 pounds weight on a double purchase, which keeps a constant strain on the rope under all circumstances.

This machinery is so arranged that the wire rope passes for some distance in open view of the engineer, so that it can readily be examined at any minute.

The hill is the best portion of the city for residences, and the road brings within five minutes of the business portion of the city a large amount of property that was comparatively worthless on account of the difficulty of access, but is now in demand, having trebled in value since the road was completed.

Freeing Cable Roads from Snow and Ice.

Mr. A. S. Hallidie, the well-known designer and constructor of cable railroads, has just received through the MINING AND SCIENTIFIC PRESS Patent Agency a patent on a plan designed to protect the tube, slot, and permanent way from the action of snow and ice in winter, and to

or scraper, in combination with the traveling endless rope and a suitable hearing device and grip whereby the plow may be moved along and the track cleaned.

Within the tube, pipes are fixed which extend in the direction of its length and are secured to the sides out of the way of the grip and rope. These pipes are connected with boilers or air or gas heating apparatus, so that hot air, gas, vapor or liquid, as may be found most

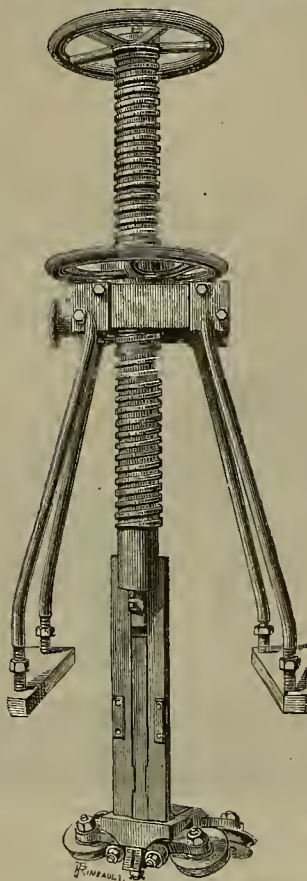


FIG. 4.—THE HALLIDIE CABLE GRIP.

desirable, can be passed through the pipes, and the interior of the tubes will thus be kept at a temperature to melt any ice or snow which may enter the slot, and it will also prevent water from freezing in the tube. It will keep the lubricants on the pulleys and other moving parts from becoming thick by reason of the cold, and

over the road. By this construction Mr. Hallidie is enabled to employ the endless cable to advantage within an underground tube for the propulsion of cars in cold as well as in warm climates, without danger of stoppage or damage by snow or ice. As the weight of the cable is very considerable in itself, and as it is carried by the grip at a level somewhat above the line of run of the rollers supporting the same, it will be apparent that the draft of the cable upon the car and snow-plow is in a downward direction, and this draft downward on the nose of the plow tends to keep it close to the track. A directly opposite effect is produced in snow-plows drawn by horses, as there is a continually upward draft given to the nose of the plow. It will be obvious, therefore, that a snow-plow connected to a cable as described, will be acted upon by the cable with a double effect—the first, the old, being to draw the plow along as the cable advances, and the second, its new effect, being to hold the nose of the plow down to the track and to its work.

The Wingard System of Street Railroads.

Mr. Adam Wingard, of this city, patented, Dec. 5, 1882, an improved roadway and mode of propelling cars on the same for use on street railway systems, where the propelling agency may be engines, cables, electricity or horses. It consists in placing and carrying the roadbed and track within and through an underground tube or tunnel similar to the tubes now in use by the cable roads, having a continuous narrow slot or narrow apertures, in and along its top, communicating with the street or surface above, and then in making connection of the car-body with its trucks or running gear that is adapted to travel within the said slotted tube or tunnel. The objects of this improvement are principally to enable lines and systems of street railways to be run without obstructing the surface of the streets with rails, switches, turnouts and other parts of a roadway.

The roadway is placed out of the way of the street traffic, and there is no wear and injury to the rails and other parts of the structure from the heavy trucks and vehicles passing over them. Expense is also saved to railroad companies in street repairs. A light T rail is placed on the bottom of tube where the foundation is solid and fixed, out of the way of snow, ice and all other incumbrances on the surface of the street. It is considered that less motive power will do the same work, with less wear and friction and less jar. Under this system a single track may be placed on narrow streets, with turnouts for passing cars from opposite direction. With cable, or any motor, the motion can be reversed at any point on

Cable Railroads and Real Estate.

It has been the experience in San Francisco, where there are more cable railroads than elsewhere in the world, that the building of one of these roads has an immediate and decided influence in advancing real estate for several blocks on each side of the route for the whole length. And, moreover, large tracts of land previously unoccupied are brought into market. This is, of course, specially the case at the outer or further ends of the roads. The regularity, rapidity, frequency, ease and cheapness of transport is such that people will walk several blocks to take cable cars, passing horse car lines on the way. It is but natural, therefore, that where new cable roads are projected, residences will go up rapidly near the line, and the property be more in demand than when access to it was not so easy.

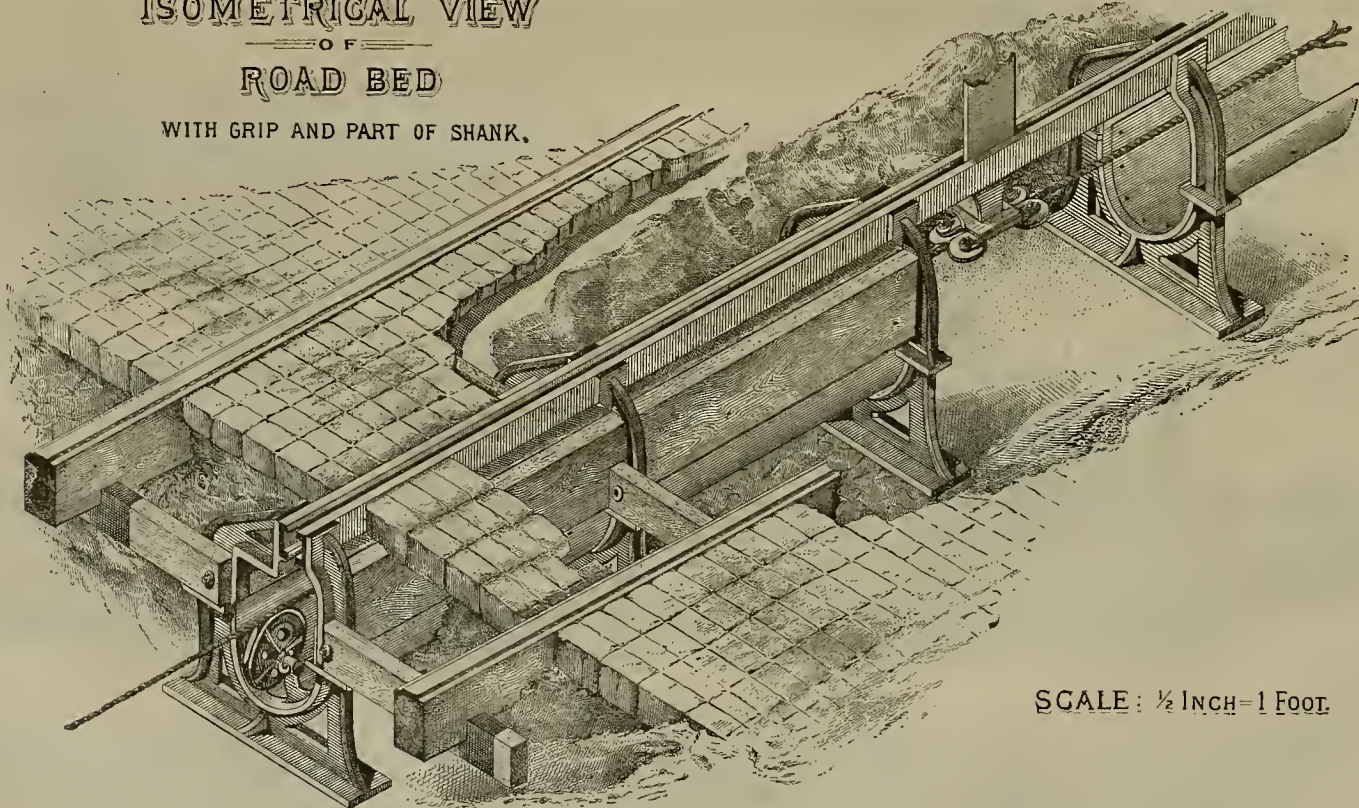
It has been a theory by those who know nothing about it that these cable lines are detrimental to the streets through which they run. They argue that a steam road would have this effect, and cable roads will do so to perhaps only a less degree. A number of years' experience in this city, however, shows the theory to be entirely fallacious, for wherever one of these roads has been built there the property has advanced, new buildings have been erected and the whole street has become improved in appearance and traffic. The roadbeds are smooth and clean, the cars make little noise, no objection has been found to their presence on the streets. In fact, as we have stated, they have improved the streets and the property in whatever direction they have been run in this city.

In an affidavit made before the Supreme Court of New York in the matter of the petition of the New York Cable Railway Co. for appointment of commissioners, Mr. A. S. Hallidie, of this city, said, in speaking of the advance of real estate: "The property on the line of the Sutter street cable road, after it was finished, became at once in demand and the real estate dealers in advertising property on Sutter street or in its vicinity would generally head it 'on the line of Sutter street cable road,' so that this property brought an enhanced value. Just before the building of the Clay street railroad I purchased on the top of the hill, for the purpose of putting up a residence, a piece of property costing \$3,000, right adjoining 'Noh Hill,' before it was Noh Hill. Eighteen months afterwards I sold it for \$9,000. That I cite as an instance to show what effect on real estate the construction of the cable road had, and it was so through the whole line of the road. A year after the Sutter street road was completed, in or about the month of April, 1878, another road was constructed on the line of California street and run through Noh Hill. The people who had fine residences there found that the cable system was so noiseless and unobjectionable, doing away with the use of

ISOMETRICAL VIEW

OF ROAD BED

WITH GRIP AND PART OF SHANK.



SCALE: $\frac{1}{2}$ INCH = 1 FOOT.

prevent any water which may enter the tube from becoming frozen, or any accumulation of ice or snow upon the permanent way.

It consists in the employment of pipes which are connected with a steam-boiler, hot-air or gas apparatus, whereby the interior of the tube may be kept warm, and the formation of ice within the tube or around the slot can be prevented, and the surfaces of the permanent way kept in such a condition that snow and ice may be easily removed by the employment of a plow

the whole apparatus in working condition. The warm air will escape through the slot and will thus keep it clear in cold weather, and any ice or snow which accumulates on the rails will be kept in such a condition that the plow or scraper will easily remove it without too much strain on the driving rope.

The plow or scraper is suitably supported on a truck running on the rails and provided with a gripping apparatus, so as to be connected with the moving cable so as to move the plow or scraper

the road; no turn-table is required at terminus. Curves can be turned with largest sized cars now in use. The floor of the carriage being nine inches from the street it is easy to get on and off. There are no wheels on the surface to main pedestrians. The ends and sides can be so shaped to make it impossible to get under the body of the car. These are, in brief, the points claimed by Mr. Wingard for his system. He has a number of improvements in detail to perfect the system.

horses, so certain and regular in its operations, petitioned the Board of Supervisors to build a road there and that road was built.

Perhaps no more convincing proof of these assertions can be brought forward than official figures compiled by the assessor's department of the city and county of San Francisco, which show the effect of cable railroads on real estate.

We append a table showing the benefit to and enhancement in values of real estate derived after construction of cable, street railways tra-

versing certain routes and districts in this city, as per official data and figures taken from the assessment roll of real estate of the city and county:

Name of Railway Co.	Date of granting of franchise or construction.	Value of lands, bordering the line of route, in year 1884, showing depreciation.	Percentage of depreciation and loss in value of said lands.	REMARKS.
Clay Street Hill, Sutter Street.	1873	755,740	10-42-100	Always cable power, commenced the use of Cable Power.
California Street.	1870	1,707,415	23-82-100	Always cable power, commenced the use of Cable Power.
Hayes Street.	1870	1,481,430	18-100	Always cable power, commenced the use of Cable Power.
Presidio and Feller.	1870	619,430	20-68-100	Always cable power, commenced the use of Cable Power.
Market Street.	1870	27,300,000	14-78-100	This formerly used horses for motive power, but in 1870 it was changed to cable power, and the Hayes street and McAllister street branches (Cable Power) added. It is now the leading street railway of the city.

The above values are the assessed values of lands for the years given, bordering about 200 feet each side of railway line. The territory lying beyond said 200 feet line, though participating in the benefit of cable facilities, is not included, as it is not needed for demonstration.

The following table shows depreciation and loss in values of real estate over and in certain routes and districts traversed by horse car street railways in the city of San Francisco, as per official data and figures taken from the assessment roll of real estate, and was compiled also by the assessor's department of the city and county:

Name of Railway Co.	First figures taken for the year 1870.	Value of lands, bordering the line of route, in year 1884, showing depreciation.	Percentage of depreciation and loss in value of said lands.	REMARKS.
Omnibus, North Beach and Mission.	1870	19,147,570	12-125-756	The "Omnibus" is the oldest line in the city, and was established about the year 1855; it is the next oldest line to the "Omnibus" and was established within a year or two of the "Omnibus."

The year 1879 was taken as a date for the first year. The year 1879 is the one least unfavorable to the horse car system. Had the date of construction been taken, the difference in "percentage of loss" would have been greatly increased. The year 1879 was deemed most proper as that was the year of general construction of leading cable roads, which marks an era in the railway history of this city.

The most desirable residence property in San

Francisco is along the cable lines. The Clay, California, Sutter, Geary, Market, McAllister and Haight street roads have each influenced the real estate largely, and all along these lines thousands of new fine residences have been erected. The older portion of the city, where horse car lines run, are less in demand for residences or business property. The following paragraph, taken from the real estate review of last week of a local cotemporary, will show that these cable roads have their influence on the markets, even when only projected:

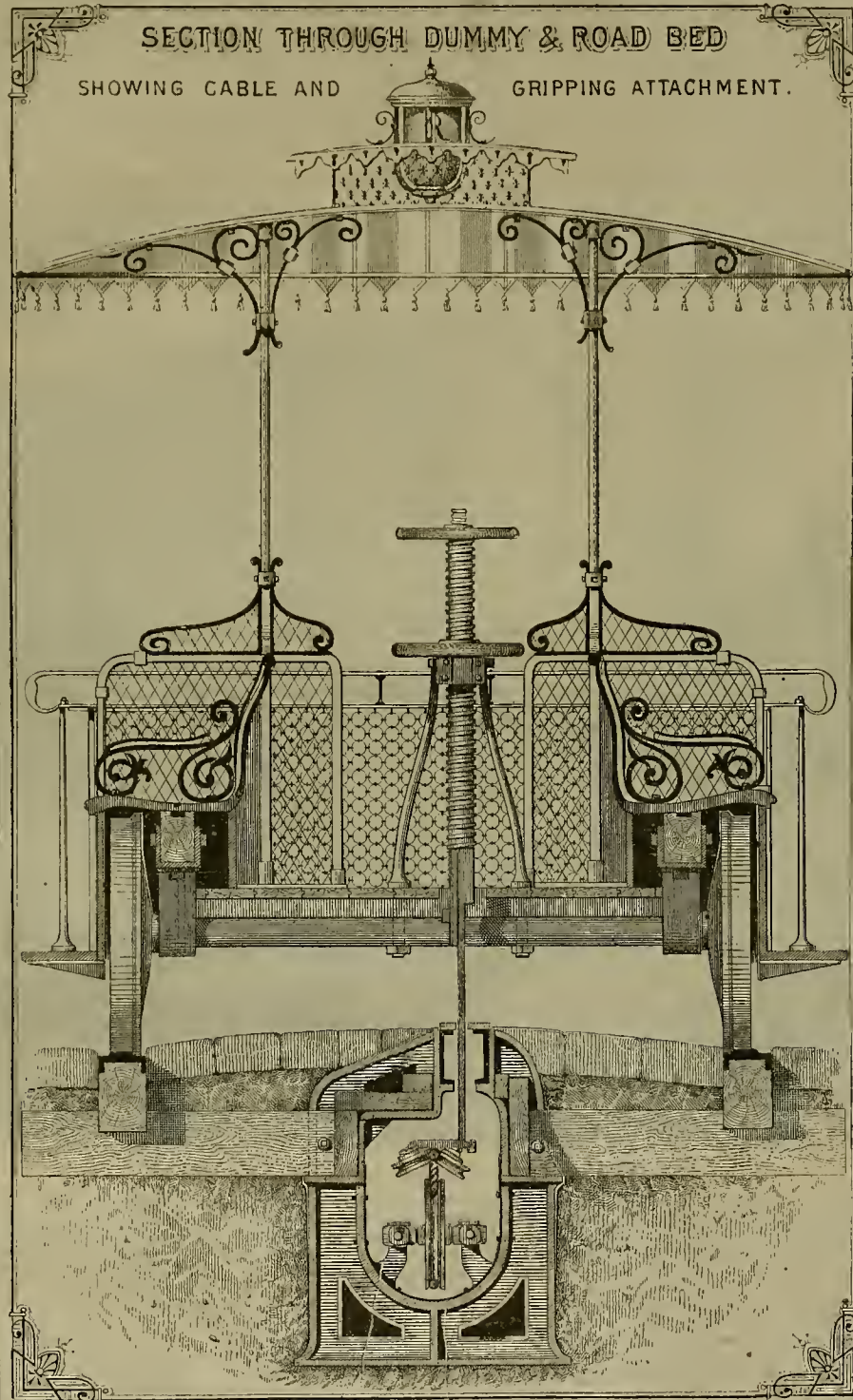
"June and July are the light months in real estate matters. Both buyers and sellers are out of town in large numbers, and frontage and improvements give way in the thoughts of many to fishing, shooting and bathing. During

\$960 to \$2,700 each. The latter price was paid for the lot fronting on Baker street, corner of Fell. The entire block was sold inside of an hour and a quarter, and this briskness, combined with the fair average price, shows that the desire for building lots in what may be called the park district continues unabated. Maurice Dore & Co. had a similar experience with an auction sale of dwelling lots affected by the prospect of the Castro and Market street cable road. That this road will be built at the same time or soon after the Hayes street line there is now little doubt, and real estate in the neighborhood is feeling the influence. On all the streets in the vicinity of the park lines of Market street cable system dwellings are going up steadily and finding ready tenants in

has added to the value of real estate on the lines where it has been operated many millions of dollars, and it is really and substantially so much added to the real and substantial wealth of the city, or that portion of the city wherein the cable system is in operation. The appreciation of real estate is not limited to the mere streets upon which the cable road is operated, but to the cross and parallel streets for quite a distance either way."

Crossing Cables.

The manner in which cable roads cross each other without the crossing cables coming in contact has been a subject of interest, and a great deal of thought and study has been bestowed upon it. There are a number of quite different conditions in San Francisco where cables cross other in different localities. In some crossings the roads are both level at and for a distance each side of the crossings, at other, one line is level while the other has a grade immediately after crossing one way and just before crossing the other. In another case one line leaves a curve before crossing and goes on a curve immediately after crossing the other way. These conditions are made more complex in some cases by the fact that this line that puts the cable in operation first, has the right to have its cable above the other line which must cross under it, and therefore the line having the top cable need not let the grip go from the cable which the line whose cable is under must let go the cable before reaching the other cable which the car has to cross, and again pick up the cable after the crossing has been made. As is well known the grip in holding the cable raises it from the carrying sheaves, so that without some changes the under cable in a crossing would be brought up against the upper ones and injurious wear would result. To prevent this raising up of the under against the top cable it is the general plan to carry the under cable down over a sheave of moderate diameter at one side of a street and under a similar sheave, so that this under cable will be carried from two to three or more feet below the upper one. On the opposite side of the street two other sheaves are placed so as to bring the cable up to its normal height, from whence it passes on to the ordinary carrying sheaves on the line. These defective sheaves being placed on opposite sides of the street to be crossed necessitates the letting go of the cable by the grip a few feet before these deflecting sheaves are reached; therefore, the car must shoot across the street to a point beyond the deflecting sheaves on the opposite side, when the cable can be picked up again by the grip. As the widths of the streets are from 68 to 70 feet it will be seen that either the car must have been given momentum by its speed on one side in order to carry it across the street after the grip has let go the cable, or some assistance must be given it by giving the track a slight downward grade in the direction in which the car is running, and this has been the general manner of accomplishing the desired object. The long distance to which the cars have to be propelled by momentum, and the absolute necessity of having the assistance of gravitation makes the changing grades on a crossing street a serious matter, and Mr. W. W. Hanscom, our well known cable railway engineer, has perfected a plan by which the deflecting sheaves are dispensed with, and the distance which a car has to move across by momentum has been reduced from 70 or 80 feet to 12 or 15 feet, and the deflecting sheaves at each side of the street not being required, the consequent wear of the cable is avoided and no change of grade is necessary. The plan consists simply in arranging a swinging bar having attached to it two sheaves, one above the lower cable and the other at right angles to the first is so placed that it is directly under the upper cable, so that when the under cable is raised by an approaching grip it raises the sheave over it, and thus raises the bar to which is attached the second sheave under the upper cable, which is raised by this second sheave coming up in contact with it; thus as the lower cable is raised, it, through the bar, raises the upper cable out of its way, and when the lower cable is dropped from the grip both cables go down together.



June, however, the dealers have learned of the final determination that two new lines of cables are to be built to help along their business. The most important determination is that the Hayes street cable road is to be built and completed within a year. The officials of the Market street system recently wrote to Easton & Co.: 'As to the Hayes street cable road, it will be built. The only delay is in the grading at the far end of the street. The contract for the work is now signed by all the owners. The grading work will certainly be commenced within 60 days, and the road will be completed in or before 12 months.' The grading has, in fact, been begun. This work followed immediately after the signing of a contract for that purpose by I. Steinhart, the agent for 1,800 feet frontage on Hayes street, belonging to the Seligman estate. The first sale of property affected by the Hayes street road took place yesterday in Easton's auction rooms. The sale was of the full lot bounded by Baker, Broderick, Fell and Hayes streets. The block was subdivided into 25-foot front lots on all sides and aggregated \$45,065. The lots sold for from

instances where they are for rent."

Mr. Charles B. Holmes, president and superintendent of the Chicago City Railway Co., in an affidavit made before the same court, said: "With regard to the effect upon the values of real estate by the cable system, much more definite conclusions can be reached, and this affiant is prepared to state that such appreciation over the lines operated by the company of which he is the president and superintendent as aforesaid, are very marked and decided. A few instances will perhaps illustrate this branch of the case. A house and lot purchased for \$1,000 two months before the construction of the cable system, was sold within six months after the line was in operation for the sum of \$5,440, a gain of \$4,440, attributable exclusively to the construction and operation of the cable system; and that is only a fair sample of many instances. The whole extent of the appreciation of real estate by reason of the substitution of the cable for the horse system can, with entire safety, be said to be largely in excess of the expense of the entire system itself. The substitution of the cable system in place of the horse method

THEY are going to add 20 more stamps to the Camas No. 2 gold mill, at Wood River, Idaho.

Cable Roads in the East.

It took some time after the cable railroad system was proved a success in San Francisco before any of the large cities in the East would adopt it; and even now it is not in use in as many places as one would suppose in view of its superiority over ordinary systems of street transportation and its influence in advancing real estate values. The system has had to meet strong opposition from owners of horse car lines already in operation, and that peculiar prejudice which exists against such decided innovations. Still, the cable system is gradually gaining ground and in several Eastern cities roads have been built and a number of others are projected. In an interview this week with Mr. James Gamble, General Manager of the National Cable Railway Co., we obtained the following facts concerning cable roads in the East.

In New York

They are building a road on 125th street, from river to river, from the corner of Tenth avenue on 125th street, all to be run by one station. This road is being built by the Third Avenue Horse Railroad Company, and if it

show that breakage of cable seldom occurs and that delays from this cause are unfrequent.

In this connection it may be of interest to note the cable roads projected by the New York Cable Railroad Company.

The Rapid Transit Commission appointed by the Mayor, on November 30, 1883, granted a franchise to this company to construct some seventy-two (72) miles of cable railway, of which about fifty-two (52) miles will be surface railway, ten (10) miles will be elevated and ten (10) miles may be either surface or elevated. The routes consist of:

First—A main East Side axial line, extending from the Harlem river, via Lexington avenue, Irving place, Lafayette place, Crosby street, Brooklyn Bridge terminus, William street, Wall street and Broad street to South Ferry, with a branch to Wall Street Ferry, the portion from Great Jones street to Frankfort street to be elevated, the remainder to be on the surface.

Second—A main West Side axial line, extending from the Battery, via West street and Tenth avenue to Fort George, of which the portion from the Battery to Thirty-second street will be elevated and the remainder may be elevated or surface; with an elevated branch extending from West street at Christopher street, along Thirteenth and Twelfth avenues to Seventy-second street.

tem may be made under the General Surface Railroad Act of 1884.

These routes constitute a system reaching all parts of Manhattan Island, and enabling passengers to make a continuous trip from any point to any other point on the island, reached by the system for one five-cent fare. The company has decided to use the system and appliances known as the Cable Railway, which have been so successfully operated in San Francisco and Chicago in this country, in London and Liverpool, England, and in Melbourne, Australia. This system, which is controlled by the National Cable Railway Company, presents the following advantages, viz:

1—An unlimited capacity for traffic at the times when greater capacity is needed; 2—The ability to run at any rate of speed, on surface railways, that municipal authority will allow; 3—More promptness in stopping and starting than with horse cars, causing less delay; 4—Greater safety from accidents causing injury to persons; 5—Freedom from interruption by snow; 6—Greater cleanliness, leaving no animal voidings affecting both health and comfort. The style of cars proposed on these various lines is shown in the engraving on this page.

In Philadelphia.

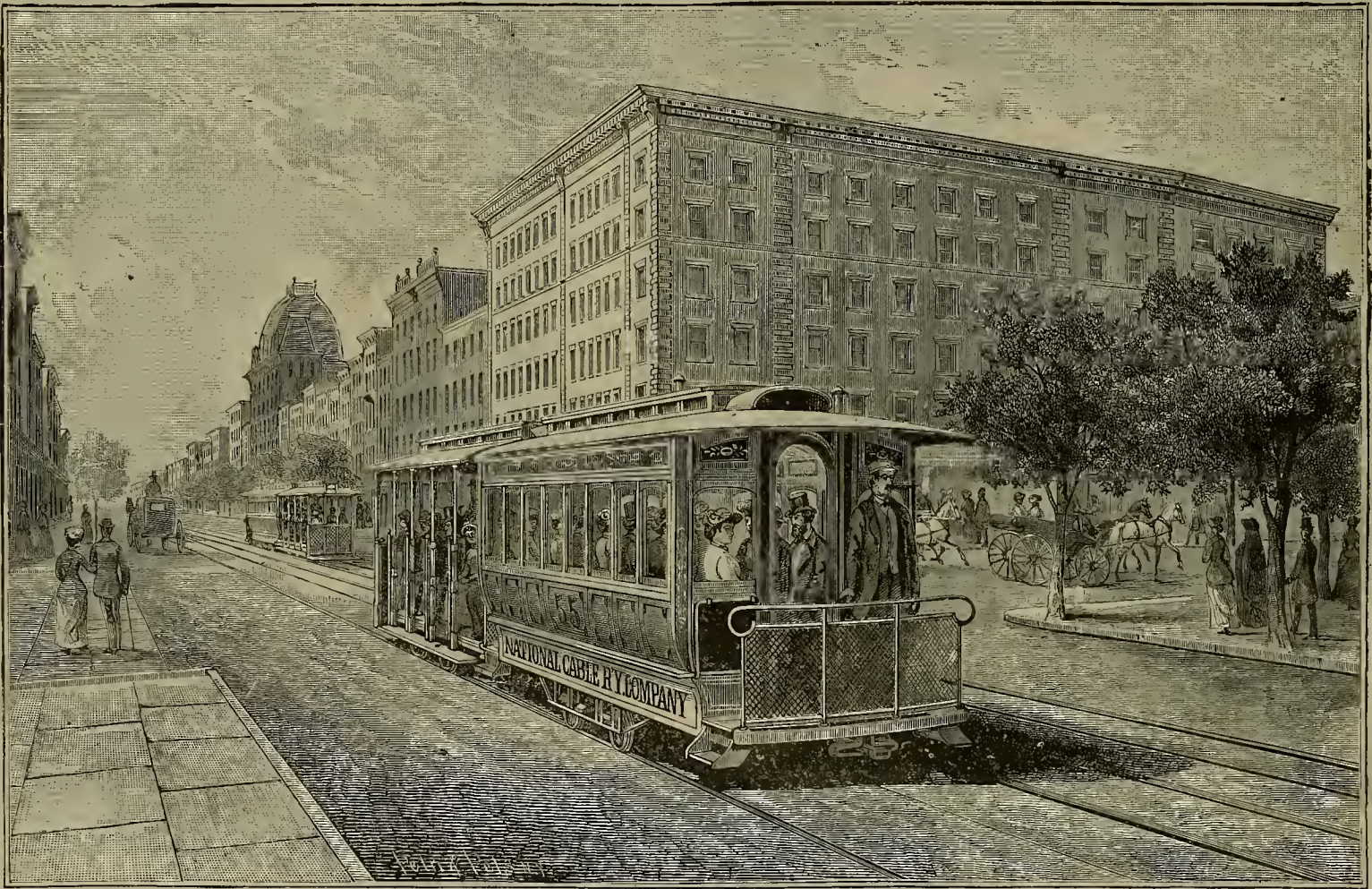
In Philadelphia a combination of the princi-

way Co. A road under construction in Cincinnati, and one also in St. Louis, are both, it is claimed, working on other patents which are infringements on the Hallidie.

The Chicago Road.

A Chicago road has ten miles of double track running on two different avenues, with a single station located on State street. The construction of this road is first-class in every respect, and has been a success from the start. When I passed through the road last October, the president informed me that they were carrying 16,000 more passengers per day than heretofore. He accounted for this large increase by the advantage of the cable road over the horse road, having caused extensive building outside of the city, and be found also the time made was so much quicker that people would walk two, three and four blocks from the horse road to take the cable road, the road at this time carrying on an average 125,000 per day. It may be asked, by the success of this road, why there were not other roads in Chicago. The reason is that there is no device for cable roads crossing drawbridges, and also that the present road controls the "Hallidie" patents for that city.

The experience so far has been that there is no necessity for heating the tube in winter as



CABLE CARS FOR PROPOSED ROADS IN NEW YORK.

proves successful they intend to place the cable all the way from 125th street on Third avenue to the post-office. This road is being constructed under what is called the "Miller" patents, which are claimed to be an infringement on the "Hallidie," and suit has already been commenced by the National Cable Railway, which controls the "Hallidie" patents east of the Rocky mountains. The object of the New York Cable Railway was to organize a general system of cable roads covering all the principal streets in the city not occupied by the horse roads. A commission appointed by Mayor Edson gave this company, under the Rapid Transit Act, 29 different routes covering about 70 miles of street. The plan of this company was to convey passengers between any two given points for one fare, 5 cents. This met the opposition of all the horse roads as well as the elevated roads in the city of New York, and no means have been left undone to defeat the scheme.

An elevated road, probably one mile long, is about completed at Hoboken, run by cable on the Hallidie system, from the landing and connects on the Hoboken Heights with several different horse roads.

The cable road being constructed on Tenth avenue has arranged for two cables in each conduit, the object being to provide against accident. In case of breakage, one cable to take the place of the other—one always remaining idle. To accomplish this the chamber run below the bottom tube had to be made over 30 feet, necessitating sub drains. The complication of machinery necessary to run extra cables and the sub-drains in the tube will undoubtedly give the cable company a great deal of trouble.

Experience of cable roads in this city goes to

Third—A central line, extending from Tenth avenue, via Fifty-ninth street, Madison avenue, Twenty-third street, Second avenue, Myrtle street, and Catherine street to Madison street.

Fourth—An East Side line, extending from Harlem river, along First avenue and Twenty-third street to Second avenue.

Fifth—Cross-town routes, thirteen (13) in number, extending across the island and reaching direct or by branches the ferries at Cortlandt, Chambers, Catharine, Grand, Roosevelt, Desbrosses, Christopher, Twenty-third (East and West), Thirty-fourth, Forty-second, Eighty-sixth and Ninety-second streets.

Sixth—A route commencing at One Hundred and Fifty-fifth street and extending along the Kingsbridge road to Kings Bridge.

Seventh—A route commencing at the Harlem river at Kings Bridge and extending to the Yonkers line.

Eighth—A branch from Tenth avenue along One Hundred and Eighty-first street, crossing the projected new high level bridge over the Harlem river to Aqueduct avenue.

Ninth—A route from Inwood Ferry along Inwood and Dyckman street, to River street on Harlem river.

In addition to the above, extensions have been located under the General Surface Railroad Act of 1884, including

Tenth—A route commencing at Forty-second street and extending via Broadway and the Boulevard to One Hundred and Fifty-fifth street, there connecting with the route extending along One Hundred and Fifty-fifth street from North river to the elevated road on Eighth avenue. Any further extensions of surface railways needed to complete or protect the sys-

tem may be made under the General Surface Railroad Act of 1884. These routes constitute a system reaching all parts of Manhattan Island, and enabling passengers to make a continuous trip from any point to any other point on the island, reached by the system for one five-cent fare. The company has decided to use the system and appliances known as the Cable Railway, which have been so successfully operated in San Francisco and Chicago in this country, in London and Liverpool, England, and in Melbourne, Australia. This system, which is controlled by the National Cable Railway Company, presents the following advantages, viz: 1—An unlimited capacity for traffic at the times when greater capacity is needed; 2—The ability to run at any rate of speed, on surface railways, that municipal authority will allow; 3—More promptness in stopping and starting than with horse cars, causing less delay; 4—Greater safety from accidents causing injury to persons; 5—Freedom from interruption by snow; 6—Greater cleanliness, leaving no animal voidings affecting both health and comfort. The style of cars proposed on these various lines is shown in the engraving on this page.

The Philadelphia system has two stations, one on Market street and one on Columbia avenue.

Kansas City.

There is a road under construction at Kansas City some two or three miles in length. This road is about completed and they also claim that they are constructing it under the "Miller" patents. The first attempt made to run the road with what was called the "Miller" grip was a failure, the grip breaking and nearly killing the engineer, and at last accounts they were constructing a new grip which my informant stated to be like the "Hovey," which is used upon the California street and other roads in this State, and which is owned by the Hallidie Co. Suits have been commenced against this road by the National Cable Rail-

way Co. A road under construction in Cincinnati, and one also in St. Louis, are both, it is claimed, working on other patents which are infringements on the Hallidie.

The Chicago road has ten miles of double track running on two different avenues, with a single station located on State street. The construction of this road is first-class in every respect, and has been a success from the start. When I passed through the road last October, the president informed me that they were carrying 16,000 more passengers per day than heretofore.

He accounted for this large increase by the advantage of the cable road over the horse road, having caused extensive building outside of the city, and be found also the time made was so much quicker that people would walk two, three and four blocks from the horse road to take the cable road, the road at this time carrying on an average 125,000 per day.

It may be asked, by the success of this road, why there were not other roads in Chicago. The reason is that there is no device for cable roads crossing drawbridges, and also that the present road controls the "Hallidie" patents for that city.

The experience so far has been that there is no necessity for heating the tube in winter as

As to the life of a rope, which is a somewhat important question, Mr. Hanscom said but little in his paper, which is published in another column. The conditions under which they run are so different in this city, and the care they receive so different. On the Clay street road, the first rope lasted the longest. It lasted two years and three months. The last rope lasted 21 months, but it had more work and wear, owing to the line running longer hours. The traffic is, however, uniform, and there are not so many stops necessary as on the Market street road, which has the hardest wear of any in the city, on account of the frequent stops. The rope which runs from the engine house to the ferry wore out in six months, while that from the engine house to Twenty-eighth street was in good condition at the same period. This is on the same road, but the latter rope has not to stand so many stops and starts.

The Market Street Cable Road.

The Construction and Operation of an Important Cable Line.

The Market Street Cable Railroad, the last one built in this city, is the most extensive one and goes through the heart of the city from the water front to the suburbs. The equipment of the road is first-class in every respect, no expense having been spared in its construction. Traveling mainly on a street where there are some eight other lines of street cars, it immediately became the favorite, owing to the convenience and comfort of its cars, the speed at which they travel, and the frequency at which they pass.

Shortly after the completion of this road we published a description of it, which we now reproduce in our "Cable Railroad Edition," as this description, with the engravings and details, will be valuable for reference to those interested in this branch of modern engineering progress. As we built the first of these roads here, our experience is useful to all others; and no doubt most of the roads built in the future will look to those in this city as examples for guidance.

The building of this road had the effect of enlivening, so to speak, a large tract of this city. For some years, south of Market street and out by Valencia, the city has been rather "slow," the northern and north-western portions improving much more rapidly, and having improvements of better character. The length of time it took to get out towards the Mission and thereabouts, or even Market street to Tenth and Twelfth streets was detrimental to these portions of the city. The cable cars now go from the ferry to the end of Valencia street in 34 minutes, and run frequently. All those portions of the city which the road or its branches tap have felt the good influence of rapid communication and have been extensively built up since the road was commenced.

The Road and Its Branches.

The main line of the road runs on the principal thoroughfare of San Francisco—Market street. The streets north and south of this all open into it, and the traffic is larger than on any other avenue in the city. Not only do the north and south streets, such as Kearny, Dupont and Stockton, and Second, Third and Fourth open into Market, but the streets north of it running across Kearny and Dupont, such as O'Farrell, Sutter, Post, Geary, etc., also open into it. This latter line of streets run at an angle from Market. The lower ends of the cables of the Sutter and Geary street cable roads are at the junction of these respective streets and Market. The peculiar central position of Market street, therefore, makes the road a highly important one. It was supposed by many that a cable railroad on that thoroughfare would be almost impracticable, owing to its crowded state at certain periods of the day. Many thought the cars would have to move so slowly that they would be unpopular. Experience has, however, proven these fears to have been unfounded. In fact, the line makes better time than any of the cable roads, the cable running about 8 miles an hour; and, including an average of 30 stops, the cars run from one end to the other at a rate of about 7½ miles an hour.

It has been found, too, that the speed at which the cars are run tends to make people more cautious than on slower roads. Moreover, the track is kept clear easily. Teamsters know that the cars run fast, and at the first sound of the gong clear the track, not taking time about it, as is apt to be the case with slower roads.

People are not apt to try to run across in front of these cars, but seem rather to prefer letting them pass. The quick speed, therefore, has been advantageous to the road, and is very satisfactory to the public.

There are several branches to this road, transfers for which are given passengers without extra charge, the fares being five cents. At Fifth street is a horse-car branch one mile long, running south. At McAllister street is a cable railroad branch, which runs to Golden Gate Park. There is a separate cable to Market street, run by a separate engine, and the cars switch off from this to the Market street cable at the junction of the two streets. This branch makes another complete line from Golden Gate Park to the ferry. The engine house of the line is at the further end of the road.

At Hayes street there is a horse-car branch to Hayes valley, through a populous neighborhood. The next branch to the right is that of Haight street. Every other car on the main line switches off here to go out Haight street to Golden Gate Park. We give a profile of this line in another column. At the end of the Haight street line a road is built to run as far as the Pacific Ocean Leach and Cliff House. This is run by steam dummies, and is a separate line from Haight street, though con-

with a heavy brick flooring and foundation to the boilers, engines, heaters, etc. The room is well lighted and ventilated. In the rear of the engines are the long pits and tracks for the stretching apparatus. At no distant day we will have a detailed description of the underground workings at the junction of Market and Valencia streets.

Outside, the most prominent feature of this building is the chimney, which forms an important landmark, and is next to the largest on the coast. The base is nine feet below the level of the fire-room floor, so that it is about 24 feet below the surface of the ground. The foundation is 30 feet square, battering in one inch in the course until it comes to 16½ feet square, where the flue enters. Then it goes up to the water-table, about 10 feet above the surface of the ground. For the rest of its height the chimney is in the form of an eight-cornered star. The inside is a circle seven feet six inches in diameter. The top of the stack is 175 feet above its foundation, or 166 feet above the fire-room floor. It was necessary to have this very high stack not only for good draft, but also to deliver the products of combustion high up out of the way. We give an engraving showing the exterior of the engine house. An engine house of similar design has since been constructed on

& Co., of this city. The exhaust pipes were made by H. W. Rice, manufacturer of portable engines and boilers, in this city and a very satisfactory job he made of them.

The boilers in use are the first of the Babcock and Wilcox type ever put up on this coast. They came here all built and ready to put up, and are guaranteed to be of 250 horsepower for each section, there being four sections. These boilers are very substantial looking structures. There is a Llewellyn water heater five feet in diameter and a fine pair of the Dow steam pumps, made in this city.

The Driving Arrangement.

The driving method is what is known as the American method of driving, and is about the same as that used on the "Golden Gate" in Penn. The engraving on page 46 shows the general arrangement. Two drivers, H H, 12 feet in diameter are placed in line. The rims are loose, and in between these rims are bolted blocks of wood two inches thick and set on end. Maple is used here, but beech is supposed to be better. The rope passes in from the street on a slight downward incline, just clearing the top of the forward driver and passing on to the top of the rear one (or that next the engine, K), it being set six inches higher than the other driver.

It passes three-quarters of the way around, and thence upward, diagonally forward, over the top of the forward one, then downward backward, just clearing the bottom of the rear one, to the tension sheave, M, on the tension carriage. There are only three-fourths of a turn on each of these drivers or one turn and a half in all. Yet this drives 24,557 feet of rope with heavy loads. One would hardly suppose that mere friction of the rope would admit of this, but that it would slip. The tension apparatus is the secret of this result; without that it would be impossible. The automatic action of the weighted tension sheave, however, is such as to keep the rope closely jammed on the drivers, so that it is not easy for any slip to occur. The great advantage of this method is the small number of wraps on the drivers, as wraps on drivers



FERRY TERMINUS, SHOWING CARS OF THREE LINES IN COURSE OF ARRIVING, TURNING AND DEPARTING.

necting with it. This Park and Ocean road we describe in another column of this issue of the PRESS. The Haight street branch is a very important one, and the city has been built up rapidly out in that direction. Opposite the main line engine house is the Market street extension branch, soon to be run by an independent cable, provision having been made in the engine houses for the cable for this branch. It is one mile long. Baldwin locomotive dummies are now running the cars on this branch.

The grade on Market street is 3½ feet in 100. The grade on Haight street is about 12½ feet in 100 at the steepest place, and the steepest grade on McAllister street is 12½ feet in 100. The diagram shows a profile of Haight street.

The Engine Houses.

The engine houses where the motive power of the cables of the Main line and Haight street line is applied, is on the south side of Market street at the junction of Valencia. At this point Valencia leaves Market by a curve to the southeast, and Haight street branches off at an angle of about 35 degrees from Market to the northwest, some 500 feet before Valencia is reached. In the rear of the engine house are bunkers which hold 2,000 tons of coal, which may be dumped into them through chutes in the yard above. Heavy brick pillars and arches support the roof of this portion, which forms the floor of the yard above. Outside the coal bunkers is an artesian well which supplies the boilers with water. One of Dow's direct-acting deep-well pumps raises the water from this well, supplying first the heaters for the boilers, the surplus going to a tank above.

The main portion of the basement is covered

the block bounded by McAllister, Lett and Fulton streets and Mission avenue for operating the McAllister street line. This same engine will be used shortly for operating the Hayes Valley branch, which will soon be turned from a horse to a cable line.

The Engines.

The power for the first-named lines is two pair of engines, with cylinders 31x48 and 24x48, a large and small one being compounded to work in pairs. The expansion cylinder has a capacity of double the initial cylinder. They are compounded by direct connection between the bottoms of the large and small cylinders. There is no extra receiver, the pipe answering as the receiver. Only one pair run at a time, the other pair being spare engines, to use in case of breakage of the others. These engines have Scott pillow-blocks, and the O'Neil cut-off, with automatic governor. They were made by the Union Iron Works of this city. The engines are well made and are doing very satisfactory work, the cards showing great efficiency.

Each pair of engines furnishes 400-horse power in ordinary working, and is capable of working up to 700-horse power. The pinion on the engine-shaft is 4 feet 1 inch in diameter and 20-inch face. It connects with a V-toothed gear 12 feet 6 inches in diameter, and 20-inch face, which in turn meshes with another gear of same size. Each gear shaft has two reels or drivers for the rope. The engines are set in pairs 19 feet apart. The diagram given shows the position of the engines with relation to the reels, guide-pulleys and tension apparatus. The steam pipes for the engines were furnished by W. T. Garratt

ers form one of the principal sources of breakage and wear on cables. The improvements on the old English system (where numerous wraps are used) patented by S. B. Whiting in 1876-7, and used on the Brooklyn bridge, are unsatisfactory, for this reason: the friction wheel from which the power is derived, located in line between the shafts carrying the driving drums, relieves the bearings, but the old and principal fault of the wrapping of the rope still remains. As the part of the pulleys where the rope first comes on wears the most, the driver is not kept of uniform size. Therefore, the rope has to "overhaul" to compensate for difference in circumference between the sides of the driver where the rope comes and goes off. This overhauling throws excessive strain on the rope and soon breaks or tears it into pieces. By the system we have described as in use here this objection is overcome, the rope nowhere taking a complete turn of any driver. In the engraving F F shows the Market street cable; O O the Haight street angle sheaves; P P the Market street angle sheaves; and S the cars on the tracks.

On the same shaft carrying the drivers, heretofore mentioned, are large gears, of about the same diameter as the drivers, operated by a pinion on the engine shaft of one-third their diameter, so the engine makes three revolutions to one revolution of the drivers. V-teeth are used on all these gears, and they are four and a half pitch and 20-inch face. There are four sets of drivers for the four ropes, but one set of gears and one pair of engines operates them all. The other pair of engines is held in reserve as a spare set

in case of accident. The engines for the other lines located in the McAllister engine house are simple engines, 18x48 feet, arranged to work either singly or together.

The Stretching and Tightening Arrangement.

The tension of the wire rope on all these roads is something which has to be provided for, otherwise there would not be a uniform tension maintained. Moreover the change in length, with the ordinary changes in temperature, during the day and night, of 40,000 feet of metal cable, must be also looked after. On a hot day the cable is several feet longer than on a cool one, and this ever-varying change in length must be compensated for, and the apparatus for doing this must be automatic. The rope is furthermore continually lengthening by wear, and during the life of a rope the total stretch is about one per cent of its total length. The method in use on this road is considered to be the best known. Of course each rope has to have a separate stretching and tension arrangement. The principal object in keeping the uniform tension is to prevent the rope slipping on the drivers, it being driven merely by friction. Behind the engines in the engine room, and in line with the driving pulleys, brick-lined excavations 165 feet long each and 5 feet wide and deep have been made, one for each cable. Over each one is a stretcher arranged for a separate cable. A description of one will serve for all. A large and heavily framed carriage, L, mounted on wheels and moving on tracks, is placed over the excavation. A pair of tracks, close together, is on each side, and each pair forms a rack-bar, with which a pawl on the carriage engages. These pawls prevent the carriage moving forward, as the strain of the cable tends to make it. On top of this main carriage is a smaller one, also on rails, the rails being on the main carriage.

The small or supplemental carriage carries a vertically revolving pulley, M, about 12 feet 6 inches in diameter. The cable or rope, after it passes around the main drivers of the engine, extends back around this sheave on the carriage. A very heavy weight, N, weighing about 10,000 pounds, hangs on a chain and connected with the supplemental carriage, passes over a chain wheel on the lower carriage and draws backward on the upper one, thus keeping a constant tension on the cable equal to one-half the amount of the weight, the strain being divided between the upper and lower ropes. This tension sheave prevents any slipping of the cable on the drivers, as elsewhere described.

The function of the lower carriage is to take up the permanent stretch of the rope. When it is found that the weight is settling down into the pit it is known that the cable has permanently stretched. Then the lower carriage is moved back and the pawls are dropped into the ladder formed by two T-rails with pins through the webs, forming a sort of rack bar, thus holding the lower carriage in its position. This moving of the lower carriage is accomplished readily, notwithstanding the strain of the cable, and without necessitating the slowing of the ropes or interfering in any manner with the operation of the road. A heavy tackle is hooked to the rear end of the carriage, and the tail rope or hauling part is taken to a spindle or gypsy on the end of the axle of the main sheave on the supplemental carriage. This is revolving steadily all the time, and by taking a few turns of the rope the tackle is operated by the power of the cable itself and the carriage hauled back on its rails, the pawls before described automatically engaging with the teeth or pins provided by them, thus holding the carriage at the desired point. As the lower carriage moves back the weight rises and the upper carriage remains stationary, but changes its position with relation to the lower one. That is, when the lower carriage is drawn back as far as desired, the supplemental one is at the front end of the lower one ready again to be moved back auto-

street, 20,002, and the auxiliary 432 feet long. The McAllister street cable, from the engine house at Masonic avenue to Market street, is 20,543 feet, and from the engine house to the western terminus at Fulton and Stanyan streets, 5,593 feet. The last two are the same

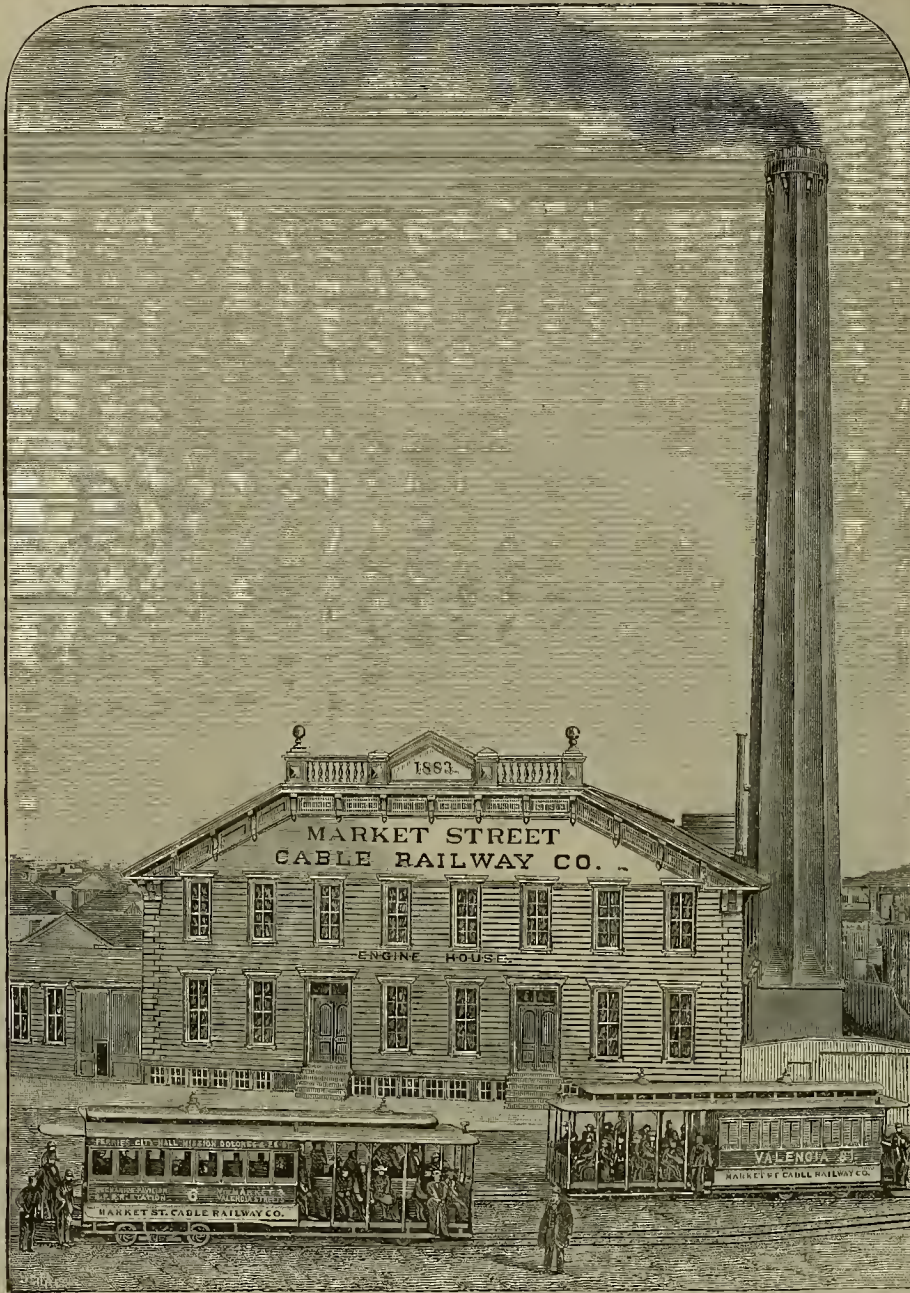
not entirely satisfactory. Moreover, in changing a street road operated by horses and having the usual large stock of common four-wheeled cars, to a cable road, several things had to be taken into consideration. The outlay for reconstruction must be large in comparison with the

open all around, but has a roof supported by ornamental posts. In the center is the brake and grip mechanism, and the engineer or grip man stands isolated in such a position that he can see ahead and on both sides. There are two front seats on each side, but the center is open in front, so no passenger can obstruct the view. The seats on the side are wide and comfortable, and set back so the passengers' feet are inside the line of the sides of the car; they are completely protected from passing vehicles by four strong posts. They are high up, also. Outside is a broad step running lengthwise the car on each side, and on these many can stand and hold on by the strong iron vertical hand-bars shown in the engraving.

The object of arranging the seats so that the passengers may sit with their feet inside the line of the side frames of the car, is to avoid liability to accident. In case of a wagon being backed against the car, or striking it in any way, the passengers are up out of harm's way. The height of the seat takes them up out of the dust also. The whole arrangement of these cars has proved highly satisfactory to the public and to the company. They carry large loads of passengers, run smoothly, and round the curves readily. They are, moreover, handsome in appearance. They are constructed in such a manner as to combine great strength with lightness. A noticeable feature is the absence of any joggling or jarring motion ordinarily incident to dummies. Market street being the main thoroughfare in the city, it was absolutely necessary to make the cars safe. It is easy to get on or off, by reason of the many posts and handles for support.

There is no communication for passengers between the car and dummy, and people cannot come out of the front of the car to alight. Most of the old street cars of the Market street line were utilized by an open portion being built on, though unless it was pointed out, the connection would not be seen. The front platforms are removed, but otherwise the cars are not changed. These cars are light and well ventilated, and their interiors are all of bright, varnished woods, with wooden perforated seats. The car body has each end supported on four wheels, united by a frame or truck having a pivot or swivel, so that the trucks may turn and accommodate

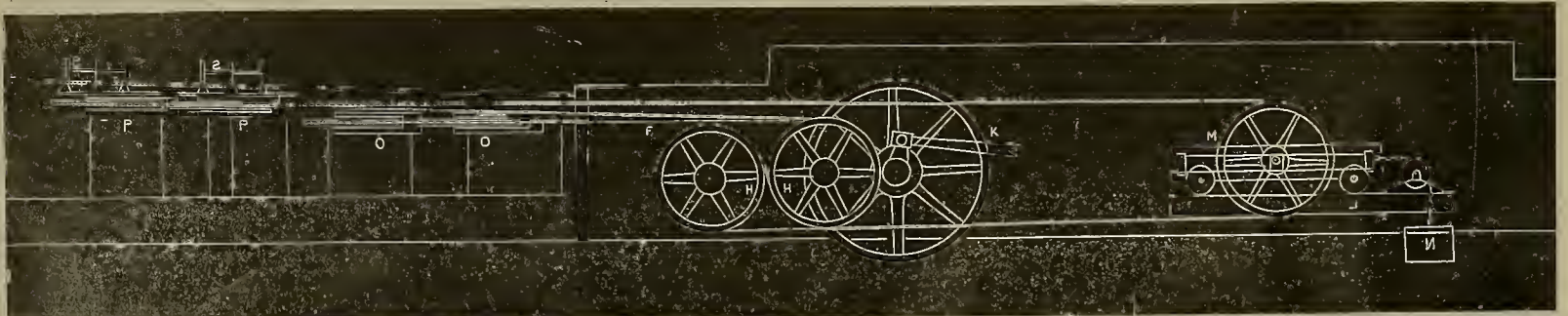
themselves to the curvatures of the road, as on ordinary passenger coaches. The grip is mounted on the solid truck of the forward or open portion of this car, an opening being made in the floor for it to project up through. As the distances between the pairs of wheels on the truck is small, the movements of the truck in accommodating itself to the curva-



MAIN LINE ENGINE HOUSE AND MACHINE SHOP.

kind of cable as the main line, but the first that were in use were made by the California Wire Works of this city. Since the completion of the road a machine has been constructed at the Valencia street engine house, from designs prepared by Henry Root, the company's engineer, by which the company manufacture their own cables. It is a compound machine,

original cost of the road, and as the total cost of the cars is but a small percentage of the whole, the car must be so constructed as to fulfill the following requirements: 1. To be as safe as possible for the public. 2. To ride easily, either empty or loaded, and carry large loads if required. 3. To be easy to get on or off, and neat and symmetrical in appearance.



SECTION OF ANGLE SHEAVES, DRIVERS AND TENSION APPARATUS.

matically by its compensating weight. By the arrangement described 330 feet of each cable can be taken up.

The Wire Cables.

The first wire cables in use by this company were made by John Roebling Sons Company, of Trenton, New Jersey. The rope is an inch and a quarter in diameter and weighs 2½ pounds to the running foot. It is made of crucible steel wire. There are 6 strands of 19 wires each around a half-inch manilla rope heart. The main or Market street cable is 24,125 feet long; the Valencia street is 20,194, and the Haight

completing the cable and winding it on the roll, in one operation, and is the only machine of the kind ever constructed. Tar is first used to fill up with and oil is added as the rope fills, until it alone is used. They have to avoid the use of tallow and other animal fats.

The Cars and Dummies.

One of the questions in connection with the new road which was most carefully considered was that of the construction of the cars. It was known that the traffic would be heavy at certain hours, both morning and evening, and that the ordinary form of car and dummy was

4. To be cheap in first cost and maintenance, and so arranged that old horse cars can be converted to cable cars without great sacrifice to property. All of these requirements seem to be fulfilled in the combination car in use on the Market street road.

The cars and dummies on this line are made in one. They are different from any previously made, being entirely original in design. They have more the character of a steam than a street car, as the engravings show. The whole car is 34 feet long and weighs 9,600 pounds. The forward part, for a distance of 14 feet, is

ture of the track are small, and do not affect the grip. The long car-body can make long and sweeping curves, necessitated by its length very readily, as the two trucks so widely separated are each on pivots, like the trucks of steam cars. This rigidity of the ordinary street car running gear is avoided, and there is no "grind" on the rails. It is the first time this system has been applied to street cars. The length of these cars necessitates some better form of running gear than in ordinary use, so the system described was adopted.

The cars ride smoother than any street car in

the city, there being none of the jolting motion so common. The roadbed is so solid and the rails so well joined that the whole road is smooth. The cars are well lighted by cut and center lights and brilliant head-lights are used in front, which light up the street far ahead. There is a large gong outside and on top of the car in front, which, while it sounds a loud alarm, is not heard so much by the passengers as by those it is intended to warn. The engineers and conductors are uniformed neatly; and during the hours when crowds prevail, there is an extra conductor or collector put on the forward car.

On the main line rope there are 41 cars at a time; on the Valencia St. line there are 33 cars in use; on the Faight St. 19, and on the McAllister St. 24 cars, making 76 combination cars in all.

It is a mistaken idea that these cars can run no slower than the cable. By reducing the grip pressure, by means of the lever, the cable slips along and the car does not move so rapidly; in fact, it may be slowed to a snail's pace, almost, while waiting for a team to get out of the way; and the starting up is so gradual that no jerk is felt.

Among other peculiarities in the construction of the cars is that of the fender or "kid-catcher," for picking up any stray youngsters who may fall on the track. It will not do to put a fender or catcher on the car itself, as the car has a considerable range of movement from variable loads and the plunging motion caused by inequalities of the road. The fender cannot be, therefore, readily carried at a fixed distance from the ground.

The method adopted is to secure to the forward edge of the rigid truck frames in front of the wheels a plank or frame extending in front of the car itself. It extends across the whole width of the car, and is not over two or three inches above the surface of the track. Knees or braces secure it firmly to the truck frame. The front edge is rounded. The construction of this part of the car is such as to lessen danger in the case of persons falling in front.

The Trucks, Tracks and Wheel Brakes.

We give two engravings, showing the details of the running-gear of these cars. (See page 47.) The rear truck carries the track-brake, which is between the wheels on each side. In addition there are the usual wheel brakes. The forward truck carries the grip and brake levers. A rod connects the rock-shaft of the track-brakes with the hand lever on the front truck. It will be seen that these trucks are similar to those in use on steam railroads, and that they are connected by a single king-bolt or pin with the body of the car. We stated elsewhere that by the use of these trucks the cars turn the curves easily and ride without jolt.

The brakes used on these cable railroads are very important factors in the safety of the system. On this road, particularly, running at the speed it does and through a very crowded thoroughfare, it is necessary to have the brake gear very efficient, in order that sudden stops can be made. It is found in practice that one of these cars, weighing 9,000 pounds, and loaded at that, while running at a speed of 8 miles an hour can be stopped in 10 feet. Even air-brakes could not excel this. While the ordinary brakes are attached to the wheels in the usual way, one set for the gripman and one for the conductor, each set acting independently, the main dependence is placed on the track brake.

These track brakes are the outgrowth of the cable railroad system, being adapted for use on very steep grades, where if the wheels were locked even, the car itself would slide on the rails. It is a very powerful appliance, and by its means one of the heavily-loaded cars may be stopped very suddenly. In the first place it may be stated that both the wheel brakes and track brakes are entirely independent of the car body, the whole mechanism being on the trucks, or running gear. The track brake is on the rear truck, as the engraving shows, between the wheels, its operating lever, which is by the side of the grip-lever and similar to it, however, being under control of the gripman who handles

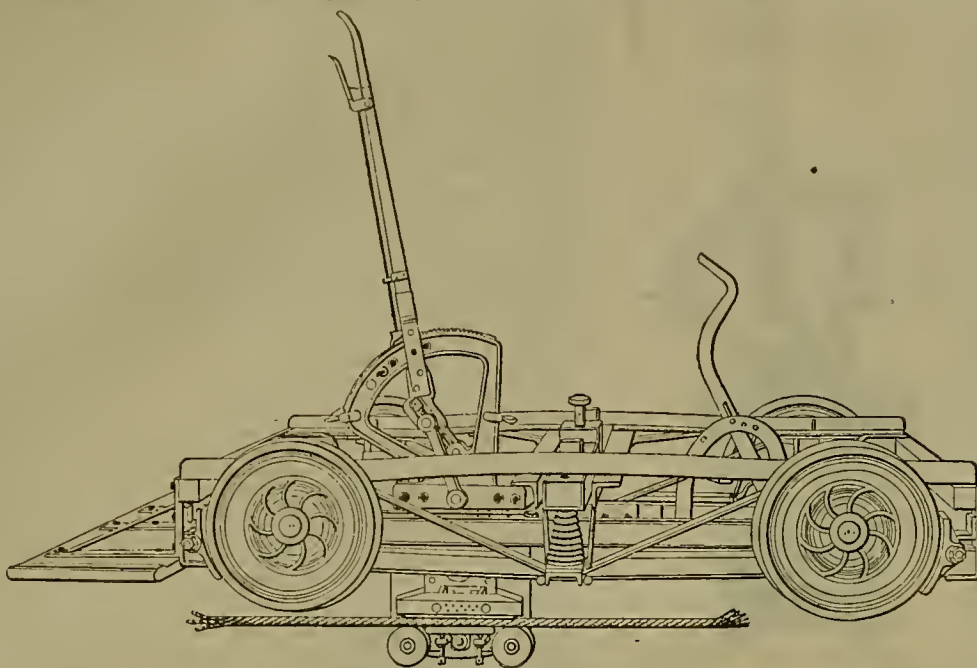
the grip. Under the car is placed a rock shaft, operated by the lever, which works toggles or joints, forming a pair of powerful levers, which press down on each track a broad block of wood. The weight of the car can almost be lifted on these blocks, so powerful is the leverage. The device is very effectual, works quickly, and is not liable to breakage. It is operated by a hand lever. The ordinary wheel brakes are controlled by a foot lever near the engineer (see engraving), so when the grip is released he can slow down with the wheel brakes, or stop suddenly with the track brake. In addition, the conductor can operate the wheel brakes on the rear part of the car. The engineer can throw down the track brake on the rear part of the car, and lock the four wheels on the forward part at the same time.

The Grip.

The most important appliance on this class

of cars is the gripping attachment, or grip, by which connection is made and unmade between the cable and the car. It is necessary to have a gripping apparatus simple in construction, with as much as possible of its mechanism above ground, so as to be accessible at all times, and to be carried at a uniform depth below the slot, so as to always maintain its position relative to the slot. In these cars the grip hangs on the fixed part of the truck, and not on the car itself. The truck is like that of a coach. The grip is between the center bolster and the

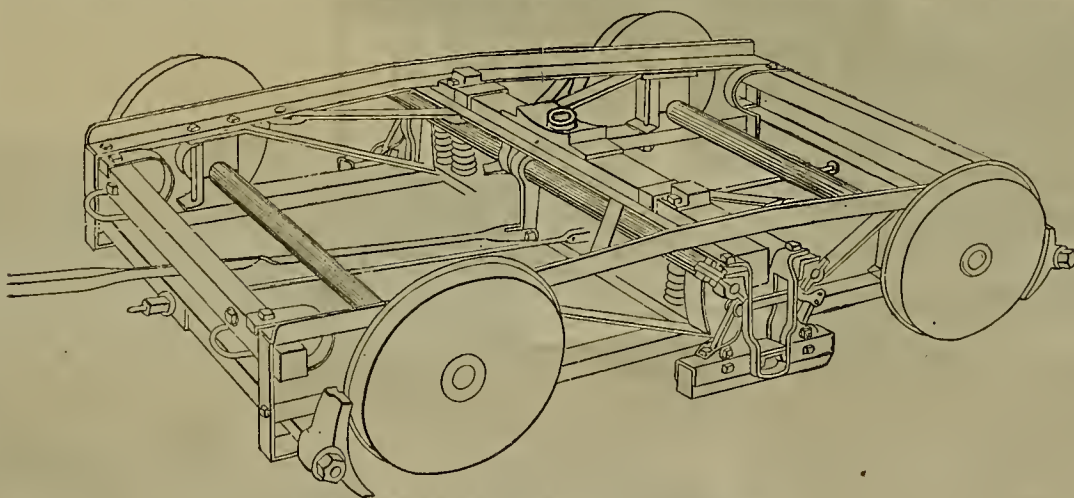
by bolts, and carries the lower jaw, while the inner frame, which slides up and down upon the outer one, carries the upper jaw, the quadrant, the operating lever and adjusting mechanism, and is held in place by guide plates extending across the stationary inside frame, and between which it slides. The frame carrying the jaws passes through the slot directly down alongside the cable, without offset. The grip-bar on which these parts are mounted is secured and supported by a frame on the running gear or truck, and not on the car itself. The car body can therefore be mounted on springs without any of the spring motion being imparted to the grip and through it to the cable. In the way in which this grip is arranged, all the parts liable to get out of order are accessible, and it is not necessary to provide pits in which to examine them. The engraving given herewith shows the con-



ROOT'S PATENT FORWARD TRUCK, WITH GRIP, BRAKE LEVER AND FENDER.

struction of the grip. (See page 48.) When the car is at a standstill, the wire cable passes along over the chilled-iron grooved rollers at each end of the lower die. The lever operating the grip is then inclined forward. When the gripman desires to start the car he moves the hand lever back. This action moves the inner frame downward, carrying with it the upper jaw or die. This die consists of a hollow piece of soft cast-iron secured in the lower end of the sliding part. The lower die is a shorter piece of soft cast-iron fitted lengthwise between

the two rollers. This is arranged with set screws to be raised to take up wear. The upper die is longer than the lower, and as it is forced down by the inner frame it rests on the moving cable, and pushes or presses it tight on the rollers before pressing it on the lower die. Gradual motion is thus imparted to the car, without jerk or jir. A still further downward motion of the upper die forces the rope or cable on to the lower die, the cable being thus held tightly between the dies. A reverse motion of the lever raises the frame and upper die, and releases the cable and allows it to run through freely without imparting any pressure to the car. The brake can then stop the car. The head of the toggle operating the inner frame slides up and makes a difference in the length of link, so that wear of the upper die is accounted for. Wood has been tried for the dies, and so has brass, but soft iron is found to be as good. The dies are easily changed. The frames of the grip are made of steel, from the Judson Iron and Steel Works in Oakland. Phosphor bronze was found to be too soft. Steel seems the best. They have been made of common cast-iron, but



PATENT REAR TRUCK SHOWING TRACK BRAKE.

forward axle of the truck, and there is but little motion to it, as the gripman who operates it stands directly over the king-bolt, around which the truck is free to swivel.

The grips of these cable roads are as much a mystery to most people as a steam engine. Men ride behind locomotives and on steamers every day who have no definite idea of the power that moves them. They ride on cable cars day after day and year after year, see a man use a lever to stop and start, but beyond knowing that something "grabs" the rope, they are in the dark. To describe in detail the operation and construction of a grip would puzzle nearly all. Yet the operation is quite simple, now the idea is worked out, though the problem had many difficulties which only experience and ingenuity have been able to overcome.

The grip in use on this road is one invented and patented by Mr. Henry Root, the engineer and superintendent of construction. It is formed of two frames, one sliding outside the other. The outer one is secured to the grip-bar of the dummy (or forward part of the car)

The concrete was not filled in the center, but a core was temporarily used, so the tube or rope-way was thus formed between the slot-iron supports. As nearly all the weight of the traffic is on the rails, the tendency of the rails to go down is resisted by the deep girder, of which the heat tie forms the top and this continuous mass of concrete the bottom. There is no danger of unequal settlement. We give an engraving which shows a section of the roadbed with these piers. The soil in which the road is built is sandy.

this is too brittle, as a blow may break it. The first thing to suggest itself would be wrought iron, but there are several objections to its use. It is more expensive than a casting, and its liability to bend is a serious objection. While the material must necessarily be tough and strong, it is better that it should break than bend under any severe strain, since it is preferable to lose a grip than to have to endanger the tube, cars or passengers. The law prescribes that the slot in the street through which the grip passes must be no more than three-fourths of an inch wide, so it will be seen there can be no spare metal, for there must be some play. This grip works very satisfactorily indeed. The grips were manufactured in this city by William H. Bireh, of the California Machinery Works, as were also the sheaves and tighteners.

Construction of Roadbed.

In laying out the plans for this line the experience of other cable roads was carefully considered, with a view, if possible, of providing against difficulties formerly met with. Every detail was studied with the utmost attention. The constructors had themselves built one successfully operating cable road in the city, and were fully acquainted with the requirements. Cable railways are ordinarily constructed of iron ribs of the form of the tube, set at suitable intervals, to which the slot iron or timber, as the case may be, is bolted, and the spaces between these ribs filled with wood to form a continuous tube. Outside and independent of this tube the rails are laid, supported on short ties or other foundations, and connected horizontally with the iron ribs by short bolts or rods, but are liable to settle by the undermining of their foundation, without regard to the tube or the other rail of the track. This will frequently occur by the renewal of the paving outside of the track, the introduction of house-connections with the main sewers, or other disturbances of the track. This settling causes great inconvenience.

It was determined, in building this road, to form a single rigid structure by connecting the rails and slot irons by yokes, and uniting the whole by employing concrete. The engraving shows plainly how the roadbed has been made. (See page 48.) The main tie or yoke connecting the opposite rails is formed of old railroad T rail, bent in suitable shape, head down. It embraces the tube and has fastened to the ends suitable chairs or plates, to which the rails are secured. From the lower part of the curved yoke extend upward two supports for the slot-irons. The lower ends of these are sufficiently separated to form the necessary width for the tube.

Tie-rods connect these supports with the main yokes through the chairs. The two rails, slot-irons and yoke are then all connected rigidly together as one. These yokes are placed every three feet along the length of the road. The rails and slot-irons being connected in the same structure, all the parts are maintained in their relative position. Whatever may occur to alter the place of one has no effect unless the change is sufficient to effect the whole structure.

In building the road the first thing done was to excavate places every nine feet, in which was constructed a concrete pier sixteen inches thick by five feet long crosswise the track, on which the main structure stands.

There are altogether some 9,000 of these piers, the foundation of which is 10 feet below the rails. For a number of blocks at the lower end of Market street the street is "made ground;" that is, it has been filled in on to the bay mud. In order to get a solid foundation, piles had to be driven to support these piers, so all tendency to settle was avoided.

The piers being built and the trench dug, a section of rail and slot-iron was put in place on the piers, and concrete filled in, filling the space between the rails and slot-iron, and forming a support for the iron-work.

The concrete was not filled in the center, but a core was temporarily used, so the tube or rope-way was thus formed between the slot-iron supports. As nearly all the weight of the traffic is on the rails, the tendency of the rails to go down is resisted by the deep girder, of which the heat tie forms the top and this continuous mass of concrete the bottom. There is no danger of unequal settlement. We give an engraving which shows a section of the roadbed with these piers. The soil in which the road is built is sandy.

In building this road, over 40,000 barrels of Portland cement were used for the concrete. There were 25,000 ribs or yokes used also. Of the steel channel-rail that forms the slot, about 1,000 tons were consumed.

The form of this slot-iron is peculiar. It is not an angle iron in the ordinary sense. The top part is 2 1/2 inches wide, and the inside or lower portion is 5 inches deep and 1/2 of an inch thick below the fillet. It is bolted on to the upright of the ribs. The upright parts of the two slot-irons are wider apart at the bottom than on top. The edges of the iron are 3/4 of an

inch apart at the top and 5 inches at the bottom, although only 5 inches deep, the slope being divided between the two. They slope back almost two inches in five. This gives room below for the straps on the grip.

By building the whole road on piers a very firm foundation was obtained, and chance of any settling obviated. If the street was dug away, this structure would remain on its 9,000 piers, like one of the old aqueducts. A double purpose was served by this. People wanting to make sewer connections or connect with water or gas pipes can do so without disturbing the road. They run all such connections between the piers, and even if careless workmen fail to make all solid again, the road does not suffer.

The Rail.

The rail used on this road is peculiar in shape, and is the same put in the California street railroad in 1877. The form was made specially for that road, drawings being furnished by the constructors to the Cambria Iron and Steel Co., of Johnstown, Penn., who made the first lot. Those on the road under consideration were made here by the Pacific Rolling Mills, from imported Bessemer-steel blooms. The rail weighs 33 pounds to the yard. It is a sort of combination T and street-car rail, the object being to get something that could be secured with a fish-plate joint. The rail is 3 inches wide, 2 inches of face and 1 inch of inner flange. It is 3 inches high. The main peculiarity is in the inner part of the T being dropped down to form the flat flangeway for the car wheels.

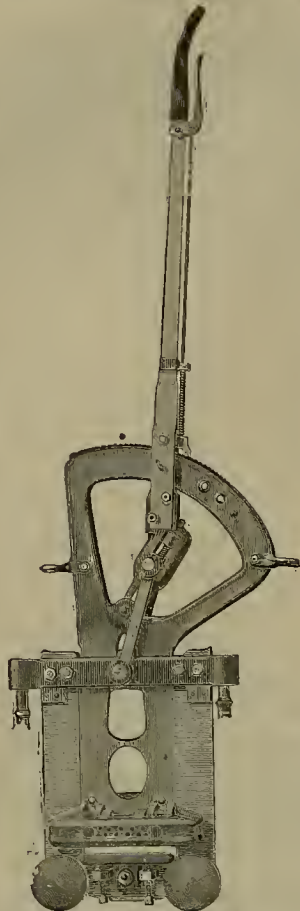
Carrying Pulleys.

Every thirty feet along the road is a grooved carrying pulley. These form the carriers for the rope. The pulley for this purpose is a solid casting, axle and all. It is 15 inches in diameter over the flanges, and 13½ inches in diameter to the bed of the groove where the rope bears. The axles are 1½ inch in diameter and 12 inches long. The bearings are 2½ inches long. A flange, or rib, is cast on the axle to prevent end motion, and it runs in a corresponding groove in the box. There are also 30-inch crown pulleys at the summit of each rise and 8 or 14-inch depression pulleys at the base of each hill. In some places the carrying pulleys are 6, 8 and 30-inch. The box in which each hearing sets is a lignum vitae block, set in a cast-iron shell, which carries the lubricant. The shells fit in a cast-iron frame, which rests on a small brick foundation in the tube or rope tunnel. There are two side walls that the edge of the frame rests on, leaving a clear passage-way under the pulley of some three inches. Each of these carrying pulleys weighs about 40 pounds. They last a long time and are seldom broken.

The Pulley Plates.

It is necessary to have these pulleys readily

latches into the recess formed by the channel iron, and holds the plate in place. The latch or dog has a weight formed on it, and hangs in the cast iron frame out of the way under the pavement. It is automatic in its action and



ROOTS PATENT GRIP.

cannot be disengaged by accident. The top of the plate has numerous rivet heads to roughen it and secure the truss and straps. The plate is subject to very heavy blows, so no rings or loose-lifting arrangement can be used. Two holes are bored in the plate, by which the hook

These pulleys, being above, would necessarily be in the way of the grip on the car, which is also above, if provision were not made to let the grip pass. This is by no means a simple problem, and more or less trouble has been experienced with those in general use. The depression pulley mechanism on the Market street road, the first of its kind used, has answered the purpose admirably. The depression pulleys are usually common pulleys, upon the underside of which the cable passes, and which are placed to one side and passed by a peculiar grip, or adapted to move in some manner that the grip may pass and then return to position. The method used on the first roads constructed here was to place the cable some distance to one side of the slot in which the grip travels. The grip was then made L-shaped so as to enable the shank to pass the depression pulleys, as the cable was carried by the grip at a fixed distance below the surface of the track. As the grip approaches these pulleys the cable is pressed down clear of them and the shank passes to one side of the pulley, the L forming an offset. This method is objectionable because the draft is to one side and causes a twisting strain of the shank. A grip with no offset, and passing down vertically without angle, cannot pass depression pulleys in the ordinary way. A different plan was therefore necessitated on this road.

At the proper position under the road-way is placed a horizontal arm, one end of which is pivoted or swiveled in a suitable manner near the slot-opening, and the other end of which carries a pulley. This is the depression pulley and holds the cable down. A counterpoise or weight keeps the arm and pulley in its place with relation to the center of the slot and over the cable. As the car comes along, the grip of course holds the cable down so as to press it out of the groove in the pulley. This leaves the arm carrying the pulley free to swing aside, but that is held by the counterpoise. The shank of the grip, however, begins to press against the side of this arm, near its hinged end, and without jar or shock presses the arm and pulley aside. The instant the shank has passed, the counterpoise brings the arm and pulley back to its central position again. As the car goes on further, the rope gradually swings back up to its normal position and comes into the groove of the pulley again. The frame or arm carrying this pulley is set at a small angle to the plane in which the grip-shank travels, and if any part should become broken, the weight or counterpoise draws the pulley and frame out of the way out of the line of travel of the shank, so there is no danger of any obstacle in the line of travel of the grip. There is no spring to get out of order in this arrangement. It must be remembered, of course, that cars can go only one way on the respective tracks of these cable roads, the cable running up one

or quite at right angles with each other. The means used for rounding the curve on the Market street road are different from those applied anywhere else, and deserve some detailed description. The curve on this road where the new system is applied is at the junction of Market and Valencia streets, in front of the engine house.

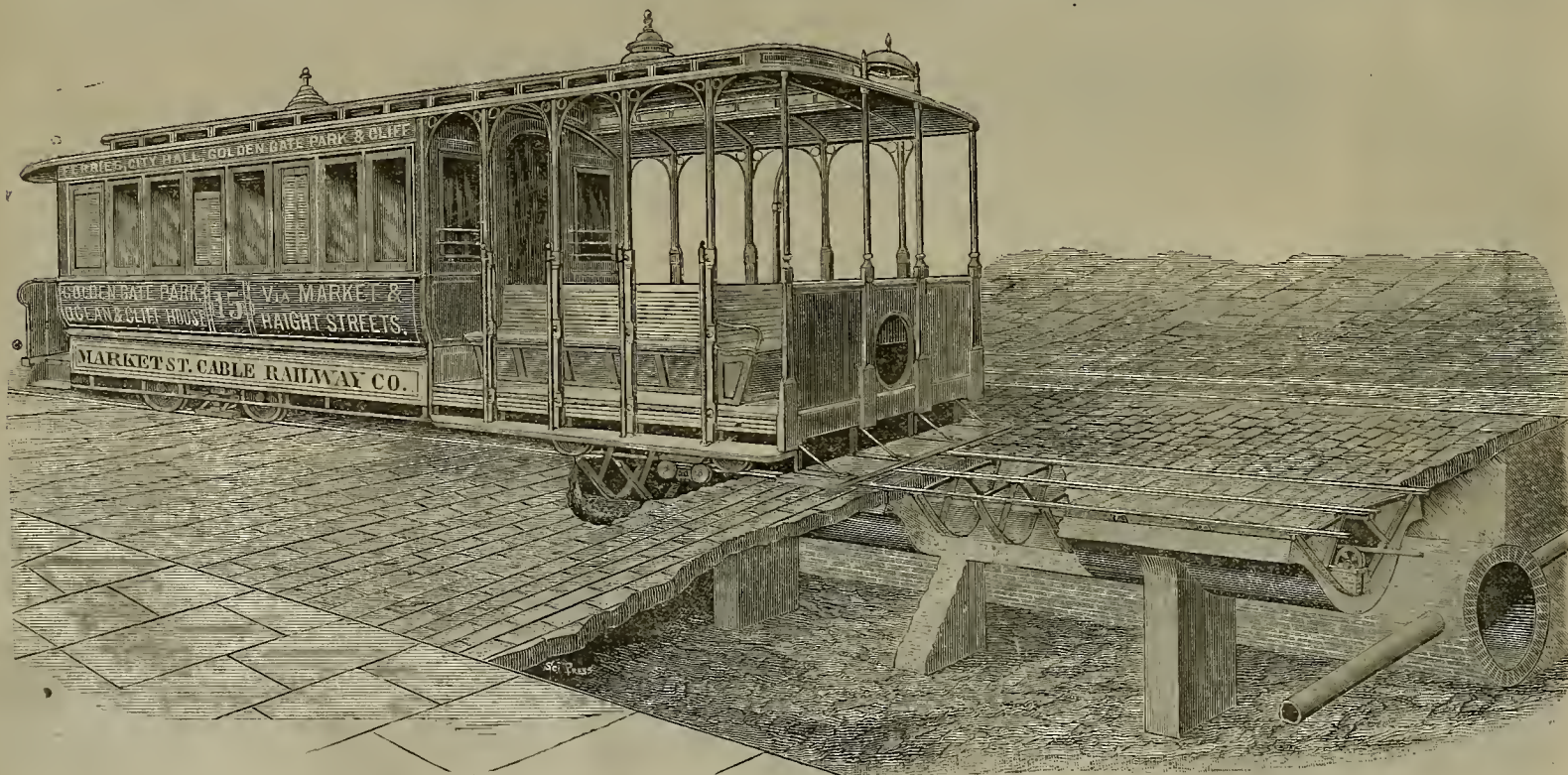
The main feature is in the use of an auxiliary cable in the curve on the line of the grip slot running at half the speed of the main cable. The two streets named do not meet at right angles. The Market street cable passes around its guide sheaves into the engine house, and that of Valencia street does the same. Between the end sheaves of these respective cables plies the auxiliary one, which carries the cars from one to the other.

The auxiliary cable is driven from a 6-foot, V-shaped iron wheel on the engine shaft. Guide pulleys suitably placed lead it out into its tube or rope way and back again.

In the curve it is guided by 15 side-bearing coned pulleys. The bases of the cones are downward, so that when the cable is within the jaws of the grip it is opposite the upper part of the conical face, and there is sufficient space for the grip to travel without touching the sheaves. When the cable is released from the grip it may settle to the lower or larger portion of the sheave-face. The auxiliary rope is 400 feet long, and the curve has 80 feet radius and about 55 degrees of angle.

The auxiliary cable only runs between one pair of tracks, and propels the cars only from Valencia street around the curve into Market street. It happens that at that point the grade is such that the cars coming from the ferry, when they let go the Market street cable, will run by gravitation around the curve to the point where they can take hold of the Valencia street cable.

On the return, however, they are on the up-grade, and there an auxiliary cable comes into play. A slight bend or turn in the track out of its regular line swings the car and grip to one side, so that the cable passes out of the side of the grip from between the jaws. The momentum of the car carries it on a few feet to the point where the auxiliary cable is running, and this cable passes into the side of the grip, the jaws of which are open to receive it. By the proper movement of the lever by the gripman the grip-jaws close on the cable, and the car is drawn around the curve. As it reaches the end of the auxiliary rope, another curve or swing in the track swings the grip away from the rope, the jaws being opened for the purpose. The momentum of the car carries it a few feet to the point where the grip may take hold of the main line cable, and continues on its way. The cars have only a space of about eight feet to travel by momentum. The distance they



SECTION OF ROAD-BED SHOWING FOUNDATION PIERS, TUBE, PATENT CAR, ETC.

accessible, so, over each one is a removable plate, which it took some ingenuity to devise, since the plate must be secure in its place, must form no obstruction to traffic, and stand heavy blows, and at the same time must be constructed so as to be taken up readily for oiling the pulley and cleaning the rope-way. The plate is twelve by sixteen inches and of flat three-eighths wrought iron. The under side, running lengthwise the center, is a channel-iron truss for the truss straps, three of which cross it. One end of this channel-iron truss projects past the plate, and dips into a recess in the cast iron frame. The other end comes flush with the plate, and a cast iron hook or dog drops or

is disengaged and it is lifted. The pulleys can then be oiled. The tube is also cleaned out through these openings. A man with a peculiarly-shaped shovel or hoe, operated through the grip-slot, pushes the dust and dirt to the opening, where it is readily removed. These plates, complete, cost about \$2 apiece.

The Depression Pulleys.

It must be remembered that in these cable roads, in addition to the carrying pulleys below, which prevent the rope sagging, there must be also pulleys provided at the crossings of upgrades to hold the traveling cable down below the surface of the street and within the

track and down the other. The grip always comes one way, and as the arm is set at an angle with the slot and partly crosses it, the grip shank must come in contact with it just at the right time and push it aside. The arm is about six feet long. This an ingenious arrangement and is at the same time both simple and effective. We have now to consider the method of

Rounding the Curves.

There are several mechanical difficulties to be met with on the curves of cable roads, especially where they have to pass around those of 90 degrees or more, with a radius now commonly used in cities with narrow streets nearly

travel on the auxiliary rope is about 120 feet.

The auxiliary cable travels four miles an hour—just half the speed of the main-line cables, and the tension of it is much less than that of the main cable, as it only has to move one car at a time around the curve, while the main cable has the strain of all the cars which are running on the various grades of the whole line. The tension being so much less, it is easy to relieve the grip from the side strain and prevent undue friction and wear in passing curves.

At proper points on the road-way are iron plates with block letters, with the words "let go," "stop," and "take rope," so that the grip-

man will know exactly where to manipulate the grip and brakes. At night the big headlights show these plates plainly.

Switch and Safety Arrangement.

Just before the curve at Valencia street is reached, the cars which are to go out this Haight street branch switch off from this main line to the right. There the Market street cable has to be dropped while the car goes around its curve in switching on to the Haight street cable, which, as before explained, is a separate rope entirely. The switch is so arranged that not only the rail but the grip-slot is set for the car as it goes around the curve. It was found that sometimes the grip-man was careless, and did not let go the cable in time, so that as the car started around the curve the cable kept carrying the grip straight ahead on this main line. The consequence of this, as might be expected, was a broken grip, and sometimes a cut cable. It would not do, therefore, to trust entirely to the gripmen at this point, and arrangements had to be made to provide some sort of safety apparatus, so in case the cable was not dropped no breakage could occur.

A switchman stands at the switch, to move the lever which throws over the guide-rail and slot-iron for turning the car off the main track. The same movement that does this also works the safety apparatus, some 30 feet away.

Connected with the switch-lever, by bell-crank, is a long shaft. On the side of this is a pin carrying a roller 6 inches in diameter and 8 inches long. This shaft is at one side of the rope tunnel or tube. The roller stands in an upright position—to one side and out of the way of the main-line cable and grip—when the Haight street switch is closed. The main line is then clear for the passage of the grip, without releasing the rope. When the switch lever is moved, however, the shaft is revolved by the same motion, throwing the roller down on top of the rope and pressing the cable down out of its straight line. The top of the roller is then lower than the bottom of the grip, so the grip is free to pass over it, provided it has released the rope.

When the car comes along, if the grip has dropped the cable, it passes on around the curve all right on to Haight street, on a slightly descending grade. In case, however, the cable has not been released by the grip, the cable draws the roller up and revolves the shaft which awings the bell-crank on the switch end of it, closes the switch, and compels the car to keep the main line. Of course then no grip can be broken, because the car keeps on the same line as the cable. The car is then stopped, backed up, and moved around the curve, where it should have gone in the first place. The fact of its having gone on down the main line is, of course, proof that the gripman neglected his duty, and several repetitions would prove his inefficiency and cause loss of position. It makes the men careful, therefore, at this point. Still, the safety arrangement always stands ready automatically to correct any such fault, or at least to prevent breakage and detention.

As the car return from Haight street to the main line they let go the Haight street cable, which passes off to the right around a guide pulley, crossing the street to the engine house. The car run by gravity around the slight curve on to the main track. Here the main Market street cable must be picked up, and an ingenious arrangement has been devised for this also.

It will be remembered that the grip is a side-hold one—that is, the cable goes in at the side to be caught by the grip. Therefore, if the rope were raised up vertically at this point it would strike against the bottom of the grip and prevent its being raised.

The rope, of course, when dropped by the grip falls into the supporting pulleys, which are below the level of the grip, so the cable must be raised until the grip can take it. The lifting arrangement or gypsy consists of a cross of inch and a half gas-pipe, one end of the head of which is hinged to each yoke of the roadhead frame. No guides are needed. The pipe projecting from the cross carries a conical roller six inches long, six inches in diameter at one end and two and a half inches at the other. A chain from the end of this pipe comes up to the surface of the street. The conductor leaves the car and pulls on the chain. This raises the pipe and roller, and the conical roller striking against the rope not only raises it, but causes it to describe a sort of half-circle, drawing it to one side so that when all the way up it slides back down the small end of the roller into the side of the grip between the jaws. It is then grasped by the grip and the car goes on down the line. This arrangement answers the purpose perfectly and is very convenient. The cost of construction was trifling.

The Turn-Tables.

At the ferry-house, foot of Market street, the cars are turned around, so the open portion

carrying the grip will be ahead. This turn-table is on the wharf, over the water, and the 10-foot pulley (or tail-sheave, as it is called), around which the cable turns is just beyond it. A slight raise in the track is made at this point, so as to give a down grade on the way back, for a short distance. (See engraving, page 45). As the car comes down the street the cable is released from the grip, by a slight bend in the track taking the car out of its line. The momentum of the car carries it on to the turn-table, which is 30 feet in diameter. There are four sets of tracks, one for the incoming car and three for the outgoing. The Valencia street car is shifted to its side-track, the Haight street car to its track, and the McAllister goes on a track prepared for it. These three outgoing tracks merge into the main line a short distance from the turn-table; but by having the three side-tracks, the cars for the respective routes may follow each other quickly. Being on a grade, the cars are readily pushed to these tracks, and run by gravity a few lengths, to where they grasp the cable running up Market street. The grip does not have to be raised while the cars are on the table or side tracks.

There are two tracks on this table, so it can be turned and transferred by them at the same time. By having the double tracks, when one car comes on and is turned around, headed for its side-track, the other pair of tracks of the turn-table is in position with relation to the main track, so the incoming car can come right on. The table has, therefore, never to be turned back. Between both tracks there is a slot and tube-way for the grip, forming a continuation of the incoming and outgoing tracks, into which the grip passes, and passes out of

tion, on Haight street, midway between Shrader and Stanyan streets, about two hundred and fifty feet before the terminus is reached. The depot is a two-story structure—ons floor only, however, having been built. Provision has been made for the second floor when required. There is a grade of three and a half feet in one hundred on this road at this point, so that the cars are run in on a Y, run by gravity from the main track to the house; and go out by gravitation, also, on the other fork of the Y to the main track again. A spacious car-house has also been constructed on the McAllister street block, opposite the engine-house, for the accommodation of the cars of that line.

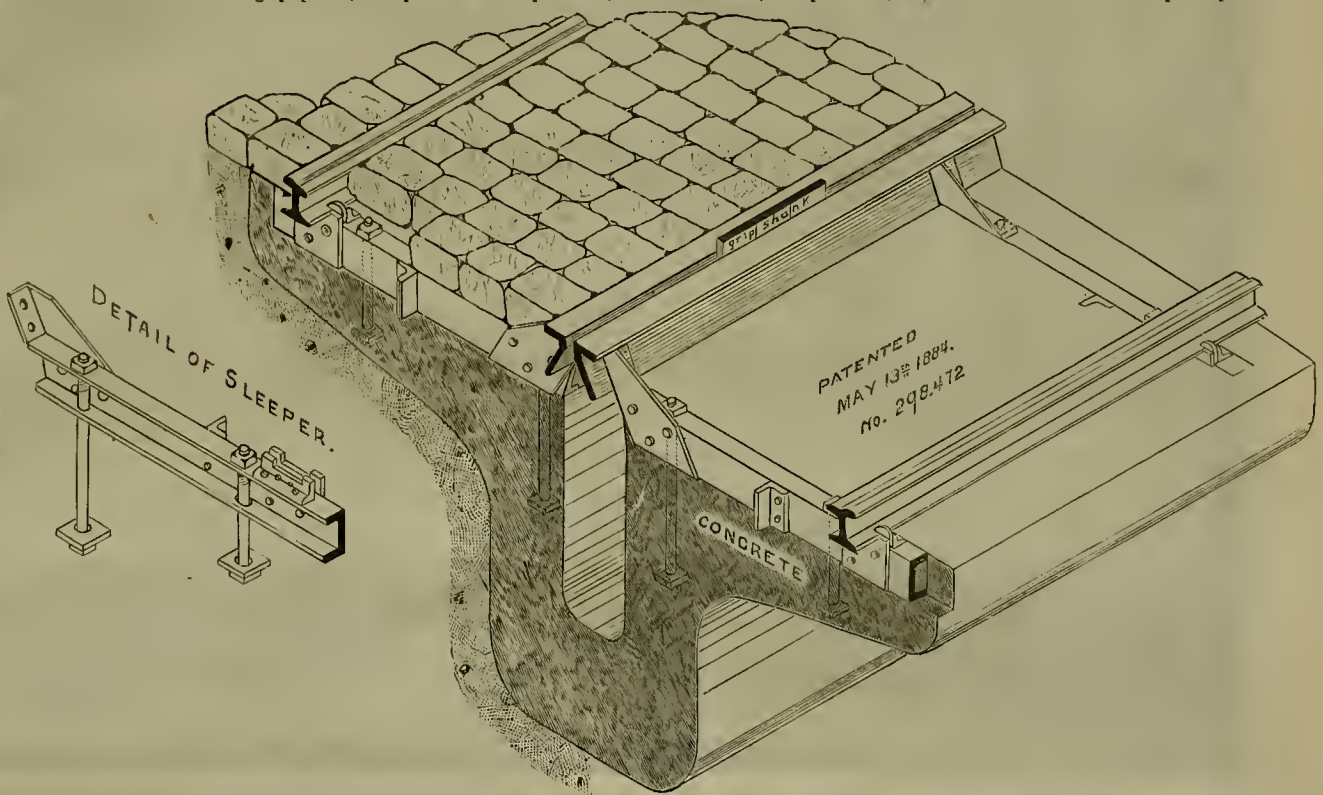
The McAllister street car house, on the opposite side of the track from the engine house, capable of holding 44 combination cars, is so constructed that a second floor may be added at any time, which will be the case at no distant day. The main body of this car house is 70x122 and there is a wing of 74x107. The Valencia street depot is built to hold 78 cars on each of the two floors. The Haight street house has room for 44 cars.

The general design of the whole road was made by Mr. Henry Root, who also designed and constructed the California street hill cable road. Many of the appliances and devices in use on the road were invented by Mr. Root; notably, the cars, grip, tension apparatus, roadbed, depression pulley, etc. All the details were arranged under his immediate supervision, and the road is operated under license from him. The road is a first-class engineering job, and superior in its details to any heretofore built. The officers are: Leland Stanford, president; Chas. F. Crocker, vice-president; N.

when the road is opened to street traffic before the concrete is properly set, or because the concrete is deficient in quantity at the bottom and sides of the tube. This occurs in spite of the heavy and expensive wrought-iron ribs used to stiffen them in cross section. Hence, the natural inference arises that the tube and slot are really held in shape, not by the ribs, but by the concrete. An examination of the ribs would indicate this without the observed facts, as the ribs are weakest at the bottom, where they should be strongest. Further, these ribs are not only an unnecessary expense, but they really weaken the roadbed by cutting the concrete up into slices of three to four feet lengths.

The above considerations form the basis of the "Isaacs method of construction." By dispensing with ribs the tube can be built much more cheaply and expeditiously. The ironwork used in the roadbed is only in the upper surface of the concrete, and consists of short sleepers, to one end of which are riveted gussets or angle plates, and to the other the attachments for holding the rails. Near the center a key piece is riveted for holding the sleeper firmly in the direction of its length. The gussets hold the slot irons rigidly in place, and keep the slot from opening or closing. The gusset is shaped so that the thin way comes in a joint of the paving, is kept low, and cut angling so that it cannot be struck by wagon wheels as the paving wears. As an additional security the sleepers are anchored in the roadbed with stout bolts, which are riveted over the nuts after the concrete is set.

By adopting the section of tube shown in the cut, acute angles in the concrete are avoided, which renders it much less apt to spall off and



J. D. ISAACS' PATENT CABLE ROADBED.

T. Smith, treasurer; J. L. Willcutt, secretary; Henry Root, engineer and superintendent of construction; H. D. Morton, general superintendent.

The Isaacs Method of Building Cable Roadbeds.

The object of this article is to introduce to the reader what is considered to be a greatly improved and at the same time very economical system of building the roadbed or tube of cable roads. The foremost consideration in a cable road is the tube. It has always been the object of cable road builders to so construct this that it shall be permanent in character, reasonable in cost, and so that the grip slot shall neither close nor open under any circumstances, but remain as first constructed. Doubtless the faulty construction of the Philadelphia tube, and the consequent closing of the grip slot, has deterred many companies from putting in a cable road. The inventor of the Isaacs method claims to have accomplished all objects essential to a good and cheap cable road tube, as will appear in the context.

The objections to the use of cast-iron ribs or yokes and wooden lagging to fill in between are many. The yokes are constantly broken under ordinary street traffic. The joints in the wood-work allow sand and dirt to sift into the tube. The wood decays so rapidly as to require renewal in about four years. The cost of keeping the roadbed in repair and the paving up to grade is very heavy. These objections seem to dispose of the use of cast-iron or wood for cable roadbeds, leaving only the combined wrought-iron and concrete to be considered.

Tubes heretofore built of concrete have given more or less trouble from closing of the slot

fall into the tube—a matter which has given some trouble in other tubes—and which also furnishes a firm support to all the paving blocks without the makeshift of a piece of boiler plate under those next the slot irons, to keep them from tumbling into the tube. In other concrete tubes the molds used have been in short sections, troublesome to keep in place and difficult to get out of the molded tube. By a method devised for this system the tube molds are made in long pieces, and are so constructed as to come apart and be pulled up through the slot, before the slot irons are finally fastened to the gussets. All iron used is of such section that it can be rolled by any rolling mill in the United States.

If it should be necessary to dig under this tube for water, gas or sewer pipes, the tube, from its shape, forms a strong self-supporting girder capable of carrying its load for a considerable span without giving way. When it is necessary to support the tube with piling in made ground it is also a strong shape for that purpose.

Guide pulleys for carrying the rope (not shown in the cut) rest in cast or wrought iron frames held in recesses molded in the sides of the tube. These are placed at proper intervals, and so arranged as to be perfectly accessible from manholes for oiling the bearings or removing the pulleys.

It is claimed that the cost of this mode of construction is from one-third to one-half that of other first-class tubes, and much less than cast-iron combined with wood or wrought-iron combined with boiler-plate, and is, when finished, an unperishable piece of work which will neither deteriorate with time nor disintegrate under traffic or changes of temperature. Those desirous of further information or details may obtain them by addressing E. H. Marwedel, 541 Market street, San Francisco, Cal.

The Park and Ocean Railroad.

One of the most important results following the building of the Market Street Cable Railway with its branches running out Haight and McAllister streets, has been in making accessible the Golden Gate Park and the ocean beach. Before these roads were built only the rich were able to use the park, but now for five cents people are landed at the park gates by either line. The public has since taken greater interest in Park matters, and the park itself has been greatly improved. There are now 100 visitors where there was formerly one.

What was formerly a barren waste of sandy dunes has been converted into a beautiful resort, with smooth, broad drives, secluded nooks, pleasant walking paths, etc. The plants and flowers, brought from all climes, thrive wonderfully and are the admiration of all visitors. The magnificent conservatory with its wealth of

the originators of the Market Street Cable Railway Company. It runs from the Park direct to the beach and is one of the most popular lines of travel on the Coast. The cars are large and exceptionally well lighted and ventilated. They are on low trucks, but are as wide and long as an ordinary passenger coach on the overland roads. The seats are arranged similar to those in passenger coaches, and there is plenty of room for each passenger. There is no appearance of a street car about these vehicles at all. The windows extend to the top and are wide so that all can have a fine view in every direction.

Powerful steam dummies draw these cars at a rapid rate over a smooth and well-built road, with the rolling brown sand-dunes on one side of the track and the beauties of the park on the other. The line runs parallel with the edge of the park to the ocean. It then turns to the right and passes along the upper edge of the ocean beach until it reaches the foot of the bluff near the well-known Cliff House.

Along this part of the line a magnificent view is unfolded. The foaming breakers form a long white fringe for miles to the blue ocean spread

the waters around are filled with these curious beings, who drown the sound of the surf with their hoarse cries. Visitors never tire of watching their gambols. On the hill back of the Cliff House many improvements are being made and pleasure resorts are being arranged.

Thousands and thousands of people visit the seaside now weekly, but the railroad arrangements are such that the crowds are easily accommodated. At each end of the line are well-built and convenient depots, and the incoming and outgoing people are kept entirely separate. The tickets are purchased as the depot is entered, and on passing through a door the tickets are each deposited in a box, so there is no further care on the part of the passenger. Everything is clean and roomy, and the arrangements are such that the comfort and convenience of the passengers are carefully looked after.

The Cable System Abroad.

Thus far the cable system of transporting street cars has not been extensively adopted

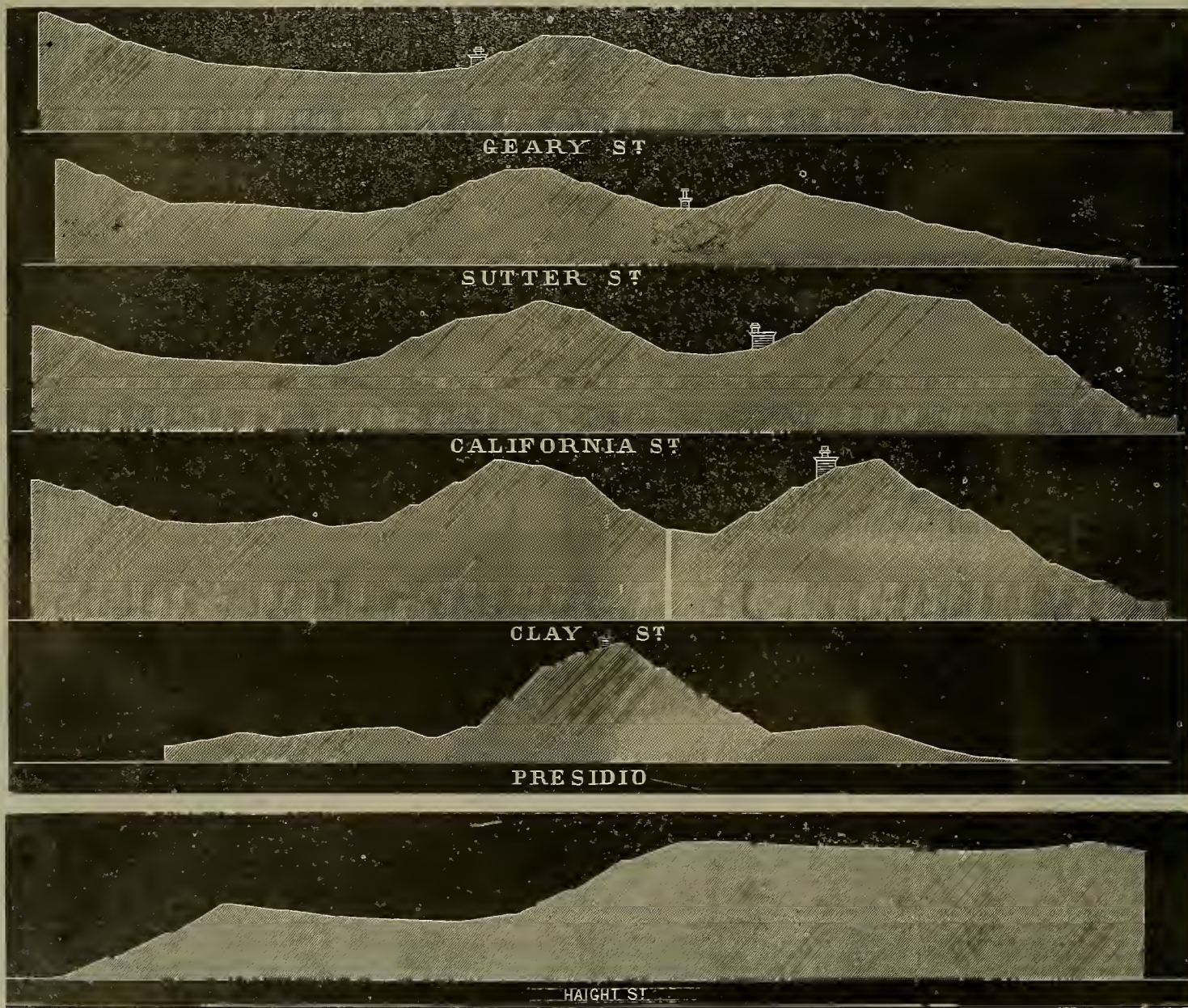
the tube the length of the curve. The engine is placed at the top of the hill.

An extensive system, covering some forty miles of street, is now under construction in Melbourne. The city issued \$5,000,000 of 4 per cent bonds for the construction of this system, which has been leased to the Omnibus Company for 6 per cent upon the cost, the city fixing the fare at 6 cents between any two given points. This will be the most extensive system of cable railway ever constructed, and great care is being taken to make it as perfect as possible. An engineer was sent to San Francisco, who examined carefully all of the cable roads of this city, and who will take advantage of the experience of the construction of the roads here.

A double track road two miles in length is also being constructed in Sydney.

These Australian roads are being built under the Hallidie patents, which were taken out in that colony.

The city of Edinburgh has already entered into a contract for the construction of cable lines there. The city of Glasgow is negotiating for a similar construction there. In Liverpool they are about to change their gauge from 4



PROFILES OF LINES OF CABLE RAILWAYS IN SAN FRANCISCO.

plant life one never tires of visiting. The lawns are smooth and well trimmed, and trees planted in every direction shelter the place from summer winds so that the old resident can hardly believe that such a spot could be so near the city.

Summer-houses, rustic seats and other conveniences have been constructed, and the Park has been beautified by fountains, statuary and other embellishments until it is now a place that San Franciscans can be proud of. On certain days a fine hand discourses choice music for the multitude of visitors. Before the cable railways were built only those who had carriages could conveniently visit the Park, while under present circumstances it is accessible to all.

Perhaps even a greater result has been attained by the same means. While San Francisco is a sea-port town, it is on the bay shore some eight or ten miles from the ocean itself, and thousands of its citizens never had a chance to see the breaking of the Pacific surf until after the completion of the cable roads. When the Haight street line was finished to the Park it became possible to reach the ocean beach in a few minutes by means of a connecting line, and at an expense of five cents more.

This connecting line is called the Park and Ocean Railroad, and was projected and built by

out before the observer, and off in the distance are the ships and steamers coming to and going from the Golden Gate, rolling and tossing on the great waves of the bay. Way off to the northwest are the rocky shores of Marin county, on which the mighty surf of the Pacific is thundering. Point Reyes and Point Bonita, where the light-houses shine out at night, are within ranges of vision and all along the Coast between there are seen the white sails of the fishermen, who frequent those waters.

As the car rolls smoothly on groups of pleasure seekers are seen wandering along the beach, enjoying the ocean breezes and the freedom of their surroundings. The unceasing surf thunders its welcome, as it breaks in foam on the bleached sand and runs far up the beach until its energy is expended. Close by is the United States Life Saving station, where the large surf-boat is an object of curiosity to all.

At the end of the line is a handsome station, largely enclosed in glass and clustered around it are hotels, restaurants, a gravity railroad, and various places of amusement for visitors. A short walk brings one to the foot of the cliff, and a few hundred yards further is the famous Cliff House, from which point a magnificent view is obtained. Close by are the well-known Seal Rocks covered with seals basking in the sunshine, while

abroad, though it has been tried in a few places. The Highgate road in London is about 1½ miles long, and was rather difficult to build. Part of it is a single track, on a very narrow road, and part is a double track. The line is on a very uneven grade, and is tortuous, having several curves in it. This road was built from designs prepared in San Francisco.

The Koslyn tramway, in the city of Dunedin, New Zealand, is a cable railroad, 3' 6" gauge, single track, with turnouts. It is 3,500 feet long, and ascends 500 feet in that distance. It has two curves, both on grades.

This road has been operating about five years, under the patents granted to Mr. A. S. Hallidie in the colony of New Zealand.

The peculiar features of this road are:

1. Single track line, with two turnouts or sidings, both parts of the rope running in opposite directions in one tube, except at the turnouts.

2. Two curves of 215 feet radius, forming an S.

3. Absence of level crossings, thus requiring stoppages to be made on the grades.

At the curves, horizontal rope sheaves are placed in the tube, and the shank of the gripper is provided with a roller, which rests against a rail placed parallel to the track and slot inside

feet 8½ inches to 3 feet 6 inches, and they propose at the same time to change their system and put down the cable system. Other cities, Sheffield, Manchester and others, are moving in the same direction. A franchise has also been granted to the Cable Tramways Company to build underground railways in London, and to connect those now operated by steam by the cable system underground. The present system of operating the underground railways is by steam motors, and the result is that the tunnel is filled with gases, and while the people are compelled in order to save time to employ that mode of transportation they would not adopt it from choice, because it by no means adds to their health. It is now proposed there to introduce the cable system, and to run the cars at about eleven miles an hour, including stops, which is about the speed on the New York elevated railroad, and about equal to the present speed of the several subways in London. That will remove all objections to the underground road in respect to gases, foul air, ventilation, etc. If that is applicable to subways it is equally applicable to elevated roads. It is intended to expend on this conversion in the subways of London somewhere from £7,000,000 to £10,000,000 sterling.

The Sutter Street Railroad.

The cable system of operating the Sutter street railroad in this city was introduced on the section from Sansome to Larkin streets in January, 1877.

The Larkin street section from Sutter to Hayes streets was built and operated the latter part of 1878.

The Sutter street line was extended from Larkin street westerly to Central avenue in October, 1879.

From January, 1877, to December, 1883, the road was operated by two plants of machinery; one located at the corner of Bush and Larkin, operating Sutter street from Sansome to Buchanan street, and Larkin street from Sutter to Hayes. The second plant was located at Sutter street and Central avenue, and operated the line on Sutter street from Buchanan street to Central avenue.

The track is about five and a half miles of double line, of which some three and a half miles is operated by cable.

In 1883 it became apparent that the proper operation of the line demanded better motive

operate its uncabled portion of the road.

Its cross town road, at right angles with the Sutter street line, and the system of transfers employed, gives a vast scope of territory for feeding the general carrying trade, and promises with contemplated extensions of cable plants to place the company in the foremost ranks of street car operations.

Its machinery is ample and six boilers are in readiness to supply steam to the engines now in use, while the foundations are laid for the reception of additional engines at any time. The draft of furnaces is superior, the tall chimney of 165 feet from the sidewalk being of a style to promote combustion, and insure fires of intense power. The water injected into the boilers is nearly at boiling point, and this is accomplished entirely by the utilization of exhaust steam, thereby promoting economy and efficiency. Its fire room is as cool as the main office of the company, being well ventilated and kept at a low temperature. The line new engines which furnish power on this road were made in this city by the Union Iron Works.

SAN FRANCISCO THE FIRST.—A good many ideas of wire-rope transportation for city streets had been advanced from time to time, and the systems patented; but none of them were put

New York's Mistake.

We notice by the New York papers that the horse railroad people have finally succeeded in securing control of that great thoroughfare, Broadway, and have the horse cars already running. These cars, although running under about one minute's headway, are packed with passengers, as many as 125 deposited on one car. This means poor accommodation for the public and death to horses.

How much better would have been a cable road such as we have on the principal streets of this city. The grip and passenger car would take up no more room than the horses and car of the ordinary road, and would carry three times the number of passengers. The cable car is handled with greater ease in a crowded street than a horse car, running slow or fast as may be desired, and can be stopped almost instantly. With all of these advantages, besides being operated at from 30 to 40 per cent less than horse cars, it appears very strange that this successful mode of carrying passengers should not have had preference over the old horse car system which is being rapidly abandoned here. It is claimed that the horse car makes less noise than

and the rope is deflected by means of two 8 feet diameter horizontal pulleys. The streets descend from both directions towards the curve, and about 30 feet before reaching the curve the grip is opened and released from the rope, the car and dummy are carried around by gravitation, and the rope is picked up again after passing the curve. This road has the steepest grades of any in the city.

The Geary Street Cable Road.

This cable railroad is built very much like the Sutter street, but the line is straight from end to end; that is, it has no curves. No depression shaves are used on this road to keep the cable down, as the angles at changes of grade are very slight.

The Geary street railroad runs over a comparatively level street, and through the most central and populous streets of the city. It was completed and commenced running March, 1880.

The gauge of the road is 5 feet and its length is 13,200 feet of double track, in which distance it passes over two elevations, 350 and 280 feet above sea respectively, and attains a third



CARS AND DUMMIES OF THE SUTTER STREET CABLE RAILWAY.

power, and the company, at great cost, purchased the 50-vara lot situated at the southeast corner of Sutter and Polk streets, and prepared the same for occupation, by excavating a large basement for machinery some 14 feet below the surface, and erecting a brick building covering the entire ground, and three stories high, amply sufficient in all respects to meet the requirements of future business for a life time to come.

There are 40 cars in use. The car seats 18 and the dummy 18 more. The engraving shows their general appearance. The gauge of the track is five feet, and cable crosses two of the main thoroughfares of the city—Kearny and Montgomery streets. Their main cable line is on Sutter street, and is 13,291 feet long. A branch cable road runs at right angles to this on Larkin street. This latter road runs across two other cable roads, viz., the California Street and Geary Street Railroad Company.

The gripping attachment used by this company is somewhat different in construction from that on Clay street, although involving the same principles. The motion of the gripping jaws is vertical instead of horizontal, and it takes and releases the rope sideways, instead of beneath, as with Clay street; and in order to run on to or off from the rope at the termini of the cable road, the track and slot diverge from or converge to the line of the rope. Levers are used for operating the jaws instead of the screw. The differences in this road and other cable roads in this city are noted in the article on "Cable Railway Propulsion" in other columns of this issue.

The company repair, construct, paint and equip its own rolling stock. Besides the cable power employed, it requires some 140 horses to

to practical and successful work until the Clay-street hill road was first operated in this city in 1873. Since that time there have been built here, on the cable system, the Sutter street, Geary street, California street, Presidio, Market, Haight and McAllister street roads. The system has also been introduced in Chicago, Philadelphia, New York, London and Dunedin, N. Z. As each successive road has been built, improvements in details on the general system have suggested themselves and been adopted. On some roads the conditions have been different from others, and these peculiarities necessitated greater or less modifications, according to their nature. Being a comparatively new field of engineering, there was, of course, much scope for inventive ingenuity, of which practical men have availed themselves. Inexperienced persons, too, have conceived ideas about cable roads, many of them quite startling in their nature. In fact, numerous patents which have been granted will be of very little use from their impracticability. At the same time improvements in detail to simplify and perfect have been made and adopted, so that now many of the obstacles and difficulties first met with have been removed.

THE Tacoma Coal Company has found by tests made by several blacksmiths that they have a vein of coal which compares favorably with the Cumberland blacksmith coal. All blacksmith coal is brought from Pennsylvania, and commands a big price.

The pay-rolls of the Comstock mines during the month of June was \$12,000 in excess of the amount paid in May.

the rumbling omnibus. With the cable car even less noise is made, and the clatter of the horses' hoofs would have been avoided. In addition to this the cable car would have been an advantage in a sanitary point of view, as the street would have been clear of the voiding of two or three hundred horses. The horse car as a rule is splattered with mud from the horses' feet, while the cable car is always clean and inviting.

The Presidio and Ferries Cable Road.

The ride over this road is a very pleasant one. When that portion of it near North Beach is reached there is a fine view of the bay, and after reaching the summit of the hill and starting down the hill a scenic panorama unfolds itself. One may see the Golden Gate and far beyond to the ocean horizon. Many persons ride frequently on this road for the view alone.

The Presidio and Ferries Cable railroad has a 5-foot gauge; 10,000 feet of double track. It ascends one hill 246 feet above its initial point in a distance of 5,000 feet. The engine is located on the summit of the hill, about midway between the termini, and about 700 feet from which is a very heavy grade of 78 feet in 412, or 1 in 5.3. The road is built very substantially, with cast iron sections or yokes, connected by rolled channel iron and sheet iron.

The grip is the same as the one used on Clay street, although made heavier to conform to the heavier grades and rolling stock.

There is a curve at the intersection of two streets, about 2,600 feet from the starting point,

elevation at its west terminus of 224 feet above sea, its starting point in the city being 35 feet above base and the two intermediate valleys being 160 and 154 feet respectively.

The tube is constructed of cast-iron sections and covered by concrete. The space inside the tube is much less than any other of the roads. The grip is worked by levers. It is vertical in its motion and takes the rope from above, the gripping jaws being immediately under the slot, as is also the rope, which is thus exposed to the falling water, dirt, etc., which the other roads avoid by having the gripping jaws and rope sufficiently off on one side of the slot to escape falling particles.

THE rope on the tube in cable roads is carried on freely-running supporting pulleys and especially constructed depression pulleys are used for holding the ropes down at the cross streets, on grades where the angle changes. The rope is run at a speed of from five to eight miles per hour, and the cars run at equal speed on a level or up or down the hills.

RICH placers have been known to exist from time immemorial in the Soledad Canyon, Monterey county, but until recently very little has been done to develop them. Now dry-washing is being done extensively on the Happy Thought mine, near Alpine Station, with flattering results. The average yield is an ounce of gold to the ton.

A PIECE of quartz gold weighing twenty-four ounces in gold was sold in San Andreas, Calaveras county, last week.

The Rasmussen System.

One of the ingenious devices for adapting propulsion by an endless wire rope to passenger travel is the invention of Mr. Charles W. Rasmussen, of Chicago, whose patents are now owned by the United States Cable Railway Company of Chicago.

There is no grip, consequently there is no need of "dummies" or "grip cars." The cable does not run over fixed pulleys, but is carried along by small trucks, to the axes of which it is firmly clamped, there being a pair of trucks to every sixteen feet of cable. These trucks run on rails that are rolled or spiked on to the lower plate of a rolled iron tube. This tube consists of three pieces of iron, rolled according to pattern, two being angle iron, forming the sides and bolted on to a bottom plate, a five-eighth inch slot being left in the top, the whole forming a tube 6 inches wide by 9 inches deep, which carries the cable and trucks. This tube is firmly bolted on to the ties of an ordinary horse-car line between the rails, and thus necessitating an excavation of only 9x6 inches instead of the usual trenches of 5 feet by 4 feet, and during the time occupied in setting a tube between the rails the traffic is not impeded with the tubing on this ground (that is strung along the line as you would water or gas-pipes). It is estimated that with fair laborers a mile a day can be laid.

By avoiding the necessity of digging the large trenches a great saving in first cost is made, and any line now operated by horses can be converted into a cable road without stopping the usual travel. In the construction of an entirely new line any style of roadbed foundation can be used.

Any ordinary horse-car can be easily converted into a cable-car by merely attaching thereto, under the body of the car and to the supports of its trucks, two revolving drums, one at either end, over which moves a flat endless chain, just 48 feet in length. Fastened to this chain are three stout arms or pins, just 16 feet the one from this other, and so arranged that there is always one pin in the slot of the tube, and immediately in front of and touching the axle of one of the small trucks. The whole is controlled by the driver or operator, who works an ordinary car-brake on the front platform. A turn to the right stops the car; a turn to the left starts it. The action of the revolving drums is such that the car can be started or stopped very gradually, or can be run at any desired rate of speed up to the full speed of the cable. When the brake is turned so as to release the drums and allow them to revolve, the car will stop, and so long as the car is still the drums continue to revolve, but as pressure is put on to the drums, and as they gradually cease to revolve, the car gradually commences to move. Should an obstruction occur on the line and the cars become backed, they can, as soon as the obstruction may have been removed, start the first car off at full speed, the next at a lesser speed, and so on until all the cars shall have assumed their regular distances apart.

Should a fire hose be across the track these cars will be able to pass over it by the same bridge as now used by horse cars, the grip not being in the way, as there is none. Furthermore, should the obstruction be of a nature to continue for hours or all day, as sometimes happens when a house is being moved, the cars coming from either end of the line will run up to the obstruction and be switched from the up to the down track and from the down to the up track by means of small portable turn-tables, such as are on hand in all car houses, the passengers in the meantime walking around the obstruction, where they will find a car ready to carry them on.

Corners are turned by means of an auxiliary cable which derives its motion from the direct cable, transmitted by a system of drums working on bevelled cogs. At the engine house the cable with its attached trucks goes in and around the usual system of drums and back to the street, the drums being grooved so as to allow the trucks to fit snugly, and as every truck enters the engine house it is automatically oiled before it goes back to the street.

The tube is kept clean by means of scrapers and brushes attached to the trucks at regular intervals, which carry dirt and slush to openings where solids are deposited in a catchment basin and fluids go into the sewer. These catchment basins are 300 feet or more apart and easily cleaned.

As a long description in detail without the assistance of diagrams would be tedious and unsatisfactory reading, we will defer that until a future time, when diagrams will be used.

Some of the advantages claimed by the inventor for this system of cable roads over all others, are:

The existing track is available throughout, no change being necessary.

No interference with public traffic, and no loss of revenue is caused during construction.

The sewer, gas or water pipes are in no instance disturbed.

Only one manhole for each 300 feet of double track is used, and there are placed between the up and down tracks where there is the least traffic.

No extra grip cars or dummies are required.

The operator stands on the front platform, enabling him to see passengers and avoid accidents.

One hand-wheel operates both grip and brakes.

The cable is always in direct line, and there is no downward strain on the car.

No watchmen are required at sections; the car connects and disconnects automatically.

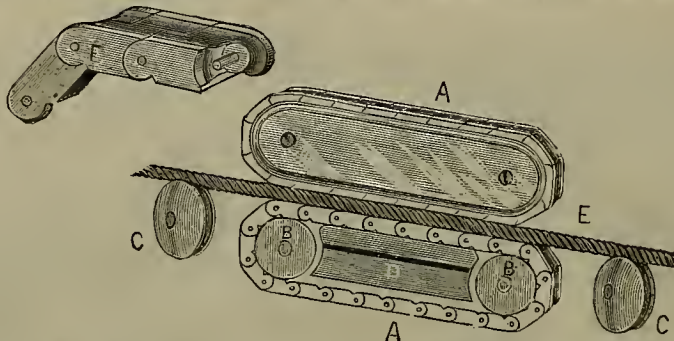
The cable is not gripped and will not get stranded, and will last seven or eight years instead of seven months.

The cable receives no extra wear from either starting, stopping or by the car traveling at a less rate of speed than the cable.

Any man who can turn an ordinary hand-wheel is sufficiently skilled to run the cars.

Taylor's Endless Chain Grip for Cable Roads.

The engraving given herewith shows a new style of grip for cable railroads (now becoming so popular), which is ingenious and simple in construction. Various styles of grips have been invented and described in these columns. Several modifications have been tried of the so-called solid grip, which is simply an iron vice,



TAYLOR'S ENDLESS CHAIN GRIP FOR RAILROADS AND OTHER PURPOSES

with one jaw upon one side of the continuously moving cable, the other jaw upon the other side, with each jaw having a semi-circular groove, the jaws made to approach and recede from the cable, for the purpose of stopping and starting the car.

Roller grips have been tried and abandoned, because the contact of the grooved rollers is so small upon the rope, that so great pressure is required to prevent slipping, that the cable is soon injured. The effect of the roller grip upon the cable is like the rolling of round bar iron between grooved rollers. The solid grips have been made of iron and other metals, and even with wood linings; and this style of grip is about the only one in use now, for want of something better.

This ingenious grip which is here described was invented by Mr. H. R. Taylor, of this city, and is specially designed to prevent the

wear of the cable by transferring the wear (consequent upon a continuously moving body being made to move or overcome the inertia of a body at rest), to certain parts of the grip, which parts can be quickly and cheaply replaced. The cut does not need much explanation. This cable is shown at E. The wheels B are enveloped by an endless chain A. The links and chain are square. The inner flat-edge runs upon the rollers B, which of course are turned flat to receive them. The outer portion of the chain conforms to the circle of a section of the cable; and the chains, one above and one below, or one at each side, always move with the cable when in contact with it. Between the rollers B, and at the back of the chains are placed lugs D, which by the mechanism that opens and shuts the grip, are made to press the chains upon opposite sides of the cable, and at this point or upon the surface of the lug and inner side of the chain is the friction and wear. The chain and lugs are cheaply replaced, and the expensive cables allowed to move and run for a great while unharmed.

The further advantage of this style of grip is

nearly to their outer edges, are covered with iron plates to keep out sand and dirt. One of the iron plates is removed from lower half of the drawing to better illustrate where the friction and wear is.

Mr. Taylor invented this and secured letters patent in 1876; also in the last year in this country and England. It has been examined and admired by many engineers and mechanics and scientific gentlemen.

The question might be asked: Why has not this grip, for which so much is claimed, been in use here long since? Mr. Taylor answers this as follows: "A ready answer can be found in the fact that every engineer here and at the East, who has built a cable railroad, has a grip of his own, which he desires to bring to a practical use, to the exclusion of others."

The time is at hand when cable railroad companies are looking for some device which will prevent the enormous wear upon the expensive cables. This grip can also be used to advantage as a brake to a mining cable, such as hoisting works for mines, etc. A model of Mr. Taylor's grip can be seen at his office, 120 Market street.

A PROPOSED CABLE ROAD.—A meeting of the Church-street Improvement Association, of this city, was held this week. In a stirring speech upon the progress of the club, and the many improvements recently made along this line of Church street, J. J. White moved that the Club, in order to facilitate the building of a cable road over the street, depend no longer upon the hope of interesting capitalists or any railroad company, but take the initial step by organizing as a company, and after grading the street build the road with its own capital. The suggestion was received with great favor, and the resolution was passed unanimously. The speaker stated that there were nearly 200 members in the Club, and all being property-owners, if they handed themselves together they could build and run their own road. This would be more advantageous to the Church-street people than if the road was built by outside capital. In conclusion, Mr. White urged that no time be lost in this consummation of the project. This was in accord with the sentiment of the association, and it was decided that at the next meeting active steps would be taken to organize and go to work.

The saving effected by the employment of the cable system in Chicago is from thirty to fifty per cent. on that of horse roads, while its capacity for traffic is almost unlimited. The speed at which the cars travel is from 6 to 10 miles per hour.

Another line called the Mornington has recently been built in Dunedin, N. Z. It is one mile and a half long, and is constructed under the Hallidie patents.

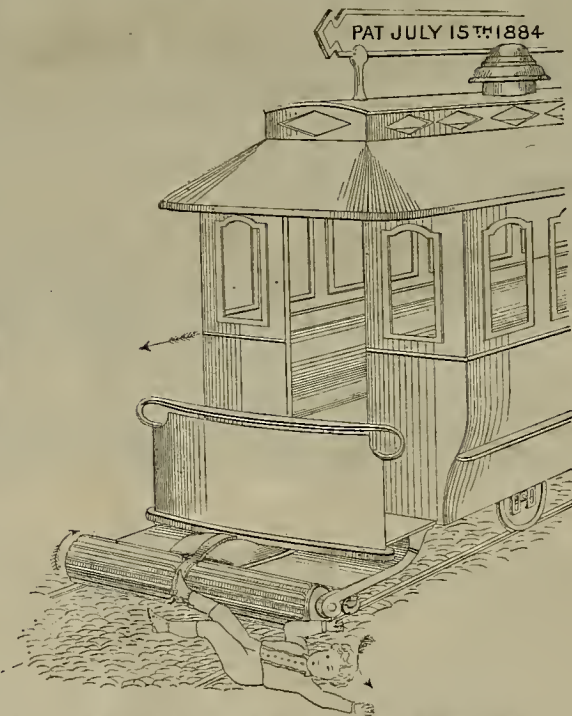


Fig. 1.—Peterson's Rotary Safety Guard for Street Cars.

Peterson's Safety Guard for Cars.

The object of this invention of Mr. L. Peterson, of 258 Market street in this city, is to prevent such accidents as are of frequent occurrence in cities, occasioned by persons being killed or injured by street cars.

Fig. 1 is a perspective view of the invention, in which the roller extends across the front of the car, or in the case of cable roads it would be attached to the front of the dummy. The roller shown in this view is made with plain corrugations extending lengthwise of the roller, the corrugations being

formed by putting on strips of rubber to act as cushions or fenders.

Fig. 2 shows a modification of the invention—the rollers being placed in an angular position in the manner of a cow-catcher—so that any object with which they come in contact will not only be brushed forward by the rotation of the rollers, so that it cannot get under the car wheels, but will also be forced to one side or the other out of the way. The meeting ends of these two rollers are supported on a frame; under the forward point of this frame is a small wheel which rests or rolls upon the roadbed, or upon the slotted iron rail when the attachment is made to cable cars. These rollers are shown on a dummy, such as is used on cable roads.

In this view is also shown a modification of the

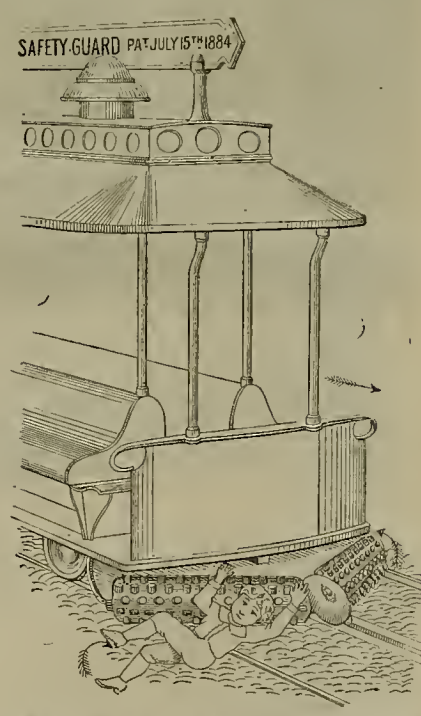


Fig. 2.—Peterson's Guard for Cable Dummies.

surface of the rollers, which consists in rows of rubber plugs or buffers inserted in the rollers, and projecting sufficiently for the purpose required.

These guards may be so constructed as to adjust themselves automatically to any inequality in the roadbed, and so maintain their proper distance from the track, which is usually from one to three inches.

The rollers do not touch the roadbed, but run close to it. They are adapted for either horse or cable cars.

The guards are driven by gearing chain or cable from the forward axle, and are rotated in the opposite direction to the car wheels, or as indicated by the arrows in Figs. 1 and 2.

Any further information may be had by addressing the inventor at the address given above.

PACIFIC CONSTRUCTION COMPANY, CONTRACTORS FOR STREET RAILWAYS, BRIDGES, AND STREET CABLE RAILROADS.

J. M. THOMPSON, President.

S. O. BROWN, Superintendent.

No. 45 Fremont Street, San Francisco.

**J. M. THOMPSON, Special Agent**

A. S. HALLIDIE'S Patent

ELEVATED ENDLESS WIRE ROPEWAY

For Transportation of ORE, WOOD, LUMBER, and other material over any description
of MOUNTAINOUS COUNTRY.

No. 45 FREMONT STREET,

SAN FRANCISCO, CAL.



GENERAL VIEW OF ROPEWAY-ORE TRANSPORTATION.

The Chicago Cable Road.

The most successful of the cable roads built East of the Rocky mountains is that in Chicago. It is 10½ miles long, with a double track, 5-foot gauge, and runs on very busy streets, which are almost a dead level.

The climate of Chicago is one of extremes, the thermometer reaching 90 degrees in summer and zero-Fahrenheit in winter, and snow falls very heavily.

The tube in which the rope runs is made much deeper than in San Francisco, being over four feet in depth, and the rope is placed about 30 inches above the bottom of the tube, thus allowing for a certain accumulation of light snow which might drift in through the narrow slit in the top of the tube, but at the depth of four feet there is usually natural warmth enough to prevent any material freezing.

The foundation for the roadbed and tube was quite soft and yielding, and consequently needed a broad base of concrete to sustain the superstructure, hence the expense of construction was quite heavy.

The rope, which is four inches in circumference, is made of steel wire, and has six strands of 16 wires. All the driving and angle pulleys

not a trip has been lost from snow or ice. The following letter from the president of the Chicago City Railroad Company shows the experience there in winter:

CHICAGO, March 9, 1883.

Mr. Chas. H. Phelps, 206 Broadway, N. Y.
—DEAR SIR: Your favor of the 6th inst. at hand. You ask regarding the operation of our cable railway system during the winter, and I am pleased to assure you that we have run smoothly and without the loss of a single trip during the entire winter.

The frost has penetrated the ground, by actual measurement, five feet six inches, and we have had heavy snow and hard rains, with intense cold immediately after it, the mercury dropping to 29° below zero.

Our construction has not been affected a particle so far as we have been able to discover, and the most skeptical now confess the system a success. When our lines operated by horses were blockaded by heavy storms, our cable lines were doing full service and at full speed.

Very truly yours, C. B. HOLMES,
Pres. and Sup't Chicago City Railway Co.

In a discussion on Mr. Hanscom's paper before the Technical Society, Mr. G. W. Dickie said that the power required for moving the cable depends to a great extent on the con-

The National Cable Railway Co.

A company has been organized under the laws of the State of New York with a capital of \$2,500,000, in 50,000 shares. The National Cable Railway Company was organized for the purpose of introducing throughout the United States the system of Cable Railways, matured by Mr. A. S. Hallidie, as operated in the cities of San Francisco and Chicago, and is the exclusive owner of the following United States Letters Patent, to wit:

No. 100,140.....	Feb. 22, 1870
127,690.....	June 11, 1872
163,855.....	June 1, 1875
170,136.....	April 18, 1876
179,016.....	June 20, 1876
179,786.....	July 11, 1876
181,817.....	Sept. 5, 1876
182,663.....	Sept. 26, 1876
183,928.....	Oct. 31, 1876
183,929.....	Oct. 31, 1876
184,624.....	Nov. 21, 1876
195,372.....	Sept. 18, 1877
195,504.....	Sept. 25, 1877
195,505.....	Sept. 25, 1877
Reissue No. 7,339.....	Oct. 16, 1876
7,807.....	April 17, 1877

The foregoing include all the original patents granted to Mr. A. S. Hallidie.

These patents have been twice broadly sustained in the United States Circuit Court as

The New Road in Los Angeles.

The first city in California, outside of San Francisco, to adopt the cable system of street-car propulsion is Los Angeles, where a road is now in course of construction and will be finished in a few weeks. It is being built by the Second Street Cable R. R. Company, and is one mile and a half long.

It is peculiar in having a single track road with turnouts, and runs from the intersection of Spring and Second, over Second to Lake Shore avenue, and over Lake Shore avenue to Diamond, thence over Diamond to the junction of Texas and Diamond. The engine house is located about midway. A Corliss engine 14 by 30 is used, built by Savage, Son & Co., of San Francisco; the rest of the machinery was built by the Union Iron Works, of San Francisco. The cars and dummies were built by A. F. Knorp of San Francisco. The wire rope is what is known as three-inch flexible, crucible steel, manufactured by the California Wire Works, also of San Francisco. Work was commenced about the 15th of April and the road will be completed the 15th of August. The tube is similar to the one used on the Clay street road. The gauge is 3 feet 6 inches.

In operating this road, where turnouts are



DUMMY AND CAR ON THE CHICAGO CABLE RAILROAD.

are 12 feet in diameter. The engines at this time in use are two in number of the "Wheelock" pattern; cylinder, 24" diameter by 48" stroke. Two other engines are ready for use as other cable lines in course of construction are completed. The boilers are in 4 sets of 2 each of what are known as the Babcock & Wilcox pattern.

The town end rope is run at 8 miles per hour; the suburban end at 9 miles. At the town terminus a second rope is employed, which is driven by a 6-foot pulley, placed on the same shaft as the 12-foot terminal pulley of the main cable, and consequently travels at one-half the speed of the latter, and carries the dummy and cars around a square, making a return by way of Madison street, Wabash avenue and Lake street to State street, passing around four corners.

The increase of passenger traffic has been so great that one dummy generally hauls two cars, and frequently three, carrying as high as 250 passengers in the train, and 100,000 passengers are sometimes carried in a day. The engraving on this page shows the appearance of the cars and dummy on the Chicago road.

It has been objected to the cable system that it cannot be worked in winter on account of snow and ice. The working of the Chicago cable roads has demonstrated, however, that the cable is the only system which will clean the snow from the track where all others failed. With the cable there is no loss of power as with locomotives with their wheels slipping, or with animals sliding upon the smooth surface; all that is necessary is to keep cars moving with snow plows or sweepers. During the winter the Chicago road has been in operation

dition of the moving part on the road bed—the pulleys generally. At one time on the Sutter street road a change that was made caused a reduction of 40 horse-power as the mean of cards taken in one hour at five minute intervals. They had been using a certain quality of oil that gummed and hardened, and on one day four of the large pulleys froze. The high rate of power was chargeable to some extent to the poor lubricant. The quality of oil, the time of oiling, etc., have an effect, so much so that it is difficult to get any data which will agree one day with the other.

The power required on the Market street road is about the same as that at Chicago. It corresponds also very nearly with that on the roads in New Zealand. In Philadelphia, when they started, they had 8,000 feet of rope, and the engineer said it took 100 horse power to move the rope alone, nearly 5 times as much as is taken on the Clay street hill road in this city. They had probably the best pair of engines in the United States to run the road, too.

The length of surface of the jaws of the grip has an effect on the wear of the rope in cable roads. The shortest dies are those on the Clay street road, 3½ inches. There are some in use, however, over 8 inches. Those on the Market street are 12 inches, and the same on the Sutter street. The Chicago roads have the dies about two feet long.

A BREAKWATER is to be built off the mouth of Smith river. Subscriptions are solicited at Crescent City for the purpose.

commanding the cable system, by decisions in contested cases, on both the law and equity sides of the court, and the Company and its counsel have an undoubted confidence in their validity.

The Charter of the Company, which is organized under the laws of New York, confers all the powers and privileges of a Railroad Rolling Stock and Construction Company, by which it can cable and equip existing street railroads as well as build new lines, and the exclusive right to grant licenses under these patents.

Under these patents the following street railroads have been constructed and are now operating under licenses granted to them, viz.: Clay Street Hill Railroad Company, San Francisco; Sutter Street Railroad Company, San Francisco; California Street Railroad Company, San Francisco; Geary Street Railroad Company, San Francisco; Presidio and Ferries Railroad Company, San Francisco; Chicago City Railway Company, Chicago.

The curves on cable roads absorb a large amount of power. In a rough way each of these curves is estimated to take about 28 horse power. This is as near as we can gather; that is in comparing it with the weight of a rope on a straight road and comparing the weight of rope in motion on both roads. This is, of course, a rough way of determining the question.

The Commissioners of taxes and assessments give valuation of New York thus: Real estate, \$1,168,000,000, against \$1,120,000,000 last year; personal estate, \$371,000,000, against \$1,332,000,000 in 1884.

met the rope is dropped from the grip and the cars pass around the turnout by gravitation. There is only one slot for the grip, the two parts of the rope traveling in opposite directions, running very close to each other. The pulleys are placed in pairs 25 feet distant from each other. The pairs are not set side by side, but are a foot or two from each other lengthwise the line. There is a turn-table at each end of the road for reversing the dummy.

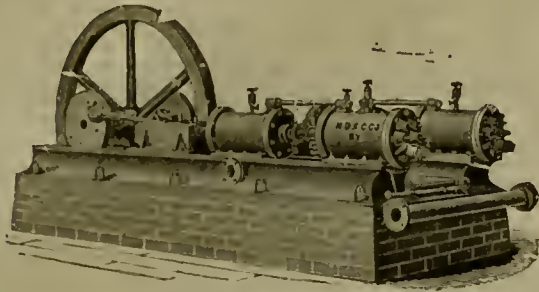
The power is communicated to the cable on the rope system. The rope is driven from the main shaft over a 4 foot rope sheave on to a 12-foot rope sheave on the countershaft; four ropes being employed to transmit the power. The wire rope is put in motion by use of the Hallidie patent grip pulley. The grip to be used on the dummies is similar in construction to that used by the Sutter street in this city. The cars and dummies are the same in style and finish as those used on the Clay street in this city.

The road does not run through the most populous part of the city, but through that part most desirable for residences and all along the line of the road there are many fine buildings in process of erection.

J. M. Thompson, 45 Fremont street, S. F., is the contractor of this road, and also has a franchise for building a cable road on Temple street.

THE New York Aldermen have passed, over the Mayor's veto, a resolution permitting mechanics and laborers in the city departments to quit work at 2 P. M. Saturdays during the summer months. Their action, however, will not result in giving the mechanics and laborers pay for time when they do not work.

NATIONAL COMPRESSORS



AND

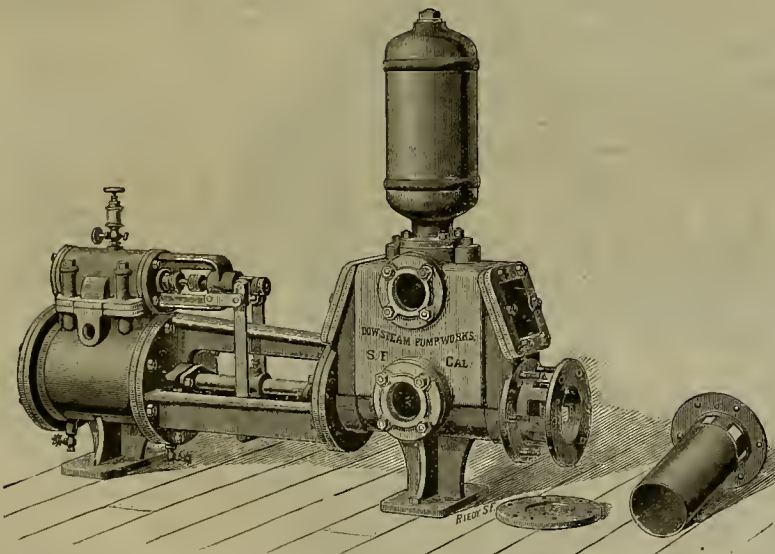
R
O
C
KD
R
I
L
L
SEDWARD A. RIX & CO., Agents,
Nos. 18 and 20 Fremont Street, San Francisco.

WE HAVE ON HAND

THE LATEST IMPROVED NATIONAL DRILL,

Which anyone, upon examining, will proclaim to be far superior to anything yet offered to the MINING PUBLIC in the shape of a ROCK DRILL.

CALL AND SEE IT OR SEND FOR CIRCULARS.

DOW STEAM PUMP WORKS,
San Francisco, Cal.DOW'S IMPROVED STEAM PUMPS
And Pumping Machinery

FOR EVERY POSSIBLE DUTY.

COMPOUND PUMPING ENGINES,

Condensing and Non-Condensing,

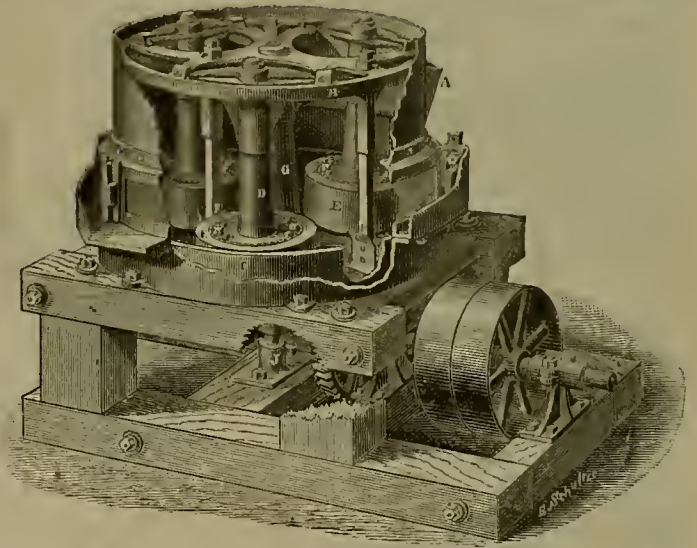
.....FOR.....

Water-works,
Mining Purposes,
Irrigation, Etc.

WORKS: 114 and 116 BEALE STREET.

Correspondence Solicited.

Call or Send for Catalogue.

F. A. HUNTINGTON'S
CENTRIFUGAL ROLLER QUARTZ MILL.

Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.	Williamson Bros' Hoisting Engines.
Frank & Co.'s Woodworking Machinery.	Atlas Engine Works Engines and Boilers.
New Haven Mfg Co.'s Machinists' Tools.	Payne's Vertical and Horizontal Engines.
Bement & Son's Machinists' Tools.	Otto Silent Gas Engines.
Bickford's Power Drills.	Clapp & Jones' Steam Fire Engines.
Blake's Improved Steam Pumps.	Pickering Engine Governors.
Perry's Centrifugal Pumps.	Judson Engine Governors.
Perin Band Saw Blades.	Tanite Co.'s Emery Wheels and Machinery.
Sturtevant Blowers and Exhausts.	Nathan and Dreyfus Oilers.
Shimer Matcher Heads.	Korting Injectors and Ejectors.
Brainard Milling Machines.	Disston's Circular Saws.
Turbine Water Wheels.	New York Belting and Packing Company's Rubber Goods.
Bradley Cushioned Hammers.	Lane and Bodley Saw mills.
Massey's Steam Hammers.	H. W. Johns' Asbestos Packing, Paint, etc.
Schlenker's Bolt Cutters.	
Holloway Fire Extinguishers.	

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

MECHANICAL PROGRESS

An Interesting and Important Discovery.

Condensing Lead and Zinc Fumes and Dust.

Mr. Alfred O. Walker, of Chester, England, a member of the firm of lead manufacturers, Walker, Parker & Co., Bagillt, had his attention called to some experiments made by Professor Lodge, of Liverpool, who had made the curious observation on the effect of a discharge of high-tension electricity from a point, or points, into glass jars or other vessels containing dust of any kind in suspension. Thus if a bell jar be filled with a dense smoke of magnesia, by burning some magnesia wire inside it, a very long time elapses before the magnesia settles out and leaves the glass clear of smoke. But if a metallic point be introduced into the jar, connected by a wire to one of the poles of a good frictional or induction electric machine to work, it is only necessary to set the machine to work, and almost instantly an extraordinary effect is observed inside the bell jar. The magnesia smoke commences to whirl about and then forms itself into large flakes and strings, which rapidly settle on the bottom and sides, leaving the jar perfectly clear of smoke. What would have taken several hours to settle in the ordinary course is completely cleared and deposited in a few seconds. The same effect is produced if the jar is filled with any kind of smoke, that from thick paper or from a cigar being acted upon exactly in the same manner as the magnesia. Professor Lodge and his assistant had made experiments on a very much larger scale than those in the glass jars. Rooms had been filled with dense smoke and rapidly cleared in the above manner. The report of these experiments suggested to Mr. Walker the feasibility of using this method to condense the fumes in lead smelting. *Engineering* reports as follows the results of these trials: "By means of large casks a wooden flue was constructed at right angles to one of the main flues of the lead works, and with a damper on the main flue it was possible to make any required amount of the fumes from a group of furnaces pass into and through the wooden experimental flue. This latter was provided with glass windows placed opposite one another for the purpose of observation. It also had dampers by means of which it could be filled with the furnace fumes and then closed at both ends, so that it formed a chamber representing the professor's bell jars on a very large scale. The electric machine employed was on the Voss system, the glass disk being 18 inches in diameter. It was worked in a small shed erected close to the experimental flue. One pole of the machine being connected with the ground, the other was connected to an arrangement of metallic points placed inside the flue, and exactly between two of the windows above mentioned. A well-insulated copper wire led from the pole to the top of a stout brass rod, which was fixed in the top of the flue, projecting some distance above it, and reaching so far into it as was necessary to sustain the discharge points in the desired position. This brass rod was fixed inside a glass tube of considerably larger diameter, in order to insulate it where it passed through the top of the flue. During the experiments several arrangements of discharge points were used, as, for instance, a brass ball having spikes projecting from it all round, a ring with spikes fixed upon it pointing in all directions, a cross studded with spikes in a similar manner, etc.

"The first experiments tried were upon the lead fume in a state of quiet—that is, the flue was filled with fume by allowing a strong current of it to pass through from the main flue and then simultaneously closing the inlet and outer dampers. The fume thus inclosed in the chamber, when viewed through the windows, appeared as a very dense fog or mist. Left to itself it took many hours to deposit. But as soon as the electric machine was set to work the same action took place as with the magnesia in the bell jar. Through the windows could be observed the same whirling movement around the discharge points, and in a few seconds the fog was seen changing into little flakes, like soot flakes, which rapidly flew to the sides of the chamber, and were there deposited, till in an incredibly short time the 'fume' had entirely disappeared from the atmosphere of the chamber, which was as clear as before the fume was let into it. Further experiments were then tried as to the action of the electric discharge upon the fume in rapid motion, as it is in the flues of the works. The damper in the main flue being closed, the whole of the pressure of furnace gases was turned through the experimental flue and allowed to stream out into the air. Then the electric machine was worked as before. No effect could be seen through the windows, because the rapid current swept the fume onward too fast to allow of any change being observed at that point. But at the outlet into the atmosphere, a few seconds after the discharge of electricity commenced, the effect was again very striking, the issuing fume again changing from fog into flakes. A glass plate held in the current before the discharge from the machine began was only coated, after considerable time, with a thin film. A similar plate held in the current during the working of the machine was instantly coated over with flakes and large separate specks of fume. So much was the fume agglom-

erated by its passage past the discharging points that on some occasions in perfectly calm weather some of it would fall to the ground immediately on leaving the exit opening of the flue. In short, the series of experiments proved that what took place under the bell jar took place equally in the flue of a smelting works, with all the attendant circumstances of heat, moisture and acid vapors. The trials of various arrangements of discharge points seemed to show that, within certain limits prescribed by the power of the machine in use, the more points employed the better was the result, the points being spread as uniformly as possible over the cross-section of the flue through which the fumes were passing.

"On the strength of the satisfactory results above stated, Mr. Walker decided upon taking measures to apply this new process of fume condensation on a full working scale at the Bagillt Works. The necessary plant is now in course of erection and nearly completed. The electric machines used will be on the Wimshurst system, with disks of 5 feet diameter. Two such machines have been constructed specially for the purpose by Mr. F. J. Cribb, engineer, of Chester. They will be driven by a small steam engine, the whole plant being placed in a small building close to the main flue of the works, through which pass all the gases and 'fume' from 19 furnaces. Mr. Walker proposes to extend the process in England and most European countries and in the United States. It is intended to apply it to other branches of metallurgy besides lead-smelting, as, for instance, the condensation of zinc oxide in the manufacture of zinc white, and the condensation of arsenic. But its principal field for usefulness will doubtless be in lead works, where so far all the proposed systems of condensers have either failed outright or proved so costly to erect and to work that the very imperfect results obtained did not render it worth while to continue their use." In this country an interesting field in the metallurgy of iron for this process would be the condensing of the zinc fumes in the gases escaping from those spiegelisen furnaces which utilize the residues from making zinc oxide from Franklinite ores.

AN IMPROVED CONVERTER. The bottom of which is readily removed without disconnecting the blast and stopper appliances, has been patented by J. F. Wilcox, of Pittsburg, Pa. The converter is composed of an upper section having a downwardly depending shell or extension to embrace the lower section. This section is supported by a bottom plate which is bolted to the lower edge of the shell. All the appliances for conducting the blast to the tuyeres and for sustaining and operating the stoppers are attached to the shell. An air-trunk or main blast-pipe extends entirely around the converter, and is interrupted at intervals by air-chambers opposite the tuyeres. The chambers are provided with doors, and the stems of the stoppers extend through stuffing-boxes attached to the doors. To remove the lower section of the converter the doors are thrown open and the stoppers are withdrawn. Then the bottom plate is unbolted and lowered by a hydraulic jack. The lower section is then free to be taken out.

DIES FOR MAKING HATCHETS.—The Germantown Tool Company, of Philadelphia, Pa., have procured a patent for dies for making hatchets. Two sets of dies are employed. One set has its working faces so shaped as to conform to the contour of the sides of the hatchet, while the other set conforms to the top and bottom of the same. A piece of metal is primarily forged or wrought to assume the general outline of a hatchet, and is then placed successively between the two sets of dies, after which it is ground and otherwise finished. In this way time and expense in the manufacture is claimed to be saved.

A NEW NAIL which will not leave any nail holes, and is more particularly adapted for attaching moldings and other light lumber, has been patented by J. M. Overell, of Evansville, Ind. The nail is made with a point at each end and with an outwardly projecting head or shoulder midway between the points. The nail is first driven into the wood by means of a punch which straddles the protruding point and bears on the head. When a sufficient number of nails have been driven into the wood the molding is placed over them and is driven down in any suitable manner.

A LIFE BUOY SIGNAL has been invented, says the Chicago *Herald*, the purpose of which is to light up the sea in case of accident at night. It is attached to the life buoy by a cord, and upon being thrown overboard bursts immediately on striking the water. The light, which cannot be extinguished either by wind or wave, burns for over an hour, and thus enables the work of rescue to be easily carried on.

DYEING.—The new alloy called dyeiot, brought into this market by Rompel & Co., of Hamburg, has been analyzed by Von Uhlenhuth and found to consist of copper 62.30 parts; lead, 17.75; tin, 10.42; zinc, 9.20; with traces of iron. It can be prepared by melting together 62 parts of copper, 18 of lead, 10 of tin, and 10 of zinc.

STEEL is slightly increased in bulk in the process of being hardened.

SCIENTIFIC PROGRESS.

Life Everywhere.

Life everywhere! The air is crowded with birds—beautiful, tender, intelligent birds, to whom life is a song and a thrilling anxiety, the anxiety of love. The air is swarming with insects—those little animated miracles. The waters are peopled with innumerable forms—from the animalcule so small that one hundred and fifty millions of them would not weigh a grain, to the whale, so large that it seems an island as it sleeps upon the waves. The bed of the seas is alive with polypes, crabs, starfishes, and with shell animalcules. The rugged face of the rocks is scarred by the silent boring of soft creatures, and blackened with countless mussels, barnacles, and limpets.

Life everywhere! On the earth, in the earth, crawling, creeping, hurrowing, horing, leaping, running. If the sequestered coolness of the wood tempt us to saunter into its chequered shade, we are saluted by the numerous din of insects, the twitter of birds, the scrambling of squirrels, the startled rush of unseen beasts, all telling how populous is this seeming solitude. If we pause before a tree, or shrub, or plant, our cursory and half abstracted glance detects a colony of various inhabitants. We pluck a flower and in its bosom we see many a charming insect busy in its appointed labor. We pick up a fallen leaf, and if nothing is visible upon it, there is probably the trace of an insect larva hidden in its tissue, and awaiting their development. The drop of dew upon this leaf will probably contain its animals, visible under the microscope. The same microscope reveals that the blood-ain suddenly appearing on bread and awakening superstitious terrors, is nothing but a collection of minute animals (*Monas prodigiosa*); and that the vast tracts of snow which are reddened in a single night, owe their color to the marvelous rapidity in reproduction of a minute plant (*protococcus nevalis*). The very mold which covers our cheese, our bread, our jam or our ink, and disfigures our damp walls, is nothing but a collection of plants. The many-colored fire which sparkles on the surface of a summer sea at night, as the vessel plows her way, or which drips from the oars in lines of jeweled light, is produced by millions of minute animals.—*Cornhill Magazine*.

GLACIAL ACTION.—The theory of Dr. Joseph Worster, of New York, promulgated some eight or ten years since, is still gaining ground. The doctor proposed a new and very simple theory to account for the ice-fields supposed by Professor Agassiz to have covered the whole area of Brazil during the glacial period. His view is that at a very remote date the whole surface of central South America was a high table-land elevated more than 10,000 feet above the sea level. As this would be within the ascertained region of perpetual frost, such an elevated plateau receiving and condensing the evaporation of the two contiguous oceans, and converting it into ice, would, in the course of ages, become loaded to a tremendous depth. This vast deposit, by constant pressure, would finally cause a gradual sinking of the table upon which it rested, to restore the disturbed equilibrium of gravitation; and if it may be supposed that the wave of depression commenced on the east coast and terminated on the west, the Andes range would be upheaved at the final termination of the wave. This view is in harmony with the ascertained comparative recency of the Andes as a mountain range, and brings a problem that has resulted in many crude speculations—the problem of the ice period—within the scope of very simple and well-ascertained laws of meteorology. The ice traces of North America are susceptible of explanation on the same hypothesis.

THE NATURAL GAS WELLS OF NORTHWESTERN OHIO.—Writing to *Science*, Prof. Edward Orton says: The gas wells that have been drilled within the last year in Hancock and Wood counties, Ohio, have furnished some interesting, and to some degree unexpected, information as to the geological foundations of the State. They show the presence of several formations that nowhere else appear in outcrop within the limits of Ohio. The section furnished by them agrees quite closely, as to its elements and its general lithology, with the New York oil region. I have lately examined the carefully kept records and drillings of six of these wells. They agree entirely in their main features. All begin in upper Silurian limestone, and all find their main supply of gas in the Trenton limestone. The Trenton limestone is crystalline and hard, but it shows the presence of fossils in abundance. The gas obtained from the wells is delivered with moderate pressure. It contains a notable quantity of sulphureted hydrogen. It is used so far mainly for heating and for steam production. Judicious estimates put the amount yielded each day by three wells in Findley, the county seat of Hancock county, at 500,000 feet.

THE SUN AND MOON.—How much brighter is sun than moon? Can anybody tell? Has anybody tried to tell? What shall be the standard of measurement? Sir William Thomson has lately printed a note which conveys some curious data bearing on these questions.

During the meeting of the British Association at York in 1881, he observed the moon when it was nearly full, and at about midnight. He found the light to be equal to that of a candle at a distance of two hundred and thirty centimetres. Making no account of the loss of moonlight in transmission through the earth's atmosphere, he computed that twenty-seven thousand million candles must be spread over the moon's earthward hemisphere, painted black, to send us as much light as we receive from her. Probably forty thousand million candles would be required to allow for absorption. Sir William carried his computations a little farther, and figured that, if the face of the moon which we see were painted black, and covered with candles standing packed in square order, touching one another, all burning normally, the light received at the earth would be about the same in quantity (see estimated by our eyes) as it really is.—*Science*.

TO AVOID ELECTRIC INDUCTION.—Incidental to the discussion which took place among the members of the late Electric Light Convention, was the question of induction, or the property by which one body, having electric polarity, causes or induces it in another body, without direct contact. The telephone people complain that the electric light wires seriously interfere with their lines by induction. A merchant of Glasgow, Scotland, has hit upon a very simple though somewhat costly arrangement of telephone wires by which, it is asserted, the annoyances resulting from induction are prevented. His office is connected with his house, some thirty miles distant, by a private line. To prevent disturbance from the induction of other wires, he uses a return wire, and the wires are simply arranged in a spiral or helical form as follows: Suppose each post to be provided with four insulators, arranged at the four angles of a square. The sending wire is attached to insulator 1 on the first post, 2 on the second, 3 on the third, 4 on the fourth, 1 on the fifth, and so on. The return wire is attached to the insulators at the opposite corners of the square, or what would correspond to that position, thus forming the helix. The arrangement is said to work so perfectly that the passage of telegraphic messages on neighboring wires does not produce the least disturbance.

A PHOTOGRAPH OF LIGHTNING.—Dr. Kayser recently laid before the Berlin Physical Society a photograph of lightning taken in France, and probably under the same minimal atmospheric pressure as that under which he had himself taken his recently published photograph, the lightning in France having been photographed three days earlier than that in Berlin. On the gelatinous membrane sent to Dr. Kayser there was presented very beautifully to the view the extraordinary manifold ramifications of the lightning. From the lowest part of a dark cloud a broad flash of light was seen to dart forth and throw off many fine branches, which again united multifariously, the junction at one place between one branch and another showing a broader line, while at other places the flashes appeared double.

BIRTH OF A VOLCANO.—A new volcano has been discovered in Russia. Twelve verst from the town of Ielna, in the Government of Smolensk, a hill is at present showing signs of volcanic activity. Ten years ago it was noticed that snow never rests on it, but melted away; and three years ago smoke began to issue from it, accompanied by rumblings. Lately flames have shot up and fragments of cinders and sand have been thrown up. A pole plunged in the ground was burned up in a few minutes. All around the base rich grass grows, which is eaten with relish by the cattle. Indications of volcanic energy have appeared at two other places in the neighborhood.

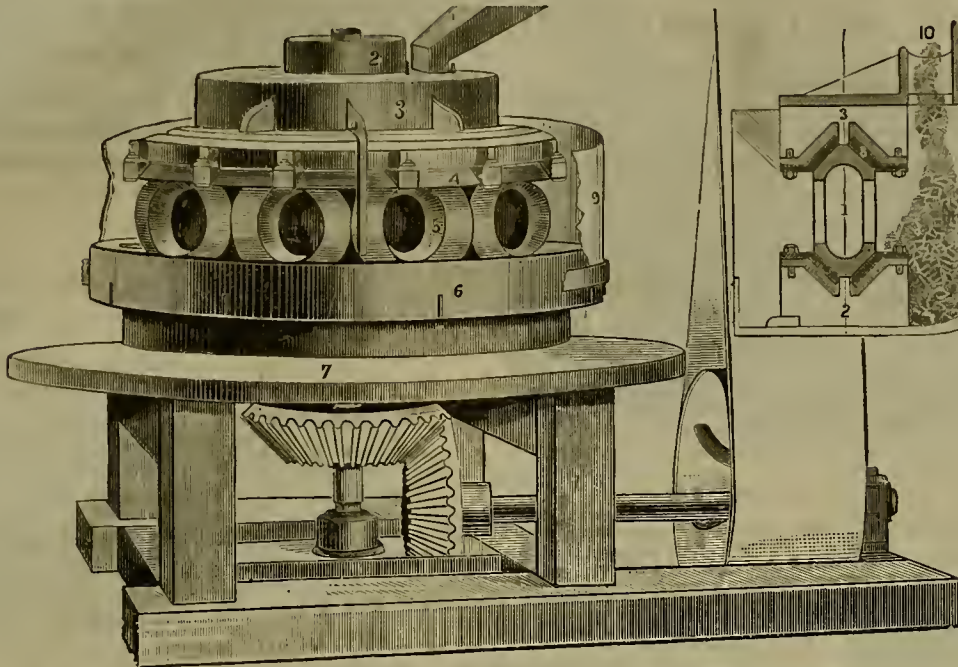
CURIOUS EFFECT OF ASPHALT PAVEMENTS.—It has been noticed that laborers who work barefooted upon asphalt pavements are subject to swelling of the limbs, which has been attributed to the vaporization by the heat of the feet of a small quantity of the petroleum or mineral oil which is contained in the asphalt. The nerves of the feet which govern muscular action and the contraction of the blood-vessels form an extensive and very sensitive nervous network under the arch of the foot where the skin is always thin and the nerves are consequently easily affected.—*Les Mondes*.

OBSERVATIONS OF SOLAR PROTUBERANCES.—In his report of the observations at the Royal Observatory of the Roman College during the year 1883, Tacchini gives indications of epochs of double maxima, as well as epochs of single maxima in the solar protuberances of each hemisphere, and he judges from analogy that the irregularities in the apparent contour of Venus may be due to a gaseous condition in that planet.—*Comptes Rendus*.

COCAINE AND FISH.—At a recent experiment a fish was placed in water containing one part of cocaine to the 1,000 of water; the animal floundered around for a few moments and then became as quiet as death. After two hours the fish was removed to fresh water, where he returned to activity. An examination of the oxygen in the water showed that the fish ceased to breathe during his torpid state. It is an expensive way of fishing.

HILL'S TRIUMPH ORE MILL.

Manufactured by **H. W. RICE,**
Engine, Boiler, and Plow Works,
No. 56 BLUXOME STREET, SAN FRANCISCO, CAL.



The successful working of this Mill warrants us in saying to the Mining Public that we are ready to make contracts for these Mills and to give a reasonable guarantee of their doing all we claim for them. We would respectfully refer to the letters below from Mr. B. F. Wilson, of Galena, Lander County, Nevada. Please write to Mr. F. A. Hill or myself for all and full particulars.

MR. H. W. RICE—DEAR SIR: I think it is due you that I write you some of my impressions of Hill's Triumph Ore Mill I purchased of you in March. I got it in position, and have had it running for the past two weeks. The mill is in every way more than Mr. Hill claims for it. In quantity it will do all any one wants to do. The important part to me was, will it save the gold? My mine is quartz, oxidized iron and some clay. It had been a question with me, will the gold amalgamate? The gold is very fine. The result in the working of the mill has been satisfactory. It saves a high percentage of the gold and mostly inside of the mill. Below the plates and blankets we fail to find any free gold. The wheels and channels stand well so far, and show no signs of wear. The mill appears to be serviceable and durable, and no doubt Mr. Hill has struck the correct idea in his invention, and mining men should congratulate him on inventing on ore mill to take the place of expensive stamps. I am well pleased with mine, and think there will be more wanted in this camp soon. Respectfully yours,

GALENA, NEVADA, May 8, 1885.

B. F. WILSON.

MR. H. W. RICE—DEAR SIR: Since writing the above letter I have been running the Mill up to the present time, and have worked over 500 tons of ore, and will cheerfully recommend the Mill. Respectfully yours,

GALENA, NEVADA, July 15, 1885.

B. F. WILSON.

SHIP RIGGING.

TELEGRAPH WIRE

MARKET WIRE



FLAT ROPE.

AGENTS
THE NEW JERSEY WIRE
CLOTH CO.

AGENTS
THE BUCK-THORN BARBED
FENCE CO.

Educational.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to CHAMBERLAIN & ROBINSON, Prop's.

THE HARMON SEMINARY,
Berkeley, Cal.

A BOARDING AND DAY SCHOOL FOR
YOUNG LADIES.

Pupils taken at any time.

For Catalogue or other information, address:

THE MISSES HARMON, Berkeley, Cal.
Or F. J. WICKSON, 414 Clay St., S. F.

MISS BISBEE'S SCHOOL

FOR YOUNG LADIES,

1020 Oak Street, - - Oakland, Cal

WILL RE-OPEN

Wednesday, JULY 29, 1885.

THE HOME SCHOOL

FOR YOUNG LADIES,

1825 Telegraph Ave., OAKLAND, CAL.

(Founded in 1872 by the late Miss H. N. FIELD.)

Gives thorough instruction in foundation studies. Admits special students. Prepares for the State University and for any of the Eastern Colleges. The Fourteenth Year will begin on Wednesday, July 29, 1885. Address MISS L. TRACY.

HEALD'S BUSINESS
COLLEGE,
24 Post St. S. F.
Send for Circular.

CRYSTAL SPRINGS.

THIS DESIRABLE

Summer Resort and Sanitarium,

Situated on Howell Mountain, 2 1/2

miles N. W. of St. Helena

IS OPEN

To those seeking health, or rest and recreation. Scenery is unsurpassed. Air balmy, free from fogs and malaria. Water pure and soft, from a fine spring. Bathing facilities first-class. Good Gymnasium. Carriage and horse-back riding. An experienced physician and surgeon, with gentlemen and lady assistants, will attend all cases needing his care. Excellent facilities for treatment. Terms reasonable. Send for Circular or "Come and see."

Address RURAL HEALTH RETREAT,
St. Helena, Cal

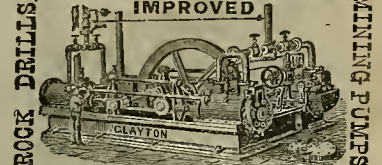
ASSESSMENT NOTICE

Grosh Consolidated Mining Company.—
Location of principal place of business, Room 39, Merchants' Exchange, San Francisco. Location of works, Storey County, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 13th day of July, 1885, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 39, Merchants' Exchange, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1885, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the 31st day of August, 1885, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

OFFICE—Room 39, Merchants' Exchange, San Francisco, Cal.

"CLAYTON" IMPROVED



ROCK DRILLS. MINING PUMPS
AIR COMPRESSORS
For CATALOGUES, ESTIMATES, Etc. Address,
CLAYTON STEAM PUMP WORKS
45 & 47 York St., BROOKLYN, N.Y.
(Near Approach to New York & Brooklyn Bridge.)

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending June 30, 1885, the Board of Directors of the German Savings and Loan Society has declared a dividend at the rate of four and one-half (4 1/2) per cent, per annum, on term deposits, and three and three-fourths (3 3/4) per cent, per annum, on ordinary deposits, and payable on and after the 1st day of July, 1885. By order. GEO. LETTE, Secretary.

Dewey & Co. { 252 Market St. } Patent Ag'ts

NOTICE TO MINE OWNERS.

WANTED—By Millman and Machinist, a Situation as Foreman of Mill. Understands the roasting of base gold and silver ores. Address

S., care C. J. PERIAM,
42 Main St., San Francisco.

Engraving.

Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of the Mining and Scientific Press, San Francisco, at favorable rates.

TO CAPITALISTS.

FOR SALE—Half interest in 4,500 feet of valuable
SILVER MINING PROPERTY

In one of the best mineral locations in Arizona, having wood and water on the ground. The mines are well developed, and thorough examination is solicited. Ore will produce from fifty to nine hundred ounces per ton. The interest will be sold at a sacrifice, as capital is required to obtain machinery for hauling water. Address

GEORGE B. McCANN,
Buena Vista, P. O., Arizona.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.

113 Leideedoff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO.
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the
most suitable Process for Working Ores.
Special attention paid to Examinations
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL.

H. KUSTEL.

METALLURGICAL WORKS,

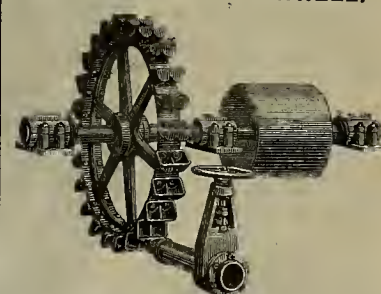
318 Pine St. (Basement),

Corner of Leideedoff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.
Assaying and Analysis of Ores, Minerals and Waters,
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.
AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

SILVER PLATED

COPPER PLATES

FOR SAVING GOLD.

California Electro Plating Works,

657 MISSION STREET,
Between New Montgomery and Third, SAN FRANCISCO.

KEATING & FAGAN, Prop's.

Metallurgy and Ores.

THE DIXON CRUCIBLE CO.

JERSEY CITY, N. J.

—Manufacturers of—

DIXON'S BLACK LEAD CRUCIBLES.
DIXON'S LEAD PENCILS.
DIXON'S STOVE POLISH.
DIXON'S AXLE GREASE.
DIXON'S PLUMBAGO.
DIXON'S BLACK LEAD.
DIXON'S GRAPHITE.

J. G. ALLEN,

Sole Agent for the Pacific Coast

108 Davis St. (near California), San Francisco

Price same as at Factory.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

GOLD MEDAL AWARDED

—AT—

Mechanics' Fair, 1883 & 1884

—FOR—

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
1883

For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

22 Fremont Street,
SAN FRANCISCO.



INVENTORS. MODEL MAKER,

253 Market St., S. E. cor Front, up stairs, S. F. Experiment-
al machinery and all kinds of models, tin, copper and brass.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.



THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast-
ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and
saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address

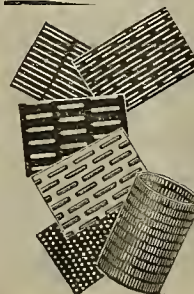
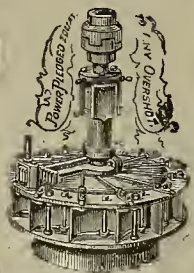
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

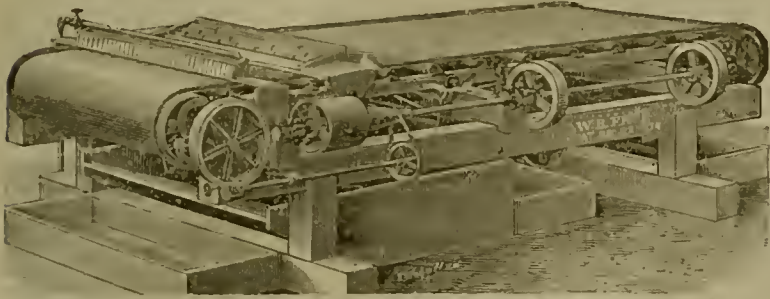


Chicago Prices Beaten!
ESTABLISHED 1860.
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor Tehama, S. F.

J. W. QUICK, Prop'r.
Sheet Metals of all kinds perforated for Flour and
Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement
and Smut Mills, Separators, Revolving and Shot
Screens, Stamp Batteries and all kinds of Mining and Milling
Machinery. Inventor and manufacturer of the celebrated
Slot Cut and Slot Punched Screens. Mining Screens a
specialty, from 1 to 15 (fine).
Orders Promptly Executed.



\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1870, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B. We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7 - No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!

**PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.**

THE "TRIUMPH" TRIUMPHANT!

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test, which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

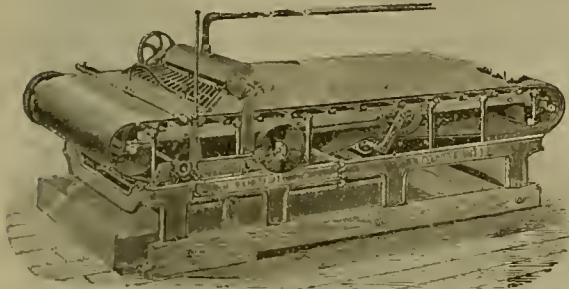
We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

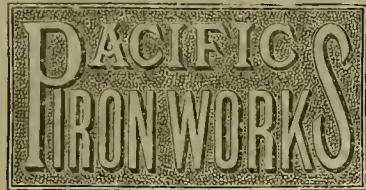
JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal



**THE
"TRIUMPH" ORE CONCENTRATOR.**



1850. 1885.
RANKIN, BRAYTON & CO.,
MINING MACHINERY.

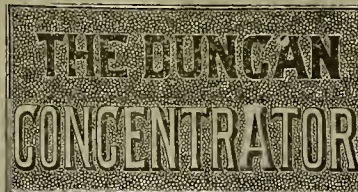
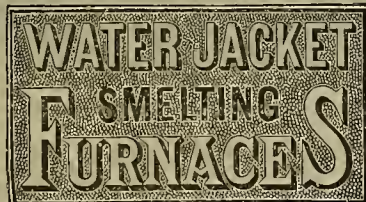
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO, or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ore and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

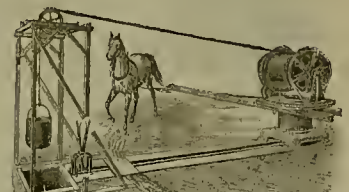
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER OF INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



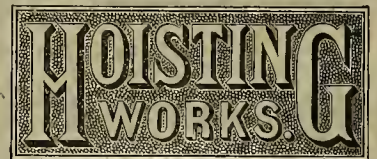
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY OF CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all the AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.

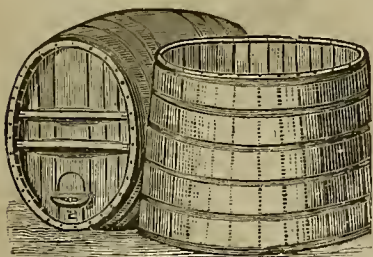


Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



WATER TANKS! WINE TANKS! CALIFORNIA WINE COOPERAGE CO.



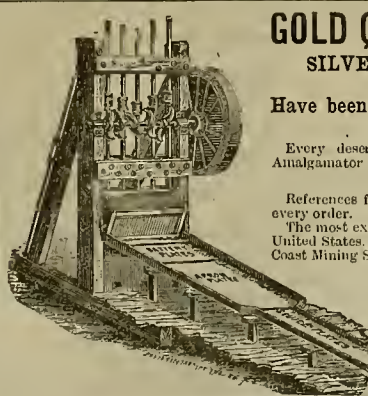
FULDA BROS., Proprietors,
30 to 40 Spear St., San Francisco.
ALL KINDS OF CASKS, TANKS, Etc.
SHIP, MINING, and WATER TANKS a Specialty.

EUREKA PIPE TONGS

Beat the world for Simplicity, Durability, and Cheapness.

They fit all sizes of Pipe Nipples, Elbows, Reducers, Union Couplings, etc. Will answer for a wrench, take out and put in Stud Bolts, etc. Are light and convenient and can all be used in one hand. No slipping or splitting pipe. Patent Right for Pacific Coast for sale.

Address, GEORGE B. KOONS,
Half Moon Bay, Cal.



GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD,
Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,
653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

A. T. DEWEY, W. B. EWER, GEO. H. STEONG) Dewey & Co.'s Scientific Press Patent Agency (ESTABLISHED 1860.

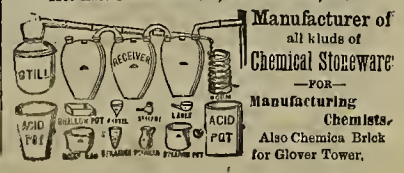
INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.



The California Perforating Screen Co.
All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for
Flour and Other Mills.

Quartz Mill Screens a Specialty.

147 Beale St., San Francisco.
RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware - FOR - Manufacturing Chemists, Also Chemical Brick for Glover Tower.

Cable Railway Items.

CABLE railways are not only popular with the public, but pay their owners well.

VARIOUS forms of grip are used on our local roads, and several other forms have been patented which have not been put to use.

THE surface of the streets through which a cable road runs has the same appearance as in the case of a horse car line, except that between each pair of tracks is a narrow slot for the grip.

THE Market Street Cable Company are owners of some 35 patents on various things connected with the cable system, including patents of Wm. Eppelsheimer, G. T. Beauregard, Thos. H. Day, Chas. M. Cbubb, Henry Caseholt, Henry Root and Leland Stanford.

THE cable system can be applied on bridges as well as on streets. On the famous Brooklyn bridge, New York, the cars are operated by endless cables. The details of construction of the road are different from those on ordinary street roads, but the general principles are the same.

IT WAS at first thought that cable railways were only specially adapted to steep hills on

The Rural Health Retreat.

At Crystal Springs, near St. Helena, under the above title, is one of the best conducted sanitariums in the United States. Its managers are determined to make it one of the leading and most thoroughly conducted health and pleasure resorts on this coast. It is not designed as a money-making institution, but a pleasant rural home for all worthy classes who seek health, rational amusement and genuine recreation.

The aim of the institution is not simply to restore the health of its patrons, but what is often more important, to enable them to retain it and avoid illness in future.

Its situation cannot be surpassed for beautiful scenery and convenience of location from San Francisco. It is on the slope of the Howell mountain range, overlooking Napa valley, and almost overhanging as it were the eastern suburbs of St. Helena. Howell mountain has long been reputed as one of the choicest localities in the State for health-recuperating qualities, and is yearly gaining in popularity.

The pure soft water of Crystal Springs would be a great desideratum in any home. The Re-

Applications for State Lands.

The new law which will go into effect on the first of next month is as follows:

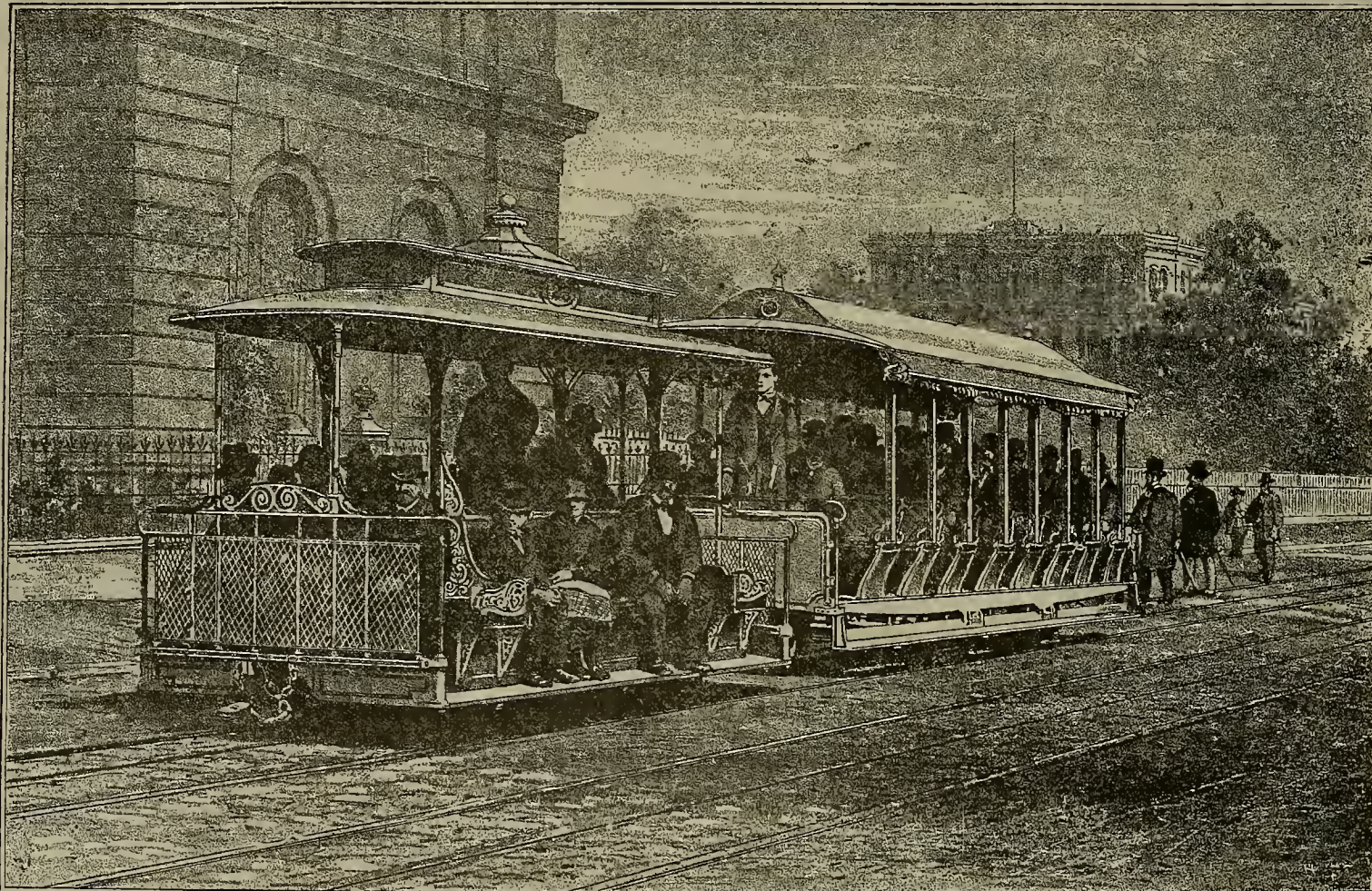
3498. All applications, under whatsoever Act, filed in the office of the Surveyor-General, must be retained ninety days before approval, and must be approved (when there is no conflict) by the Surveyor-General, at the expiration of six months, subject, however, to the provisions of Sections 3,406 and 3,407 of this code, and all unapproved applications which have been on file over six months, wherein the approval has not been demanded, and wherein the contest has not been referred to court, or a demand made for an order of reference, as provided in Section 3,414 of the Political Code, shall be null and void.

SEC. 2. This Act shall take effect on the first day of August, 1885, and the Surveyor-General shall give notice to each applicant to be affected thereby by sending to said applicant or his attorney a copy of this Act.

So far as possible, copies of said Act have been sent out from the office of the State Surveyor-General to the parties interested, but from the manner in which the records have

Mining Share Market.

There is a continued dullness in the stock market, which has grown very irksome to dealers. Nothing is expected or anticipated, particularly, in the way of a sudden change for the better in any of the mines all along the Comstock, outside of Hale and Norcross, so far as the immediate future is concerned, therefore all eyes are concentrated on that single point. If all the mines, or even neighboring mines, along the lode were pursuing deep workings, same as the Hale and Norcross, there would be competition and assistance, not only in getting the water out, but in deeper explorations. The *Enterprise* says: "Literally speaking there is nothing to sustain speculative stocks but Hale and Norcross, or to establish any special rates for the same. Were there a dozen companies thus prosecuting deep workings and practical developments, there would be competition in both mines and stocks, and prices would fluctuate accordingly, as in the glorious past; but now everybody with either mines or stocks in their speculative eyes eagerly watch Hale and Norcross, which is the single standard of value by which the



CAR AND DUMMY OF THE GEARY STREET CABLE RAILWAY.—(See page 51.)

which it was next to impossible to make use of horses, and impracticable for ordinary traffic; but experience has shown the system to be equally well adapted to level streets, and to crowded thoroughfares as well as less frequented streets.

THE CARS of the Market Street Cable Railway Company have carried as high as 57,000 passengers in one day. Under the system in vogue at the terminus, cars can be turned and dispatched in less than one minute.

THE combination cars used on the Market street road in this city, in which the car and dummy are one, has a very easy motion and great carrying capacity. It can be turned and dispatched with rapidity, and rounds sharp curves with ease, being also excellent on hilly roads, the swivel trucks being free to turn vertically and horizontally. The gripman has control of all brakes. There is little liability to accident in the use of these cars.

THE UNION IRON WORKS, the largest iron manufacturing establishment on this coast, have done a great deal of the work on the machinery of the cable railroad lines in this city. They built the engines which run the Market, Haight and McAllister street roads, and those on the Sutter and Geary street roads. They also built part of the machinery for the new Los Angeles road. The Union Works have had great experience in this line, and their machinery has always worked in a very satisfactory manner from the first start.

THE President has appointed James Kimball, of Pennsylvania, Director of the Mint, in place of H. C. Burchard,

treat is under the management of Elder J. D. Rice, who gives constant, careful and conscientious attention to his duties. He is well supported by faithful and competent assistants.

J. S. Gibbs, Medical Superintendent, is a graduate from a thorough medical and surgical course in New York city, where he afterwards had three years' practice. He was recently associated with Dr. J. H. Kellogg, Superintendent of the Medical and Surgical Sanitarium at Battle Creek, Mich., said to be the largest institution of the kind at present in the world.

We advise those wishing further information, who cannot conveniently at once visit this place, to address "Rural Health Retreat, Crystal Springs, St. Helena, Napa county, Cal."

THE FULTON IRON WORKS in this city (Hinkley, Spiers & Hayes) have done a great deal of work for the cable railways of San Francisco. In their shops were built the hoilers for the California St., the engines for the Presidio, most of the machinery for the Clay St., and the gripping machinery for the Geary St. roads. The engines on the Presidio road have shown very remarkable results in economy and efficiency.

THE TELEGRAPH HILL CABLE.—A short line of cable road is in operation in this city which carries passengers a few blocks to the summit of Telegraph Hill, and is patronized by those who go there to see the view or visit the resort on the hill. There is little peculiar in the construction of the road differing from others of the kind.

It is said Japan is assisting China in the defense of the Korean frontier against Russian,

been kept it is impossible for the Surveyor-General to know the address of a large proportion of those who have filed applications for land. For this reason Gen. Willey asks the publication of the above law for the benefit of whom it may concern. Correspondence on the subject should be addressed to H. I. Willey, Surveyor-General, Sacramento.

Satisfactory, Etc.

NOGALES, A. T., May 27, 1885.

MESSRS. DEWEY & Co., Gents:—Yours of the 18th of May enclosing notice of allowance of my application for a patent for "Process of Treatment of Nickel and Cobalt Ores," was duly received. It is extremely satisfactory, and I must say I am surprised at the rapidity with which you have accomplished a result which I expected would have taken six months or a year to reach.

Yours, very respectfully, C. H. AARON.

Gold Mines For Sale.

Two small gold mines for sale, in Kern county, California. Ore has paid by assay \$20 per ton. Worked to a depth of 60 feet. The vein is 15 inches wide. The mines are within seven miles of the Southern Pacific Railroad. The owner is not in a position to develop them without aid. The purchase price is very reasonable and there is a good opening for any one to take hold of the claims and work them. Address W. L., P. O. Box 2361, San Francisco.

OPERA GLASSES for the Panorama at Muller's Optical Depot, 135 Montgomery street, near Bush, opposite Occidental Hotel.

prices of all other mines are regulated and established.

The usual amount of development work is going ahead all along the Comstock, with no new features to mention outside of Hale and Norcross.

Bullion Shipments.

Christy, July 7, \$2,100; Hanauer, 7, \$8,200; Stomont, 7, \$5,670; Queen of the Hills, 7, \$1,200; Orland, 9, \$29,951; Kentuck, 9, \$6,000; Queen of the Hills, 9, \$1,600; Hanauer, 12, \$5,000; Crescent, 11, \$2,700; Queen of the Hills, 11, \$4,400; Drum Lummon, 10, \$25,000; Grand Prize, 12, \$15,000; Alice, 6, \$15,792; Lexington, 7, \$32,000; Allen Hays, 8, \$2,000; Alice, 10, \$3,328; Dexter, 9, \$6,400; Moulton, 6, \$14,928; Dexter, 10, \$5,840. From Nevada City, Cal., for June, \$150,000.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLELL—California.
A. C. KNOX—Ventura and Los Angeles Co's.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
F. W. SMITH—El Dorado and Placer Co's.
W. B. TURNER—Oregon.
Geo. McDowell—Fresno and Tulare Co's.

THE Pinnacle mines are reported flourishing and promise a rich yield. It is expected that new developments will soon be made in that neighborhood.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

CONDUCTING BRAIN TO THICAMINO MACHINE.—James T. Watkins, assignor to Byron Jackson, S. F. No. 321,007. Dated June 30, 1885. The object of this invention is to feed or advance out grain from the derrick platform, upon which it is deposited by the derrick forks, to the elevator, by which it is carried to the separator or thrashing machine. It consists in a combination of devices.

SCREW FASTENING FOR BOXES OR CASES.—Eugene Ritter, Ehrenfeld, Germany. No. 321,054. Dated June 30, 1885. The invention consists of a screw which passes through the cover or part to be secured, and a cylindrical nut having internal screw threads, into which the screws fit, and external threads by which it may be screwed into the edges or body of the box, so as to form permanent sockets, into which the screws may be inserted at any time, and from which they may be removed when it is desired to remove the cover without defacing or breaking the woodwork.

ROAD LOCOMOTIVE.—Geo. G. Buckland, Tulare. No. 321,005. Dated June 30, 1885. This traction engine for ordinary roads, consists in a main frame, the forward portion of which is carried by peculiarly mounted, wide-rimmed wheels, which encircle and enclose a boiler and engine carried by the frame, and from which the front wheels are driven by suitable power-transmitting mechanism. The rear portion of the frame is carried by smaller wheels peculiarly mounted in a pivoted or swiveling truck-frame, and connected with the front wheels by power-transmitting mechanism, whereby all the wheels are drivers. It further consists in the steering-gear and in details of construction and arrangement.

BEESWAX EXTRACTOR.—Joseph D. Enas, Napa. No. 321,090. Dated June 30, 1885. This invention is in that class of wax-extractors in which a foraminous comb-basket is confined within an exterior vessel and is subjected to the action of steam. The invention consists in providing the comb basket with a top-extension projecting above and resting upon the rim of the exterior vessel and provided with handles, that portion of the basket which lies within the exterior vessel being provided with peculiarly sloping sides. It consists further in a filling-spout or lip on the exterior vessel, and a tube-connection between it and the interior water-pan, by which the latter is supplied, the said lip being so located and arranged that its top shall be a little below the level of the discharge aperture from the water-pan.

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific-side of the American Continent. He writes thereof from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less concise writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Lignite; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay of Potassium Zirconate; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 196 12mo. pages, with illustrations, well bound in cloth. Price, 25¢. Postpaid, 30¢. Sold by DEWEY & CO., Publishers, No. 252 Market Street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zirconate; Electric Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores; New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 150 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F. These are much needed books for miners and other practical men, by an intelligent miner and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

Lost Papers.

If any subscriber fails to receive this paper promptly after making due inquiries at the Postoffice, it is respectfully requested to notify this office by letter, that we may send the missing papers, and, if possible, ward against further irregularities.

A GREAT number of new houses have recently been erected in various parts of Napa valley.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCALITY.	S. No.	AMT. LEVIED.	DELINQ'T SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alaska M. and M. Co.	Alaska.	11.	40.	June 30.	Aug. 6.	Aug. 22. T. H. May.	306 Pine st.
Altman M. & M. Co.	California.	2.	01.	June 15.	July 20.	Aug. 10. J. M. Huntington.	306 California st.
Best & Belcher M. Co.	Nevada.	32.	50.	June 2.	July 3.	July 25. W. Willis.	30. Montgomery st.
Blue Bluff M. Co.	California.	9.	24.	July 10.	Aug. 21.	Sept. 12. E. Stodolitz.	419 California st.
California M. Co.	Dakota.	16.	15.	May 28.	July 10.	Aug. 5. W. I. Oliver.	328 Montgomery st.
Copper Mt. Con. M. Co.	California.	2.	01.	June 17.	Aug. 13.	Sept. 17. A. I. Perkins.	310 Pine st.
Cou. Reforma I. & S. M. Co.	Mexico.	6.	49.	July 1.	July 31.	Aug. 17. T. S. Gifford.	331 Montgomery st.
Entrach Gravel M. Co.	California.	18.	05.	May 25.	July 14.	July 31. H. Kiny.	209 Sanson st.
Endowment M. Co.	Nevada.	5.	50.	May 19.	June 22.	July 20. F. M. Hale.	327 Pine st.
Golden Gate M. & M. Co.	Nevada.	2.	25.	June 11.	July 14.	Aug. 1. R. Hewston.	311 Montgomery st.
Gould & Curry M. Co.	Nevada.	53.	49.	June 1.	July 8.	July 23. A. K. Durbrow.	306 Montgomery st.
Gold Canyon M. Co.	California.	1.	21.	June 10.	July 13.	Aug. 4. P. A. B. Riba.	423 Montgomery st.
Homeward Bound M. Co.	California.	1.	25.	June 12.	June 20.	Aug. 11. D. A. Smith.	209 Post st.
Interoceanic M. Co.	Nevada.	42.	15.	July 13.	Aug. 17.	Sept. 5. R. R. Kelley.	419 California st.
Johnson Gravel M. Co.	California.	1.	9.	July 1.	Aug. 5.	Aug. 25. G. W. Hile.	318 Front st.
Merrill M. Co.	California.	9.	13.	June 24.	Aug. 7.	Aug. 31. W. I. Oliver.	328 Montgomery st.
Mayflower Gravel M. Co.	California.	22.	40.	June 4.	July 10.	Aug. 11. J. M. Huntington.	328 Montgomery st.
Mono M. Co.	California.	22.	50.	June 17.	July 22.	Aug. 11. G. W. Hile.	309 Montgomery st.
Navajo M. Co.	Nevada.	11.	25.	May 25.	June 23.	July 20. J. W. Pew.	310 Pine st.
Pay Day M. Co.	Nevada.	3.	02.	June 6.	July 11.	Aug. 10. W. Van Hook.	419 California st.
Potosi M. Co.	Nevada.	19.	50.	July 14.	Aug. 19.	Sept. 10. C. R. Elliott.	309 Montgomery st.
Savage M. Co.	Nevada.	83.	40.	July 1.	Aug. 4.	Aug. 21. E. B. Holmes.	309 Montgomery st.
Sierra Nevada M. Co.	Nevada.	82.	25.	June 2.	July 15.	Aug. 4. E. L. Parker.	309 Montgomery st.
Starlight M. Co.	California.	2.	05.	June 26.	Aug. 1.	Aug. 21. C. E. Hayes.	310 Clay st.
Silver Hill M. Co.	Nevada.	22.	10.	July 1.	Aug. 4.	Aug. 24. E. B. Holmes.	309 Montgomery st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Benton Con. M. Co.	California.	W. H. Watson.	332 Montgomery st.	Annual.	July 29.
Deerhoe Blue Gravel M. Co.	California.	T. Wetzel.	522 Montgomery st.	Annual.	Aug. 4.
Lady Washington M. Co.	Nevada.	W. H. Watson.	332 Montgomery st.	Annual.	July 29.
Manhattan Bar M. Co.	California.	J. W. Pew.	310 Pine st.	Annual.	July 29.
Mammoth Bar M. Co.	California.	Idaho.	311 Montgomery st.	Annual.	Aug. 5.
New York Hill M. Co.	California.	J. B. Leitch.	311 Montgomery st.	Annual.	July 29.
Union Con. M. Co.	Nevada.	J. M. Huntington.	301 California st.	Annual.	July 29.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kosuth M. Co.	Nevada.	C. K. Steadant.	328 Montgomery st.	06.	Mar 15.
Metallum M. Co.	Nevada.	W. H. Hild.	310 Pine st.	20.	July 30.
Navajo M. Co.	Nevada.	J. W. Pew.	310 Pine st.	50.	Feb 13.
Plymouth Con. G. M. Co.	Nevada.	W. Van Norren, Pres.	23 Nassau st. N. Y.	50.	Apr 6.
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery st.	25.	July 15.
Synthetic M. Co.	Nevada.	J. Stedfield Jr.	419 California st.	10.	May 5.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 25.	WEEK ENDING July 2.	WEEK ENDING July 9.	WEEK ENDING July 16.
Alpha.	1.20	1.80	1.00	1.30
Alta.	.55	.90	.45	.60
Andes.	.40	.60	.30	.35
Argenta.	.10	.15	.05	.05
Balding.	1.30	1.60	1.00	.75
Best & Belcher.	2.35	2.90	1.65	2.65
Bullion.	.40	.50	.35	.45
Bonanza King.	.10	.15	.05	.05
Bodie Con.	1.80	2.20	1.35	1.50
Benton.	.15	.10	.10	.10
Bodie Tunnel.	.60	.75	.50	.55
Butter.	2.00	3.35	1.25	1.50
California.	1.75	2.10	1.30	1.50
Challenge.	.20	.20	.20	.20
Champion.	2.10	2.75	1.85	2.55
Chollar.	2.00	2.90	1.50	1.00
Con. Imperial.	2.00	3.35	1.25	1.50
Con. Virginia.	2.00	3.35	1.25	1.50
Con. Pacific.	1.35	1.90	1.25	1.40
Crow Point.	1.35	1.90	1.25	1.40
Eureka Con.	7.00	7.05	5.50	5.65
Eureka Tunnel.	.30	.45	.30	.40
Exchequer.	.30	.45	.30	.40
Grand Prize.	.75	.85	.75	.85
Gould & Curry.	2.50	3.10	1.75	1.70
Goodshaw.	7.25	9.87	7.75	10.67
Hale & Norcross.	10.67	8.12	6.37	7.25
Holmes.	4.50	4.50	4.50	4.50
Independence.	.10	.20	.20	.20
Julia.	.20	.30	.30	.30
Justice.	.20	.30	.30	.30
Martin White.	.10	.10	.10	.10
Mono.	.55	.90	.45	.60
Mexican.	1.20	1.80	1.00	1.30
Met. Diablo.	3.00	2.50	2.50	2.25
Northern Belle.	.30	.35	.30	.30
Navajo.	.30	.35	.30	.30
North Belle Isle.	.75	.75	.75	.75
Occidental.	1.60	2.30	1.25	1.60
Ophir.	.45	.70	.40	.45
Overman.	1.05	1.35	.95	1.25
Potosi.	.45	.70	.40	.45
Prud Con.	4.00	4.85	3.20	3.65
Savage.	1.25	2.05	1.00	1.40
Seg. Belcher.	.10	.10	.10	.10
Sierra Nevada.	1.25	2.05	1.00	1.40
Silver Hill.	.10	.10	.10	.10
Silver King.	.10	.10	.10	.10
Scorpion.	.15	.20	.20	.20
Syndeate.	.40	.35	.40	.30
Tioga.	.10	.10	.10	.10
Union Con.	.10	.10	.10	.10
Utah.	2.50	3.10	2.00	2.30
Yellow Jacket.	2.35	3.10	2.00	2.30
Hale & Norcross.	100	100	100	100
Julia.	200	200	200	200
Independence.	200	200	200	200
Mexican.	350	350	350	350
M. White Con.	400	400	400	400
Bullion.	250	250	250	250
Bulwer.	450	450	450	450
Belle Isle.	200	200	200	200
Santon.	100	100	100	100
Chollar.	1,250	1,250	1,250	1,250
Con. Va. & Cal.	1,600	1,600	1,600	1,600
Exchequer.	150	150	150	150
Gould & Curry.	1,450	1,450	1,450	1,450
Union.	500	500	500	500

Sales at San Francisco Stock Exchange.

THURSDAY A. M. July 16.	100	Hale & Norcross.	6.50
199 Alpha.	200	200 Julia.	100
100 Andes.	1.70	200 Independence.	150
100 B. & Belcher.	2.10	350 Mexican.	800
100 Bodie Con.	1.40	200 M. White Con.	400
100 Bullion.	250	700 Occidental.	1,000
10 Bulwer.	450	200 Ophir.	1,150
100 Belle Isle.	200	750 Potosi.	400
250 Santon.	100	300 Savage.	1,200
250 Chollar.	1,250	100 Sierra Nevada.	1,200
300 Con. Va. & Cal.	1,600	200 Scorpion.	100
100 Exchequer.	150	350 Solid Silver.	250
550 Gould & Curry.	1,450	50 Union.	750

COMPLIMENTARY SAMPLES OF THIS PAPER.

are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in that it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, it is the fault of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. Look carefully at the label on your paper.

Dewey & Co.'s Scientific Press Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.
No. 252 Market St. Elevator 12 Front St.
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

SCHOOL OF
Practical, Civil, Mechanical and
Mining Engineering,
SURVEYING, DRAWING AND ASSAYING,
24 Post Street, San Francisco.
A. P. VAN DERNAILEN, Principal.
Send for Circulars.

RUPTURE!



A New Invention! The "Perfection" Belt. It is a new and self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, cor. Third, San Francisco.

CALIFORNIA MACHINE WORKS.

WM. H. BIRCH,

ENGINEER AND MACHINIST,

No. 119 Beale Street, San Francisco, Cal.,

BUILDER OF

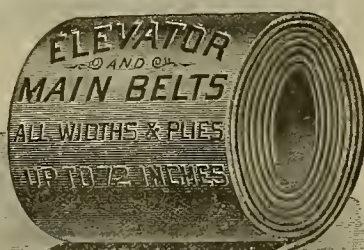
Steam Engines, Dredging, Saw-mill, and Mining Machines, Brodie
Rock Crushers, Flour Mills, Steam Power, Hydraulic,
Sidewalk and Hand-power Elevators.

MANUFACTURER OF

B. E. HENRIKSEN'S Patent

Automatic Safety Catches for Elevators

All Kinds of Machinery Made and Repaired. Orders Solicited.



SOLE AGENTS

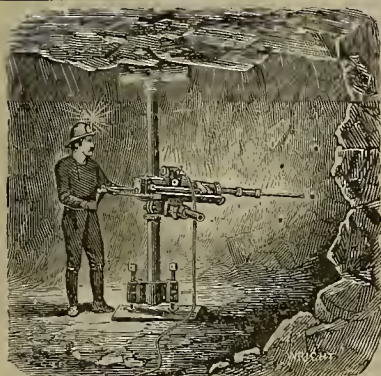
"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made.



INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

⚙️ Gear Cutting a Specialty. ⚙️

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco.
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAGE AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

⚡ Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

Room 5, First Floor,
BOSTON, MASS.

PYROMETERS

GALILEO'S, HOBSON'S, and STEIN'S

PRESSURE GAUGES

Hot-Water THERMOMETERS

ANEMOMETERS

SAFETY LAMPS

BAROMETERS

SALINOMETERS

Mining and Meteorological

Instruments at every this station.

List and Description of our Ten Catalogues sent free on application.

JAMES W. QUEEN & CO.

924 Chestnut St. Philadelphia

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast,

Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

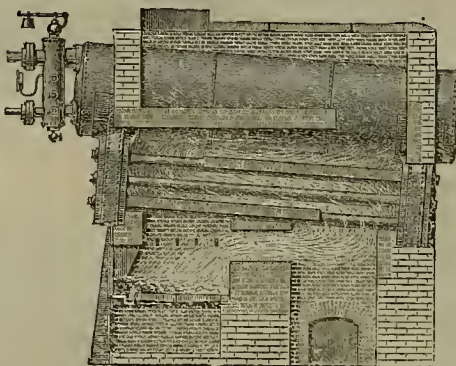
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Borax Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.



Send for Circular and Prices.

THE CUMMER ENGINE CO.

CLEVELAND OHIO.

SEND FOR 150 PAGE ILLUSTRATED CATALOGUE.



Awarded highest premiums at Cincinnati and Louisville Expositions of 1883, for "Best Automatic Engine." We will furnish anyone copies of the ORIGINAL ENTRIES of several engine builders who claim they were not competing with us. They all entered in the same class with us, and now by deceptive Circulars (one headed "Fact versus Falsehood") attempt to mislead. No premiums were offered for Condensing Engines.

AUTOMATIC

JOSHUA HENDY MACHINE WORKS Agents for the Pacific States, 49 & 51 Fremont St. San Francisco.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,

22 Cliff Street, New York.



THE JENKINS STANDARD PACKING

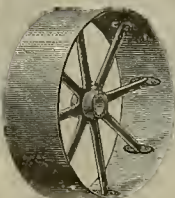


For Sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal.

IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

JENKINS BROS., 71 John St. New York.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

⚙️ Send for Circular and Price List. ⚙️

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

Iron and Machine Works.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. ⚙️ PRICES MODERATE. ⚙️

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF

Steam Engines, Flour Mill,

Mining, Saw Mill and

Dredging Machines

Griddle Rock Crushers,

Steam Power, Hydraulic,

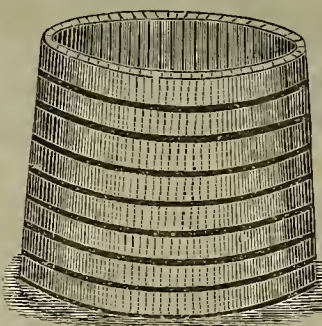
Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ⚙️ ORDERS SOLICITED. ⚙️

MECHANICS' MILLS.

Water Tanks.



Wine Tanks.

Our well-known TANKS are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

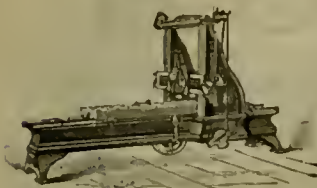
SAW MILLS AND MACHINERY of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

Dewey & Co. { 252 } Patent Ag'ts
Market St.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



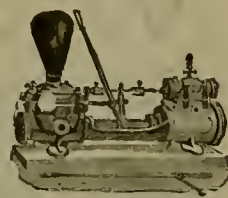
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

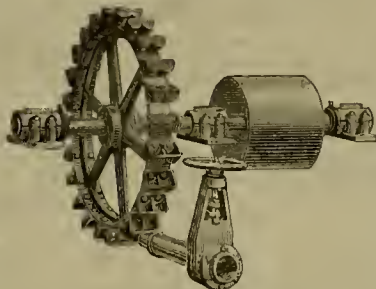
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE,

Flat and Round, of the best material and work-
manship. Large Stock always on hand. Special
sizes made to order.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch.

WIRE FENCING

Of various designs for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS,

BRANCHES—Sacramento, Los Angeles and Portland,

No. 329 Market Street, Cor. Fremont, San Francisco, Cal.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flat from 1 to 8 inch. Angles, Tees, Channels and other shapes
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

All Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.

IRVING M. SCOTT, Gen'l Manager.

J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

WORTHINGTON,

145 Broadway and 86 and 88 Liberty St., New York.

BRANCH OFFICES:

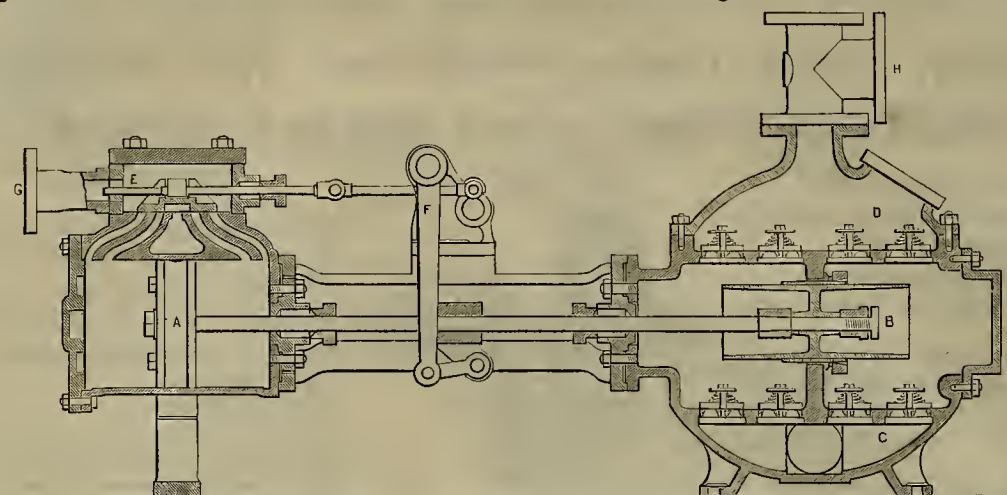
Boston, Chicago, Cincinnati, Cleveland, Pittsburgh, St. Louis, San Francisco.

COMPOUND
CONDENSING

PUMPING
ENGINES.

PUMPS

Of Any Capacity
FOR ALL PURPOSES.



Worthington
METERS

FOR
Pipes from $\frac{1}{2}$ to 6 Inches
FOR MEASURING

OIL,
WINE,
WATER
AND OTHER LIQUIDS.

LOCATION OF WORKS:
Pike City, Sierra County, Cal.

ALASKA MINING CO., 320 Sansome Street,
SAN FRANCISCO, CAL., July 15, 1885.

MR. A. L. FISH (Representing "The Worthington Hydraulic Works")—DEAR SIR: We started the Worthington Compound Pump on the 6th of June. It is the admired of all who see it working. We were burning 17 cords of wood per day pumping and hoisting (15 cords when pumping without hoisting) before starting the new pump, and 8 cords per day hoisting and pumping with the Worthington—showing a saving in pumping alone of 9 cords per day, at a cost of \$3.25 per cord, besides doing away with the services of two men for the 24 hours formerly required to wheel wood into the mill, effecting a net saving of \$35 per day in pumping alone. We carry steam down our shaft 500 feet. Too much credit and praise cannot be given it. We cheerfully recommend the Worthington Pump to all who require pumping machinery.

Yours truly, E. P. BATES, Superintendent and Manager.

TO WHOM IT MAY CONCERN:

We claim for the Worthington greater economy than with any other pumping engine, and give herewith a few figures for consideration. The duty trials of Worthington Direct Pumping Engines at Salem, Mass., Newark, New Jersey, and recently at Buffalo, New York, show the

consumption of coal, compared to that consumed (doing the same work) by rotative engines at Montreal, Canada, to be less than .31 per cent; Shepard engines, Buffalo, less than .42 per cent; Cornish engines, Louisville, Ky., less than .45 per cent; Cornish engines at Cleveland, Ohio, less than .55 per cent; the best Cornish engine in America, at Jersey City, N. J., less than .57 per cent; Fall River, Mass., Rotative engines, less than .33 per cent; and have all been superseded by the Worthington. The above-mentioned tests of Worthington Pumping Engines show a consumption of less than .45 per cent for the same duty that the Chicago Water Works engines show for nine years.

The Pumping Engines in use on the pipe lines of the National Transit Company are the Worthington Compound Condensing type of 500 to 800 horse power each, and are working against pressures of 1,000 to 1,500 pounds per square inch. The greatest distance between two stations is 114 miles. They are forcing oil from the oil regions of Western Pennsylvania to the cities of Buffalo, Cleveland, Pittsburgh, Baltimore, Philadelphia, Jersey City, New York City, and through the Hudson and East Rivers to Long Island City Refineries. The oil is pumped over the Alleghany Mountains, 3,000 feet high.

The Pumping Engines built for the English Government, intended for pumping water across the African desert for the British armies, are the Worthington. Every sale of the Worthington Pump is a guarantee for the purpose required.

A. L. FISH, Sales Agent, 30 and 32 First Street, SAN FRANCISCO.

CALIFORNIA WIRE WORKS.

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE.

Bright, Galvanized, Telegraph, Baling,
Annealed, Tinned, Telephone, Furniture
Coppered, Lacquered, Fence, Spring.

ASK YOUR STOREKEEPER FOR



Trade
Mark.

WIRE CLOTH. Brass, Copper, Iron, and Steel, all kinds, and meshes from 1 to 10,000 holes to the square inch. for Quartz, Paper, Sugar and Pulp Mills. AGENTS for National Battery Cloth.

BARBED WIRE. Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Wire and Flat Barbs, 2 and 4 Pointed. No danger of lawsuit by buying our make.

WIRE GOODS.

Ornamental, Decorative, and Useful, for indoor and outdoor use. Flower Pot Stands, Summer Houses, and Trellis-work, every kind of Fancy Work.

WIRE GUARDS, FENCES, RAILINGS, GATES, STALLS, SCREENS, SIEVES,
WROUGHT IRON RAILINGS, FENCES, CRESTINGS, GATES OF FANCY
DESIGNS.

ALL KINDS OF ORNAMENTAL WORK IN WROUGHT IRON AND WIRE.

Our Wire Cables, Ropes and Cordage have Stood the Test of Years.

ESPECIAL ATTENTION PAID TO CABLES FOR STREET RAILWAYS.

For Anything in Wire, Address the

CALIFORNIA WIRE WORKS,

BRANCHES—Sacramento and Los Angeles, Cal.; Portland, Or.

No. 329 Market Street, San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, JULY 25, 1885.

VOLUME LI.
Number 4.

The Babcock and Wilcox Boiler.

The Babcock and Wilcox boiler is a type which has been known for some time and which has gradually won its way to public favor by the results which it has accomplished. These boilers have a record for safety, durability and for economy in the use of fuel. Not long since the Fulton Iron Works, of this city, secured the agency for the manufacture and sale on the Pacific Coast, and steam users can now be supplied with this boiler, manufactured in this city as one of the local industries of California.

Mr. Chas. G. Ewing, who has represented the Babcock & Wilcox Co. on this coast for three or four years, has been engaged by the Fulton works to give personal attention to the details of this branch of the business, at 561 Howard street.

The engraving on this page shows a 125 horse-power boiler of this type. This boiler is composed of lap-welded wrought-iron tubes, placed in an inclined position and connected with each other, and with a horizontal steam and water drum, by vertical passages at each end, while a mud-drum connects the tubes at the rear and lowest point in the boiler.

The end connections are in one piece for each vertical row of tubes, and are of such form that the tubes are "staggered" (or so placed that each horizontal row comes over the space in the previous row). The holes are accurately sized, made tapering, and the tubes fixed therein by an expander. The sections thus formed are connected with the drum, and with the mud-drum also, by short tubes expanded into bored holes, doing away with all bolts and leaving a clear passage-way between the several parts. The openings for cleaning opposite the end of each tube are closed by hand-hole plates, the joints of which are made in the most thorough manner by milling the surface to accurate metallic contact, and are held in place by wrought-iron forged clamps and bolts. They are tested and made tight under a hydrostatic pressure of 300 pounds per square inch, iron to iron, and without rubbing, packing or other perishable substances.

The steam and water drums are made of flange-iron or steel of extra thickness and double riveted. They can be made for any desired working pressure, but are always tested at 150 pounds per square inch unless otherwise ordered.

The mud drums are of cast-iron, as the best material to withstand corrosion, and are provided with ample means for cleaning.

In erecting this boiler, it is suspended entirely independent of the brick-work or fire-front from wrought-iron girders resting on iron columns. This avoids any straining of the boiler from unequal expansion between it and

its enclosing walls, and permits the brick-work to be repaired or removed, if necessary, without in any way disturbing the boiler. All the fixtures, such as fronts, bearers, buckstays, gauges, valves, etc., are extra heavy and of neat design, made especially for this boiler.

The fire is made under the front and higher end of the tubes, and the products of the combustion pass up between the tubes into a combustion chamber under the steam and water drum; from hence they pass down between the tubes, then once more up through the space between the tubes, and off to the chimney.

water level; freedom of expansion; safety and durability; capacity, etc. The following are among the San Francisco and Pacific Coast users of the Babcock & Wilcox boilers: The Genesee (Flour) Mills, the Market Street Cable Railway, Visitacion Water Co. (Bay View), the Capitol Mills, Messrs. Tatum & Bowen, San Francisco; Pasadena Land and Water Co., Los Angeles; Moulton Mining Co., Butte City, Mon.; the Judson Manufacturing Co., Oakland; the California Cotton Mills Co., Oakland; the Northern Pacific R. R. Shops, Portland, Or.; the Lick Paper Mills, "Agnewe," Santa Clara

Spanish-American Trade.

English manufacturers are becoming alarmed at the inroads made upon their trade by the Americans, or Spanish-American markets. In Mexico, Central America and South America English goods have had a strong hold for a long time; but owing to dullness at home the American manufacturers have of late been reaching out for new trade, and have been getting it, too, much to the disgust of the agents of English houses. The latter are now urging their home establishments to meet the existing

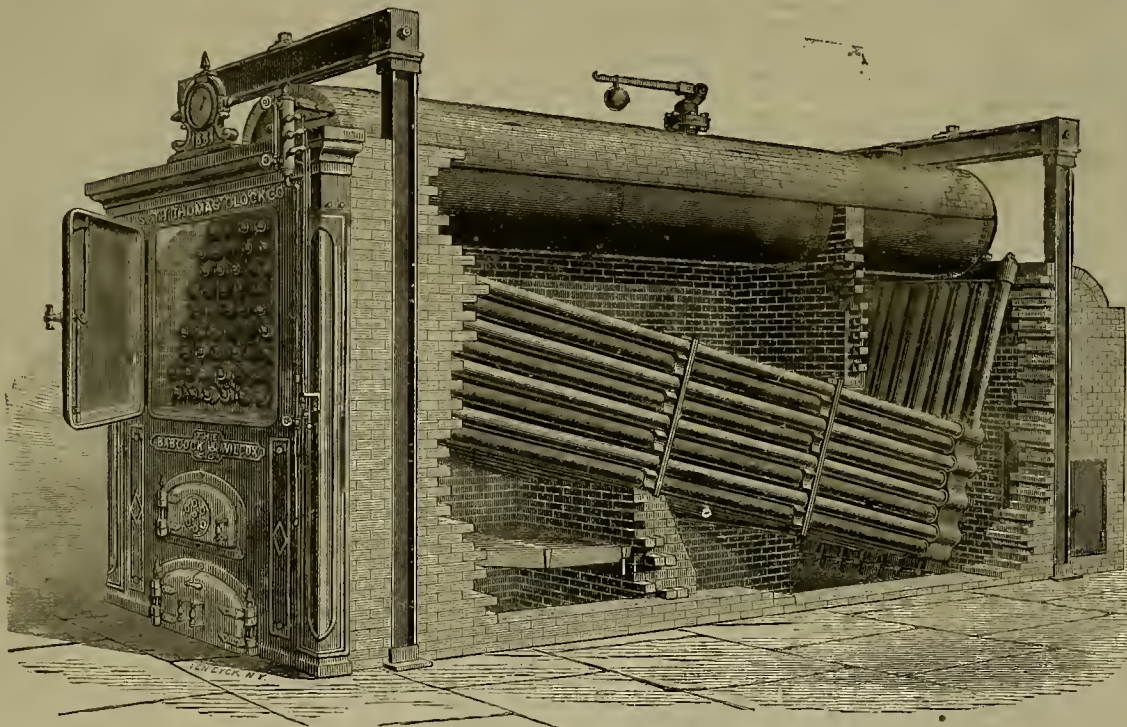
competition in like manner. A correspondent of the *British Trade Journal* sums up the situation (writing from San Jose de Costa Rica) when he says: "The Americans are not content with monopolizing the hoardings and newspaper columns with advertisements, and with circulating illustrated catalogues and prospectuses; they have now begun to develop a methodical and systematic propaganda hitherto unattempted. American agents are scattered here and there to entrap the consumer, and well-paid travelers scour the country, forcing American goods on the market."

Mere grumbling, however, will not do much good to our cousins across the water. Mexico is now linked to the United States by good railroads, and this, of itself, is a fair reason why we should be favored with the preference.

With Central America, we of this coast have long had a good trade. We build vessels for their coast trade, and send them down loaded, and we take their coffee, etc., in return. With Mexico, too, our California manufacturers, especially of mining machinery, have done well. Men from this State have of late been "drumming" the Northern States of Mexico pretty thoroughly, with various classes of goods. The proportion of poor people among the population is so great, however, that only certain classes of goods will sell there. As the country becomes more settled up with Americans, our trade ought to be much greater.

This extension of trade to other countries is a good thing for this nation. The more we can make and sell abroad the better we will be off. For a hundred years we have been importing too much. Now we have so many of our resources developed that we can afford to look out of our own boundaries for customers. And we will not be likely to sit and wait for them to come, but will send and hunt them up. The American drummer with his samples will do more to change channels of trade than all the diplomats living.

TWENTY-EIGHT States in the Union have adopted laws restricting the practice of medicine to educated persons.



BOILER OF THE BABCOCK & WILCOX TYPE—125 HORSE POWER.

The water inside the tubes, as it is heated, tends to rise toward the higher end, and as it is converted into steam—the mingled column of steam and water being of less specific gravity than the solid water at the back end of the boiler—rises through the vertical passages into the drum above the tubes where the steam separates from the water and the latter flows back to the rear and down again through the tubes in a continuous circulation. As the passages are all large and free, this circulation is very rapid, sweeping away the steam as fast as formed, and supplying its place with water; absorbing the heat of the fire to the best advantage; causing a thorough commingling of the water throughout the boiler and a consequent equal temperature, and preventing, to a great degree, the formation of deposits or incrustations upon the heating surface, sweeping them away and depositing them in the mud-drum, whence they are blown out.

The steam is taken out at the top of the steam-drum near the back end of the boiler after it has thoroughly separated from the water.

Among the prominent advantages claimed for these boilers are the following: Their heating surface in furnace; joints removed from fire; large draught area; complete combustion; thorough absorption of heat; efficient circulation; quick steaming; dryness of steam; steadiness of

Co.; Germania Lead Works, Salt Lake; G. Billing Smelting Works, Socorro; Empire Mining Co., Salt Lake.

TAILINGS.—Superintendent W. E. Sharon, of the Yellow Jacket mine, has recently had the value of the tailings bank at the foot of Sugar Loaf mountain thoroughly tested by taking about 150 assays from different portions of the reservoir. The present shows an average value of \$5.50 per ton. These tests were made with the view of working the tailings in a large pan mill to be built on the site of the old Express mill (now partially dismantled), on the north side of the reservoir. The assays proved too low, however, to admit of profit with steam power, and the project has been abandoned for the present. If arrangements can be made for a supply of water at a rate that will give a fair margin, the mill will be built. This bank of tailings, about 600,000 tons, is the property of the Bank of California.

It is generally believed that Frank Drake's mission to London is to induce the Eberhardt Company to purchase one of the valuable mining properties in Taylor District, Nevada.

THE coinage of the various mints during the month of June was \$4,936,801, of which \$2,378,150 was in standard dollars.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Georgia Gold Mines.

EDITORS PRESS:—An old California expert, writing from Georgia, says: "Californians seem to know but little about the Georgia gold mines. It has surprised some who have visited them very much, amongst others Prof. Hanks, the California State Mineralogist, who, in his hurried trip through a portion of the gold belt expressed himself as highly pleased and surprised at the low cost of working the mines here." My own visit a short time since to the rich mines of White county would be interesting to any one from your Golden State. Most of the mines in this county are idle for want of proper capital for mills, to bring water, etc. The Forest Springs mines, said to be the best ever opened in the State, are about to be opened anew for work, having recently had their water rights confirmed in the U. S. Courts. These mines were formerly the old Sprague & Lewis and worked in a small way over fifty years ago. The quartz rock from the Sprague yielded from \$1 to \$5 per bushel, or \$20 to \$100 per ton. Rock lately crushed from this mine yielded \$18.13 per ton.

The "Lewis" is another true fissure vein and pays from \$6 to \$26 per ton, while the cost of mining and milling is less than one dollar per ton.

The famous "Loud" placer mines are drawing attention now. Seven and three-fourths pounds of gold were found in a pocket in the slate-bed rock. Another find of 17 nuggets in a pocket yielded about \$3,000. This placer mining with pay dirt from 5 to 20 feet deep pays with cradle and Tom an average of one pennyweight per day to the hand, and by hydraulic washing probably the richest results to be found on the continent.

The foreman of one of the most successful mining companies gave me the result of June's clean-up, which I think cannot be equaled anywhere for cheap mining. The 40-stamp mill crushed 3,532 tons of quartz, which yielded with coarse screens \$6,624. The sluices yielded \$1,728; total, \$8,352. This cost at the mine, hydraulic pipe, etc., \$268.42; at the mill, \$300, leaving a net profit of \$7,783.58. The decomposed schistose bed-rock at the mine is filled with seams and chutes of good quartz rock. This is piped away with a stream of water and carried through sluices to the mill, which process accounts for the low cost of working the mine. Mill machinery can be bought here at a lower price than any mining country I know of. A 40-stamp water-mill was put up in running order for \$10,550.

The Blue Ridge mountains of this State seem to be full of mineral and have been very little prospected.

When Californians get started this way with their thorough knowledge of mining the country will be surprised at the rich developments sure to be the result. X X X.

Base Ore and Concentration.

It is now a generally conceded fact that no subject connected with the reduction of ores begins to compare in importance to that of concentration. In early days mines were found to pay well, and were worked without much regard to economy or close saving; but times have changed. The richer surface deposits have been worked out, and with depth comes a base mineral carrying a large percentage of the value of the ore in such a combination that it will not amalgamate without being submitted to a subsequent process of chlorination. The treatment of this product has now become a very simple, and comparatively inexpensive matter, but the separation of the base mineral from the gangue has been one of the most difficult problems ever encountered in the process of ore reduction.

Any number of machines, it is well known, have been invented for this purpose, some of them being more or less successful, but all open to serious objection in their want of adaptation to various ores, high costs, complicated mechanism, etc. The machine that shows the greatest advance towards perfection in this direction is unquestionably the Duncan. We have heard much of its operation in various parts of the country, but until recently have had no opportunity to personally observe its workings.

Some two months ago three of them were introduced into the Utica mill, near here, taking the pulp from ten stamps, and their operation has awakened great interest among mining men in all this section of the country. So satisfactory has been their work after a thorough test, that three more have been put in to run in connection with the ten-stamp battery which has recently been added to this mill. Six of them are now running, working the product of 20 stamps, upwards of 40 tons per day, saving the sulphurets in a remarkably clean condition, and fully up to 95 per cent. No such work has ever been seen in this part of the country before. These machines are wonderfully simple, and run with little or no attention, and are said to cost less than half that of any other of like capacity. Success to the Duncan!—Mt. Echo.

The May Flower G. M. Co.

The Newest Placer County Bonanza.

The late rich strike at the May Flower mine, near Forest Hill, continues to be the absorbing topic of interest to miners and all others who are connected with mining enterprises in this county. That ninety or a hundred thousand dollars have been taken out in a little more than a month is in itself a statement of the splendid results which pluck and perseverance will some times command. In this connection, a brief synopsis of the history of the mine will be timely, and very welcome to our readers. The May Flower Gravel Mining Company was organized October 26, 1877. The mine, which was bought of W. A. Freeman, is situated in Second Brushy Canyon, a mile and a half north-east of the town of Forest Hill, and comprises a large extent of ground in May Flower Canyon, Crary Canyon, Young America Canyon and Stone Canyon. The public of Placer county well know the obstacles and discouragements that beset the company at the outset of its career. When it became necessary to give up hydraulicking, Mr. Chappellet gave his attention to the study of the best method of working the mine by means of tunnels and shafts. A shaft was sunk on the plateau in Crary Canyon, July 26, 1883, the top gravel having previously been washed off. The directors of this mine did not approve of this rash and costly experiment, as they doubtless regarded it. But Chappellet was an old Comstock miner, and they had great respect for his opinions, and they did not thwart him to any great degree.

Opening the Mine.

But there was more discontent yet when the energetic superintendent continued to sink other shafts. After many vexatious delays and difficulties of various kinds, after shafts and tunnels and winzes had been run thousands of feet into the earth, when the head men of the company had had their patience finally worn out, it was all but decided that Chappellet must go. It is said he had tendered his resignation, but, like Columbus, when his sailors were about to mutiny and turn the ship back, he wanted just one more chance. And lo! like the immortal navigator, his vision was greeted with the crowning glorious discovery, his faith was rewarded, his triumph was complete. A quarter of a million of money had been expended, and how many there were, not only among directors and capitalists, but of the outside mining world, who were sorry to think that not a dollar of it would ever come back to the pockets of the too-confiding stockholders. On the 27th of May last the pay lead was struck. It was found to be seven feet thick on the bed-rock in the river bed, by 75 feet wide. The last run of one week, prior to the writing up of these notes, produced \$32,000, equal to an average of \$92.65 per ton. The present outlook is far better than when the run above mentioned was made.

The May Flower is the first company that has ever tapped the main channel on the Forest Hill divide. No other gravel mine on that divide, or anywhere else, so far as known, has made so good a showing of gold produced in so short a time as the May Flower has done during the past six weeks. That the output of the precious metal will continue there seems no reason to doubt; the channel is large and the company's claim is extensive enough to give employment for a century.

The Works.

The company's works comprise some of the largest, most imposing and altogether best mining outfits in this State or any other State. They have fine hoisting works, with three large boilers, a 10-stamp mill, which will very soon be enlarged to 20 stamps, if, indeed, the enlargement has not already been made. The frame-work covering these works and all this machinery is the largest of any in California, and is built in a very substantial manner. The hoisting-tower is 106 feet high, this height being deemed necessary in order that the mine should have a good dump. About 65 men are employed by the company, which, we may say, *en passant*, has its own boarding-house and workmen's cottages, and will soon have its own general merchandise store, butcher shop, etc.

In fact, the mine has become in itself the nucleus of a thriving village. This brief and hasty, but, so far as it goes, accurate sketch of the mine would be lacking in one important matter of interest to the public, did we not give the names of the gentlemen who compose the Board of Directors of the company. These are: James Newlands, president; R. Martinez, vice-president; V. M. Foucault, Chas. Collischonn and J. St. Denis. Messrs. F. Chappellet and Jos. Morizio, the very efficient and able secretary of the company, are the two oldest members of the company—and who were, in fact, the originators of it—and they are, of course, as already intimated, consulted about everything, and indeed they are the arbiters of the mine's destiny, for had it not been for their intelligent management and courageous persistence, the May Flower strike would not be, as it is now, the theme of conversation on Pine street and Pauper alley, as it is in Placer county and to some extent all over the coast.—*Placer Argus*.

A PLACE known as Russel's, near Santa Cruz, has been chosen for future State militia encampments. It is said to be free from fogs, and only ten minutes' walk from the beach.

Legitimate Mining.

The days of great mining excitements and "booms" are fast becoming a thing of the past. So many have proved to be fraudulent schemes of companies of men that the public do not "bite" as readily as in the early history of mining. Something more than flaming reports, accompanied by rich assays, are necessary to attract the attention of the mining public, and to induce any great number to rush to the alleged favorable localities. The great deceptions that have been practiced in the past, and the deceptions that are now being practiced in some localities on a smaller scale, have resulted in considerable injury to legitimate mining, inasmuch that the capitalist hesitates a long time before he will venture to invest in property, no matter how promising its surface indications. "Honesty is the best policy," refers to mining as well as other industrial pursuits, and when the miner deviates from its practice he injures his prospects to the extent of his misrepresentations. It is better for a mining enterprise, as well as any other kind, to build up on its own merits, and then it will stand firm like a monument of truth and worth, to give encouragement to other enterprises, and induce capital and labor to combine in developing Nature's vast mineral resources. Mining operations in many localities are progressing successfully, though slowly and without any fuss, and when the Eastern capitalist with his idle millions sees the authentic reports of the annual yield of bullion, and his curiosity is aroused to examine carefully the source from whence it flows, he will be encouraged to invest, and if he does not fall into the clutches of mining sharks, will be instrumental in building up new and prosperous camps, and while adding to his own great wealth will give labor to thousands and increase the country's wealth. It pays to publish the truth at all times and to keep within the bounds of fair estimates. The various companies that are now operating in this desert in a quiet and business-like manner, are beginning to attract the attention of outside capitalists, so that we can reasonably expect and predict that many more similar enterprises will be established, and that the great mineral bearing desert will support thousands where it now supports hundreds of people. When the California Southern is completed and the Carson and Colorado Railroad connects with the Atlantic & Pacific, then new localities will be favored with cheap transportation, and where the prospector is now struggling to open up his prospects and vainly trying to interest the capitalist to examine and purchase the same, there will ere long be thriving camps, with improvements and developments on every hand. The improvements that have been made in these mining regions in the past three years warrant these predictions, and the best results can be accomplished by pursuing a business-like and legitimate course in all operations, and avoiding wildcat schemes as has, with a few exceptions on a small scale, been done with profitable results.—*Calico Print*.

Wood River.

The Salt Lake Tribune, in an article on Wood River, Idaho, says:

Everywhere there has been the past few months a season of quietness in business and a stringency in money matters. Wood River has felt the depression severely, but just now there are signs of the coming of better times. Like all mining districts, the rush of people here brought a large percentage of non-producers expecting to gain an easy living off the labors of the miners, and, having failed to do this, are ready to condemn the country. Then, again, with prospect and mine owners there has been a disposition to sell rather than to work their properties. A few sales at large prices put the owners of almost every prospect in the notion of making similar sales rather than working their ledges or ore deposits for what there was in them. This and the idle talk that the

Mines Did Not Go Down

Deep has seriously affected the whole Wood River country, and it is time such ideas should be abandoned, and the mines be worked for what there is in them. Then the want of ample capital has kept back much development, and scores of good properties have been permitted to remain idle.

The depression in prices of lead and silver has also had its influence and turned the attention of mining men towards gold, which just now is the desideratum with many. About one year ago trouble began over miners' wages, culminating in a reduction, the shutting down of some of the best mines, the final disbandment of the Miners' Union, and a general depression in business of all kinds. These disturbances kept away outside capital, and no one can compute the loss to the district from these causes.

But Wood River is a good country. It has the prettiest hills and valleys, is the best timbered, best watered, has a good climate and in many respects is the best mining country in the West. Business has begun to revive and we confidently look forward to better times. Just now

The Gold Belt

Is exciting attention. Beginning a few miles southwest of Bellevue, a good ledge has been located for miles northward, and on the Camas No. 2 a 10-stamp mill is pounding out gold.

This mill was first thought of about three months ago, and for two or three weeks has been producing gold at the rate of nearly \$150 per day. This is from surface rock, where the immense ledge lies exposed, and is easily taken out with pick and shovel. A few weeks will determine the question of enlarging the mill and of erecting other mills on the ledge, which is extensive enough to keep hundreds of stamps employed for many years to come.

Hydraulicking in Trinity County.

A correspondent of the *Report*, writing from Trinity county, says:

Modern improvements in mining are doing much to develop the mines of this county. I was asked by my friend Henry Martin if I would like to see a finely equipped hydraulic mine. Of course I did. So early this morning with a fine span of horses attached to his buggy we drove to Junction City, nine miles below Weaverville, where we visited the Hayes Rad Hill mine, owned by Dr. Albert H. Hayes, of Boston, who purchased the McKenna and Keno mines about five years ago. These mines lie on the south side of Trinity river, extending about two miles, and contain about 500 acres of mining ground, not over ten acres of which have yet been mined. Five acres of the McKenna mine yielded \$200,000 before the sale to Dr. Hayes. Already about \$100,000 has been expended in making this what they call "a finely equipped mine." A ditch ten miles long, of nearly \$3,000 inches capacity, takes the water out of Canyon creek and conveys the same to the high bluff bank of the Trinity river, where it is stored in a large reservoir which is reached by a stairway of 580 steps. This reservoir is 300 feet above the bed-rock and 360 feet above the river.

The water is conveyed across the Trinity river in an 18-inch pipe, resting on a suspension bridge supported by two four and one-half inch cables, 516 feet long, the span from tower to tower being 350 feet. Each cable contains 1,050 wires of Bessemer steel, and weighs over 23,000 pounds. All the pipe used for mining purposes is manufactured on the grounds—the iron being shipped in sheets direct from Philadelphia—one shipment alone containing nine carloads. The mine is worked by three hydraulic giants—two number five and one number seven in size. They can throw water through 5 and 8-inch nozzles a distance of 300 feet against the gravel banks. These banks are from 20 to 140 feet high. The able and energetic superintendent of this mine, E. M. Benjamin, who for eight years was foreman of yards and docks at the Navy Yard, Mare Island, has made many improvements in working the mine, among others instead of blasting boulders and running them into the dump they are hauled away on sleds by horses. In this way they can remove 300 tons of rock per day. Thirty-two men are now employed in this mine; wages \$50 per month and board. The mining season usually extends from November to August, or a longer or shorter time, according to the supply of water. Mr. Benjamin says they have mining ground enough to last a hundred years. This does not look as if the mines of Trinity county are exhausted. Everything about this mine is in perfect and systematic order, and the enterprise of Dr. Hayes is sure to be crowned with success. The bookkeeper of the mine is Miss Ruth Benjamin, daughter of the superintendent. The books are neatly and cleanly kept, showing that she fully understands her part of the business.

NEW MINING MACHINERY.—Inventors are still diligently at work and numerous devices are constantly being brought to notice for extracting cheaply the values in the ores or for eliminating waste material and concentrating the values. Quite a number of process plants have been erected in various parts of the State the present year, notice of most of them having been given in these columns. Concentration is most desired by mine owners, who, as a rule, are well satisfied with existing prices of reduction. Denver seems to be headquarters for these experimental machines and some very good results have been secured on sample runs on ore sent for that purpose. This is encouraging, but by far the healthiest evidence of real merit in these new devices is the form by which inventors introduce their machines to the public. They do not attempt to crowd a sale through, but instead offer practical tests on any kind of ore a miner can bring, and allow him to witness their performance. Two or three machines now on exhibition in this city are winning friends daily when in operation, and it will not be surprising if a number of them are purchased by their converted admirers.

IN FAVOR OF SILVER.—Baron Rothschild, who is reputed to be one of the greatest financiers, as he is at the head of one of the greatest banking houses in the world, expresses his views on the silver question, and they are in accord with those of the friends of the double standard. He says the simultaneous employment of the two precious metals is satisfactory and gives rise to no complaint. Whether gold or silver dominates for the time being, it is always true that the two metals concur together in forming the monetary circulation of the world, and it is the general mass of the two metals combined which serves as the measure of value of things. The suppression of silver would amount to a veritable destruction of values without any compensation.

MECHANICAL PROGRESS.

The Nail Question.

Iron cut nails appear to be fast going out of date. Between the growing demand for steel cut nails and wire nails the demand for the old-fashioned iron nail is being decidedly lessened. The *Age of Steel* of St. Louis furnishes the following interesting statistics:

As very few steel nails were made in the United States prior to 1883, that year may be said to have witnessed the beginning of this innovation, which made such rapid progress in 1884 and is destined to assume large proportions during the present year. The production of steel nails in 1883 consisted of 18,224 kegs, of which 2,241 kegs were made of combined iron and steel. Their production was distributed as follows: New York, 14,768 kegs; Maine, 2,143 kegs of combined iron and steel; Illinois, 700 kegs of steel and 100 kegs of combined iron and steel; Massachusetts, 513 kegs. Of the total production of nails in the United States last year, 393,482 kegs or 5 per cent were steel nails of which 500 kegs were of combined iron and steel. Their production was distributed as follows: West Virginia, 204,336 kegs; Ohio, 130,636 kegs; Pennsylvania, 29,324 kegs, of which none were made in the eastern district; New York, 14,500 kegs; Massachusetts, 11,450 kegs; Illinois, 3,236 kegs. These figures indicate the rapid growth of an industry which had no existence three years ago.

But it is not with the statistical features of the steel nail that we have to deal at this time. It has already been shown to the satisfaction of all fair-minded men that the steel nail has many points of advantage over the iron nail. And these excellencies have been so marked and striking that many of the mills now making iron nails are preparing to enter upon the manufacture of steel nails exclusively in the near future. In addition to the mills now prepared to turn out steel nails, several are engaged in the erection of plants which will be completed within the next three months. A Bessemer plant for the manufacture of nails is being erected at Mingo Junction, O. The equipment will embrace two 5-ton converters. The two companies, whose offices are at Wheeling, with works in Ohio, are extensive manufacturers of nails, and expect their joint product of steel nails to be 2,500 kegs daily when their arrangements are completed. The Western Nail Company are pushing the erection of a Clapp-Trilliths steel plant at Belleville, Ill. The capacity of the new steel plant will be forty tons per day greater than the present capacity of the nail works, but it is the purpose of the company to increase the nail-cutting department. This will require a total of 231 nail machines—seventy-eight more than are now in operation. Other iron manufacturers at Pittsburgh, Wheeling, and points further west, are earnestly considering the advisability of adding steel plants to their iron works. In some cases the only matter to be settled is the process to be adopted. In the East several parties are making inquiries concerning the cost of building steel works, but have not yet decided to enter upon the work of erection. We think it safe to say, however, that within the next year at least fifteen or twenty mills in this country will be turning out steel nails.

Wire Nails.

We may add in this connection that wire nails are also rapidly gaining ground, and the designing of machinery for making them is taxing the inventive ability of many good mechanics. It is the opinion of some who have carefully studied the mechanical and metallurgical progress that steel-wire nails are destined to come into common use in the near future. Old Bessemer rails will come upon the market in large quantities before many months have passed, because they are wearing out faster than was thought possible in the earlier days of steel tracks. Mr. Masters has shown that they can be melted in an ordinary cupola and molded into good castings, but it is believed that they can be utilized with more profit by drawing them into wire. Old steel rails can be readily worked into wire of good quality suitable for nails. A mill has been erected in Syracuse for making wire from old rails, but it has not gone into operation. How fast steel-wire nails will come into use depends largely upon how fast old steel rails are thrown upon the market.

Self-Hardening Steel.

Mr. Adam Tindel, of the Frankford Steel Works, Philadelphia, is producing a tool steel which possesses remarkable qualities. Its chief peculiarity consists in its being self-hardening. No process of hardening in water or other liquids nor of subsequent tempering is necessary in its use. In this respect it resembles Mushet's steel. In making a tool from Mr. Tindel's steel it is shaped over the anvil, as with ordinary tool steel. When the tool is forged it is laid aside to cool in the air. When quite cold it is found to have taken a hardness exceeding that of any steel hardened by the usual process of immersion in water or brine. So hard is it that the teeth of a Stubbs' file will be turned by a single stroke across it, and the edge of a finely-tempered cold-chisel completely destroyed in an attempt to cut it, not the slightest impression being left on the Tindel steel. Another peculiarity of the metal is its ductility in forging. It forges and welds to

iron quite as readily as tool steel. At the usual heat no difference can be perceived in its capacity for being drawn, bent or tortured from any good quality of cast steel. We have been shown samples of this material, and the file and chisel tests certainly show a superiority in hardness above that of tempered steel. Mr. Tindel has a number of reports from prominent manufacturing firms and railroads who have been using his steel for nail cutters, dies and lathe and planer tools, working on tires and hard castings, which go to show that the steel, which he has named *Acier Imperiale*, will occupy a prominent place in the line of tool steels for the special uses for which such a grade of metal is adapted.

DEADENING THE SOUND OF CIRCULAR SAWS.

—The circular saw frame should be fixed on a brick or stone bed, and the shaft or bearings kept clear of the wall, so that the sound is not carried by contact into the wall. If the wall is not built, we recommend a hollow wall with iron ties, and the space filled in with sawdust, no opening of any kind being made. If the wall is built, and of single brick, line it with another single brick wall, inserting sawdust between, or a layer of hair felt. If the wall is of wood quartering, lath and plaster it on both sides, and fill in between with sawdust, or coat over the studding with hair felt, and lath and plaster over the face of it. In fixing the quartering, if attached to wood at the top or bottom, bed the attaching points, or parts, in hair felt. Sound will travel with air; therefore exclude all connection of air. Sound will travel through glass, wood, or stone, except it be of great thickness; therefore intercept it by sawdust or hair felt, which are non-conductors. If you have a circular saw on one side of a wall, and you want a point of silence on the other, you must stop all direct communication, and can the sound-laden air to travel in long and circuitous routes; and give out its vibrations before it reaches that point.

DECOMPOSITION OF CAST IRON BY HEAT.

From some experiments which M. L. Forquignon made upon malleable iron, he was led to suppose that cast iron, at a temperature somewhat inferior to its melting point, is decomposed into free graphite and a purer carburet of iron. He accordingly heated cast iron in a vacuum, to a temperature of from 900 degrees to 1,000 degrees C., for several days, without melting or softening. The metal became malleable, and its surface was covered with a dull greyish efflorescence, which produced a mark upon paper or on rough porcelain. The fracture was sometimes of a uniform black, like that of a lead pencil, and sometimes it was dotted with black grains of amorphous graphite, regularly disseminated throughout the mass. It seems probable, according to the *Comptes Rendus*, that this partial decomposition depends upon a tendency to equilibrium between the carbon, the iron, and the carburet of iron, the relative proportion of each of these bodies being a function of the temperature. The decomposition of a homogeneous solid into two other solid bodies is a very rare, if not unique phenomenon.

A NEW PROCESS OF HARDENING STEEL TO BE used for tools, dies and similar purposes has been patented by N. C. Hubbell, of Hartford, Conn. The inventor uses the substance known as snell-marl, as it comes from the bed. This substance is powdered and mixed with water, the proportions being 3½ pounds of powder to 10 gallons of water. The steel is heated in the usual manner, but to a much lower degree than in cold water. It is then plunged into the bath and remains in the same until cool. This bath is said to produce the same degree of hardness with a much lower degree of heat, and thus any cracking is claimed to be avoided. It is also said that the lower grades of steel may be hardened by this process and employed with the same success as the finer grades.

A NON-EXPLOSIVE (?) BOILER!—A correspondent of the *English Mechanic*, writing from Morchain, Somme, France, says: "A boiler of a new system, which receives the name of *generateur triyrique inextinguible*, has been invented, which differs from all those hitherto produced. The metallic surface submitted to the action of the fire does not touch the water; in no condition can the boiler get red hot; it is enveloped all over by the same temperature; hence an immense vaporization; and steam can be produced to the very last drop of water without the least danger."

TOOLS FROM OLD STEEL RAILS.—A foundryman at Youngstown, O., after experimenting for three years, has secured a process by which with one heating old steel rails can be transformed into steel tools and steel castings of every description ready for use. A company is being organized to utilize the process.

THE DAVY PROCESS.—A syndicate of Mercer Co. (Pa.) capitalists has sent a commission to England to confer with Alfred Davy, the inventor and proprietor of the Davy process of steel manufacture, in regard to the feasibility of erecting a large plant of steel works somewhere in that locality.

POWER IN TURNING SHAFTS.—If a four-inch and a two-inch shaft are both solid, and each make 100, or any other given number of turns in one minute or other specified time, six times as much power will be consumed in turning the larger as in turning the smaller shaft.

SCIENTIFIC PROGRESS.

Professor Tyndall on Electricity.

In an instructive lecture on "The Sources of Electricity," delivered before the British Royal Institution several months ago, Prof. Tyndall, among other things, dealt with the properties of hollow conductors, using in the first instance a silver teapot. He charged with electricity a brass ball held by a silken thread, lowered the ball into the open teapot, then showed that the teapot contained no electricity inside, but plenty outside, especially at the end of the spout. If a little boy, he said, could be put inside that teapot no electricity would be found there.

Faraday once made a little house of laths; it was 12 feet square and covered with tin foil. While he was inside of that house not a trace of electricity could be found there with the most delicate instruments, while the house was at the same time in communication with a most powerful battery, and giving strong sparks outside. Prof. Tyndall next spoke of the influence of points, saying that one experimenter had determined the sharpness of thorns by their action upon electricity. He electrified a great insulated paper tassel, thereby causing its long strips of paper to diverge, and the distant as well as the near approach of a needle point made the strips fall together again; this, he said, explains the principle of the lightning conductor.

The best discharge of electricity is a flame; it is more efficient than metal points. A wind flowing from electrified metal points, the air being made self-repulsive. He then put some water with the shell off in a flat glass cell and dusted a little lycopodium on the surface of the liquid; the wind from an electrified point made the particles self-repulsive, and their eddies were exhibited in magnified form upon the screen by the aid of the electric lantern. The electric mill, in which vanes are driven round by the wind from an electrified point, was next exhibited.

APPROACHING EARTHQUAKES.—The late earthquake shocks, says an English paper, which were felt over a wide area in Yorkshire, remind us that an authority on the subject of those phenomena, M. Delaunay, of Paris, is of opinion that next year will see the recurrence of upheavals of the earth's crust in an intensified form. M. Delaunay is a prophet of evil, but, unfortunately, all his prophecies have hitherto come true. His specialty is earthquakes, and he predicts them only too surely. In 1877 he announced that that year would not conclude without violent disturbances of the earth, and as a matter of fact the frightful catastrophes on the coasts of South America followed. In 1883 M. Delaunay again pointed to approaching earthquakes, and soon after the volcanic eruptions in the Indian Archipelago occurred, by which thousands of human beings lost their lives, and hundreds of square miles of terra firma were engulfed by the sea. Toward the end of last year M. Delaunay once more raised his warning voice, and the earthquakes in Spain proved how well founded were his warnings. Quite recently he has prophesied very severe volcanic disturbances for 1886. Having acquired a well-merited notoriety in foretelling earthquakes, some weight ought to be attached to M. Delaunay's utterances. He affirms that next year these natural phenomena will be of a very intense character, and that they will show themselves either when the earth is under the direct influence of a planet of the first rank, such as Jupiter, or under that of a group of asteroids, or at a time when sun and moon are nearest to our planet at the same time.

A MAGNETIC TELEPHONE.—Mr. T. H. Brown, of Fort Worth, Texas, has perfected a magnetic telephone and telegraph, which does away with batteries of any kind. It was tested over 33 miles of wire Saturday, and proved perfectly satisfactory to telegraph men present, both as a telephone and telegraph. The instrument used was composed of two ounces of wire and a half a pound of steel, and can be made for 25 cents. The transmitter is simply a horse-shoe magnet, either pole being covered with fine wire coiled carefully. The armature is a disk of steel, against which the voice is thrown, transmitted through the magnet to the wire. The receiver is similar, with smaller magnet. It is claimed by the inventor that he can transmit the voice around the world or across the Atlantic Ocean, there being no limit to distance, all that is necessary being the increase in size of the magnet. The one used to-day, weighing half a pound, was capable of transmitting the voice 75 miles. The cost of batteries is said to be \$100,000 yearly, which would be saved by this invention. In telegraphing the key attachment now in use would be applied, but very little noise would be made. The receiving operator would have a disk attached to his ear, hung by a hook in a cap, or strapped around his head. The noise now incident to telegraph offices would be done away with. No one could steal information transmitted to pool rooms, stock exchanges, etc. The telegraph would be absolutely secret. The inventor says further, that the instruments could be carried on all trains, and in case of accidents between stations, could be attached to telegraph wire, and notice given to any station just where the accident had occurred, its nature, etc., and this done in a few seconds. He also says a miner or diver could take an in-

strument attached to an insulated wire, go into a mine or water, pay out wire, and converse with a person at the other end. Messrs. Brown and Masterson go to New York this week, when Mr. Brown will make arrangements to obtain patents in France, Germany and England. These being secured, he will permit patents to issue in this country. It is possible the Western Union will buy the patent.

LATERAL MOVEMENTS OF THE EARTH'S CRUST.

—While observations are being made for the purpose of investigating "variations of latitude," it is not desirable that the United States coast and geodetic survey should make simultaneous observations with a view to discover, if possible, whether or not places along our coasts are suffering changes of latitude or longitude, or both, due to lateral movements of the earth's crust? If it is true that during geological history large lateral movements of the earth's crust have taken place, and if such changes are still going on, it would seem inevitable, that, in regions where lateral displacements are taking place, landmarks should suffer a change of latitude or longitude, or both, according to the direction of yielding to lateral pressure, and that places located upon regions suffering compression or folding should be moved, to some extent, bodily toward places in adjoining regions, toward which the movements take place, but which are not themselves undergoing displacements. Since vertical movements of the earth's crust are taking place at measurable rates, and since, in the past, lateral movements appear to have exceeded the vertical, it might be expected that lateral movements are now taking place at measurable rates. Of course, if the superficial strata are not involved in these movements, the deeper strata only yielding, surface landmarks could not reveal the movement; but in this case, and in case folds of the superficial strata along our coasts are in process of evolution, it would seem that such changes might be discovered by sinking deep vertical shafts at intervals along lines normal to the coast. These carefully surveyed at intervals during one or two centuries, it would seem, should show a measurable warping or tilting if such movements are going on. —Science.

ELECTRICITY APPLIED TO THE HANDLING OF CANNON.

—The revolution which electricity is destined to make in modern warfare, says an exchange, is only as yet in its infancy. The latest invention of Mr. Maxim is, however, an earnest of the things that yet shall be. The invention is an electrical training gear, so contrived that by the simple movement of the handle the heaviest gun may be turned by a single man, and with the greatest ease, in any direction. You pull a handle to the right, and the breech of the gun moves to the right; to the left and it moves to the left. You raise the handle and the gun is depressed at the muzzle, you depress the handle and the gun is raised. This training gear was applied to one of the 38-ton guns at Garrison Point Fort recently, and the preliminary trial showed that one man could train the gun with the greatest nicety. One may expect Providence to be very much on the side of the big guns, when a 38-ton gun can be aimed at quickly moving objects as easily as if it were a pistol or a walking-stick.

SILICEOUS BRONZE.—Copper, which is desirable on account of its great conducting power for electricity, cannot be employed on long circuits, on account of its great ductility. Henri Vivarez finds in siliceous bronze a conductivity comparable to that of copper, and a mechanical resistance greater than that of iron. The silicium may be introduced in various proportions, the mechanical resistance varying inversely as the conductivity, so that different qualities may be obtained, adapted to the different services which are required; thus in telegraphy, wires of galvanized iron which weigh 155 kilogrammes per kilometre, can be replaced by wires of siliceous bronze which weigh only 28 kilogrammes; in telephony iron wire of 25 kilogrammes can be replaced by wires of siliceous bronze which weigh only 8.45 kilogrammes. —Les Mondes.

A CURIOS BAROMETRE.—Barometric changes are determined in South Chili by the use of the east-off shell of the crab, which is said to be extremely sensitive to heat and moisture. It will remain quite white in clear, dry weather, but will indicate the approach of moist atmosphere, by the appearance of small red spots, which grow in number and size as the moisture increases; and on the appearance of rain the shell becomes entirely red, and remains so while the moisture continues.

RIBBON WIRE FOR ELECTRICAL PURPOSES.—A firm in Glasgow, Scotland, is now manufacturing ribbon wire for electric purposes. It is nearly rectangular in section, and thus can be wound into a smaller space than round wire, while its greater flexibility renders it far more easy to manipulate. It is marked with the same numbers as the corresponding sizes of round wire, and is delivered on wooden bobbins.

A BRILLIANT COMET, says Prof. Klein, the Kentucky astronomer, may be looked for to appear in the southwestern heavens in the latter part of July or first of August.

FIFTEEN hundred telephone instruments in Buffalo are supplied from electricity made by the water-power of Niagara Falls.



A. T. DEWEY. W. B. EWER.
DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG

SAN FRANCISCO:

Saturday Morning, July 25, 1885.

TABLE OF CONTENTS.

EDITORIALS.—The Babcock and Wilcox Boiler; Spanish-American Trade, 65. Passing Events; Death of General Grant; Workmen and Machinery; Liquid Fuel for Marine Boilers; Good and Bad Roasting of Copper Ore; Dredging for Gold, 68. Coal Washing Machinery; Furnace Products; The American Association, 69.

ILLUSTRATIONS.—Boiler of the Babcock and Wilcox Type—125-Horse Power, 65. Portrait of General Grant, 68. Improved Apparatus for Washing Coal, 69. Ships of the Desert at Anchor, 70.

CORRESPONDENCE.—Georgia Gold Mines, 66. MECHANICAL PROGRESS.—The Nail Question; Self-Hardening Steel; Deadening the Sound of Circular Saws; Decomposition of Cast Iron by Heat; A Non-Explosive Boiler; Tools from Old Steel Rails; The Davy Process; Power in Turning Shafts, 67.

SCIENTIFIC PROGRESS.—Professor Tyndall on Electricity; Approaching Earthquakes; A Magnetic Telephone; Lateral Movements of the Earth's Crust; Electricity Applied to the Handling of Cannon; Siliceous Bronze; A Curious Barometer; Ribbon Wire for Electrical Purposes, 69.

ENGINEERING NOTES.—New Street Car Motors; Electricity as a Railway Motor; A Steel Cartilage; A Novelty in Ship Building; Railways in India, 71.

USEFUL INFORMATION.—What is a Clearing House; Burning Sawdust; Ivy Against Brick Walls; A Substitute for Whalebone; A Valuable Paper Removing a Tall Chimney; The Erie Canal for Ships; Cayenne Pepper; Bones in the Ocean; Silver Soap, 71.

GOOD HEALTH.—The Philosophy of Vaccination; Important, if True! Put this in Your Pipe; Effect of Electricity on the Heart; The Oxygen Cure; A Cholera Preventive; Wash the Head; Trichiniasis; Bathers' Cramp; Health Studies in School; Light and Heat; Effect of Morphine on the Hair and Teeth, 71.

MISCELLANEOUS.—Base Ore and Concentration; The Mayflower (G. M. Co.); Legitimate Mining; Wood River; Hydrofracturing in Trinity County, 69. Golden Opportunity; The Desert and Its B. A. of Burden, 70. MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 72-73.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 46.

Business Announcements.

Wire—California Wire Works, S. F.

See Advertising Columns.

Passing Events.

The recent shipment of several bars of bullion, worth upwards of \$5,000, from the deep workings of the Hale and Norcross mine on the Comstock, is a notable one. It constituted the first bullion shipment of the noble metals from the 3,000 level of any mine in the United States or the world. The ore material for these bars came from the cutting out of the chamber on the 3,000 level, at the surface or head of this winze, and what was extracted in sinking the winze itself in the ore body.

The miners in the Cœur d'Alene region, Idaho, have held a mass meeting. It was advised by a committee that Chinese be employed to dig a bedrock flume to work Pritchard gulch, and the question of their employment was submitted to vote. The vote was 78 for Chinese and 388 against employing them.

The Union Iron Works of this city has forwarded a bid to the Secretary of the Navy to build one or more of the new cruisers here. With the bid were forwarded plans and specifications. It would be a fine thing if we could get a chance on this coast to build one of these cruisers.

There is little new to report in the mining situation aside from what is given in our usual summary.



Death of General Grant.

The flags at half-mast and the other tokens of mourning which appear, signify that the grand old hero who has been long battling with the last enemy, has found peace and rest. The telegraph announces that this morning (July 23), at 8:08 o'clock, he passed out of life peacefully and without evident pain while his bereaved family were gathered about him. Nine months have elapsed since General Grant first consulted a physician concerning the insidious foe, known as epithelioma, which finally carried him away. For at least five months the record of his contest with the disease has been daily laid before his sympathizing fellow citizens. From all parts of the country there came to his ears words of cheer and hope, words full of tender regard, affection and honor. Nor was his native country alone in the desire to bestow upon him the strength which comes from assurance of sympathy and appreciation. The whole world had learned to honor Grant; the whole world suffered with him, and the whole world now mourns his death and will cherish his memory. General Grant was undoubtedly one of the greatest men of all time, and his name will live while history endures. The record of his life is fresh in the memories of his generation and need not be recounted now. Perhaps the greatest testimony to the grandness of the man is to be found in the fact that, though he acted so prominent a part in the most excited period of our country's history, there remains for him now nothing but honor and esteem. All sectional rancor and hate has long since passed away, and there now arises before the American people a man of lofty patriotism and devotion, a soldier of unsurpassed ability and determination, a President of the purest motives and a character of acknowledged purity and nobility. Certainly posterity will possess in the life of this quiet, unassuming, resolute, devoted man an example in which truth and loftiness of character are linked with grandeur of accomplishment, such as the world finds in but few of its heroes.

Workmen and Machinery.

A rather curious strike, in this age, is that reported in an English colliery, where about a thousand men and lads have turned out, because of the introduction of a machine that they think will reduce their wages. At one time such strikes were common in most trades, but that time has pretty much passed away, the men finding that where machines caused more or better products, there were more of them employed in the end.

The men who combine against the introduction of machinery of an improved type are but imitators of a class who caused the utmost misery and destruction at one time, and their doctrines are equally mischievous and pernicious. Opposition in its worst forms assailed every invention of use that was at one time introduced. The weaver's loom, the locomotive, the steamship, the reaping machine, and a thousand other useful inventions had for a time to run the gauntlet of a severe and an adverse public opinion. Class interests, always sensitive, amalgamated themselves against the innovations, and the pressing fears that the manual labor would be reduced, that wages would fall and pauperism would increase, were advanced as the most powerful arguments that could be adduced against them. As a matter of fact none of these arguments have been justified by events. There has been scarcely any trade that has not been benefited by machinery, and though manual labor has been

eased from much of serfdom it endured, in the great majority of cases hundreds of men more have been employed in many trades than was the case before machinery was introduced. Pauperism, the growth of population considered, has not increased, and so far from wages having fallen, the working classes of this country were never better paid than they are to-day. Working men, as a rule, it is but justice to say, have recognized the value of the improvements. In the shipyards, the factories and all great works, every machine that will quicken production and lighten labor has been in recent years gladly welcomed, and strikes, owing to the introduction of such, have been literally unknown. So far, indeed, have workmen recognized the value of machinery that many artisans have produced capital inventions, and the desire to excel in this respect is on the increase. This is particularly the case in this country, where most of our improvements in machinery come from skilled mechanics themselves.

Liquid Fuel for Marine Boilers.

Some extended trials have been made in this bay of late in the use of liquid fuel instead of coal on the steamers of the Central Pacific Railroad Company. Experiments have also been made at the shops of the company at Sacramento. The most successful results have been achieved on the transfer boat, *Thoroughfare*, plying between the freight slips at the foot of Second street, in this city, and the depot in Oakland creek. Her duty is to bring the freight trains across the bay, and she makes 15 trips a day. Liquid fuel has been used on this boat for several months. The fuel costs \$1.70 per barrel, or five cents a gallon. The boat has a return flue boiler. On arriving at the slips on each side the supply of oil is shut off entirely and the jets are lighted again when she starts. Very economical results have been accomplished, the saving over the use of coal having been greater even than expected.

The freight and passenger boat, *Salamo*, plying between Port Costa and Benicia, on Carquinez straits, is also using liquid fuel. This is one of the largest steamers in the world. Her boilers are like exaggerated locomotive boilers. Ordinary tank cars come aboard on the tracks on her deck, and the oil is drawn out into large tanks alongside the boilers, from whence it can be fed to the furnaces. It is stated that the fuel does not work so well on this steamer as on the *Thoroughfare*, owing to the difference in the boilers. The Central Pacific Co. will shortly apply the system on their large stern-wheel Sacramento river steamers, *Apache* and *Modoc*. Liquid fuel is also being used on the tug-boat, *Water-Witch*, in this bay.

The fuel used by the Central Pacific Company is not mere crude petroleum. It is a residuum of petroleum after some of the lighter products have been refined out, and is about the consistency of molasses. Some of it is the product of California wells and some comes from the East.

Experiments have before been made in this city with various forms of liquid fuel for steam boilers, but for some reason they have not continued to use it. At the old Etua Iron Works various forms of burners were used with crude oils. The Sutter Street Cable Railroad Company, before they moved their engine-house, used crude petroleum under their boilers. The trouble seems to have been with the burners, which would clog. Petroleum is used on Russian steamers and also on Russian locomotives. On this coast, where coal is comparatively high in price, and where there is plenty of petroleum, the latter ought to be more utilized. The experiments being carried out by the railroad company will serve as guides for many other steam users in this locality.

The circular of J. W. Harrison speaks as follows of Australian coal. Notwithstanding the light arrivals this month from Australia, the market has been kept amply supplied by coast coals, which are arriving freely and are being offered at prices leaving slim margins to the collieries. The arrivals of Australian for the past six months are 41,000 tons in excess of the arrivals for a similar period last year, and the monthly fluctuations show the prices averaging 50 cents to 75 cents per ton less than in 1884. The present indications for future business with Australian coal are not encouraging. The quantity consumed will be diminished, and the prices obtainable will be lower. This has been brought about by a better class of coal being mined on our coast, which somewhat assimilates in character to Wallaseid, and can be put on our market at lower figures.

Good and Bad Roasting of Copper Ore.

In working that class of ore requiring roasting, the experienced metallurgist knows the immense importance of a thorough roasting of his ore as a preliminary operation, and as a key to its most successful and economical treatment during all the subsequent processes. The difficulties of smelting poorly roasted ore are innumerable. The silica of the gangue rock, not finding sufficient oxide of iron to satisfy it, forms a tough, infusible slag, while the undecomposed sulphide of iron simply melts into a matte, forming a low grade product, which requires an extension of the subsequent processes with corresponding costs. The difference in the cost of producing ingot copper from the same grade of sulphide ore, in the one case well roasted and in the other poorly roasted, may easily make the difference between profit and loss.

The following figures, taken as accurately as possible from results of work done under the superintendence of Mr. Edward D. Peters, Jr., will illustrate this point clearly. They show the cost of putting nine tons of eight per cent ore into ingot copper; in the one case the original ore being thoroughly, and in the other badly, roasted:

COMPARATIVE RESULTS IN POOR OR CARE- FULLY ROASTING.	Well roasted.	Badly roasted.
Heap roasting 9 tons ore, at 50 cents....	\$ 4 50	\$ 4 50
Smelting the same.....	22 50	31 50
Roasting 2 tons of 36 per cent matte from well-roasted ore, three roasts, at 50 cents per ton.....	3 00	.....
Roasting 3 tons of 24 per cent matte from badly-roasted ore, five roasts, at 50 cents per ton.....	.....	7 50
Smelting 2 tons roasted matte, at \$2.50	5 00	.....
Smelting 3 tons roasted matte, at \$2.50	.....	7 50
Producing ingot from last matte.....	14 00	14 00
Total.....	49 00	65 00

This shows a cost of \$5.44 per ton for the well-roasted, and of \$7.22 per ton for the badly-roasted ore; thus showing the total cost of treatment to be increased nearly one-third through carelessness in the first operation. In reality, this estimate falls far below the real cost, as Mr. Peters has not taken into consideration the serious expenses that are likely to occur from sticking-up and burning out the furnace, the formation of an increased amount of foul slag that must be resmelted, and many other annoying circumstances, all arising from the siliceous character of the slag, which, in its turn, has occurred from the imperfect roasting of the ore.

Dredging for Gold.

We notice that some people in England are getting up dredging apparatus for dredging the auriferous sands and gravel in the Ankroba river, in the Gold Coast mines, Africa. There are several companies mining there, and these machines are for them. As the projector calls it the Ball dredging apparatus, it is possible that it may be the Ball dredger that was tried in this bay for dredging mud, but which has not been in use for some years. If it did not work satisfactorily in mud it will most assuredly not in river sand.

But whatever the design of the machinery it is as well to note, for the benefit of those who have had no experience with the plan, that it does not work. We have, in California, had more experience in river mining than other people. We have tried all sorts of plans and systems in our work, and the most conspicuous failure of all has been in the trial of dredging apparatus. We have tried to obtain gold from river beds not with one kind of dredger alone, but with many kinds and systems.

Not one of them has ever been successful. Where people have tried pumps, dredgers, vacuum machines, etc., and made a failure, others have tried the same thing on some other plan, with the same result. There are many men in this State to-day who would be richer if they had profited by the experiences of others, instead of trying the system on other plans. Our river bottoms are known to be rich, but somehow, when the dirt and sand comes up the gold seems to stay down.

On most of our rivers are old wrecks of such machines, some of them very costly to their originators. It is well for our English friends, before they attempt dredging for gold in the bottom of rivers, to inquire carefully into the experience of Californians with the plan.

Coal Washing Machinery.

Coal washing machinery is among that labor-saving machinery which has been greatly perfected of late years, many improvements having been made. In the plunger machines it was found that sometimes through careless working of the machinery, without the necessary water in the box, said box was not strong enough. To prevent interruption it became necessary to devise some means for relieving the machine of the impacts of the plunger altogether. This has been accomplished by a new arrangement shown in the cut, which was described before the American Institute of Mining Engineers by S. Stutz, of Pittsburg, Pa.

The compartments *A A'* of the separator box have been set upon heavy cast-iron brackets *B*, leaving sufficient space below the bottom for the buffer *F* and sediment-valve *K*. By means of the plunger-rod *h* passing through the stuff-

machine. The operation of the present machine is the same as previously described. Fresh water is taken in through *G*, and the slack-coal, brought upon the sieve *S* by means of the chute *J*, is separated into coal and impurities, while passing from the rear to the front of the machine. The clean coal, delivered over the bridge *M* into the channel *C'*, goes to the elevator *E*, which brings it into storage-bins, while the impurities pass through the gate opening *O* into the chamber *W*, and thence through the opening *U* to the trough *T*, where they are carried away by the action of the waste water. A number of the new machines have been erected during the last two years, and give full satisfaction in every respect. They are considered the best in the market, and offer the following important advantages:

1. The use of a differential cam for the working of the plunger allows to the material, after each stroke, the necessary time to deposit

pyrites, slate, etc., falling through the meshes of the sieve, to settle. Thus the clean water is not mixed with the slimy sediments, and the latter are not forced back again into the material.

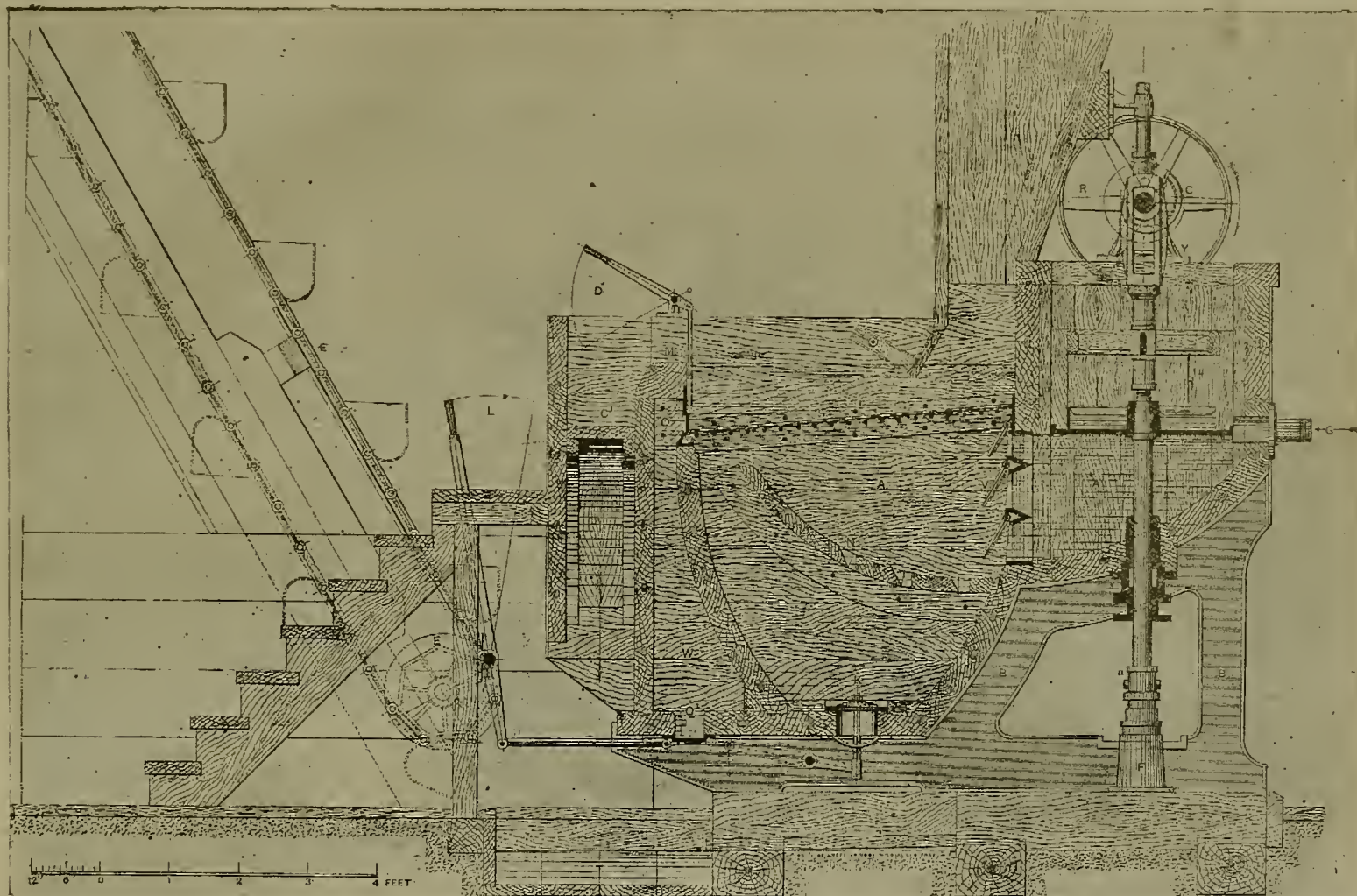
7. This machine has greater capacity per square foot of sieve-surface, with less water, than any other in use. An apparatus of, say, two sieves, 3 feet by 4 feet 9 inches, or 28½ square feet surface, can wash properly 200 to 250 tons of coal per day, of ten hours, with from 300 to 500 gallons of water per ton of coal, according to percentage of impurities, or about 7 to 9 tons per square foot of sieve-surface. The cost of washing will be from 2 to 5 cents per ton, according to locality and arrangements.

Furnace Products.

The products of lead-smelting furnaces may be, silver lead, argentiferous lead, also, and

The American Association.

The American Association for Advancement of Science will hold its meeting—the thirty-fourth—this year at Ann Arbor, Michigan, from August 26th to September 1st. A large and active local committee has been formed at Ann Arbor and has sent out a preliminary circular in which members of the association are assured there will be no lack of comfortable surroundings, and that the State University has granted the use of its buildings and grounds for the purposes of the meeting. Under the new rule, which took effect at the last meeting, members have the privilege of registering members of their families by paying the sum of three dollars for each individual to be registered. These associate members will receive badges entitling them to all the privileges extended to members generally by the local committee. The officers of several of the sections



IMPROVED APPARATUS FOR WASHING COAL.

ing-box *s* to the outside, and provided at its lower end with a shoe *a*, the impacts of the plunger are now transmitted from the buffer *F* directly to the foundation. At the same time a better guide for the plunger *P* in its up and down movement has been obtained. The plunger of the former machine had only the guide *I* and the yoke *Y*, whereas the new machine has an additional guide in the stuffing-box *s*, thus preventing wear and friction of the plunger against the lining of the box. Furthermore, the mechanism for regulating the stroke of the plunger has been simplified in dispensing with the hand-wheel. The screw-nut *e*, swivelled to the yoke *Y*, is provided with a long thread to receive the upper end of the plunger-rod *h*, and is made of steel, sufficiently strong for all purposes. It is provided with four notches *n*, into which a piece of iron can be engaged; and, by turning to the right or left, the yoke *Y* is raised or lowered, as may be required. Thus it is very easy to get the proper stroke for any kind of material, or to set the machine out of operation altogether, if necessary.

With the exception of the gate *O* for the outlet of the impurities, the other parts of the machine are left the same as before. The bottom of the plunger-box being now inclined towards the sieve chamber, less power or less weight of the plunger is required to produce the same action of the water as was obtained in the former

according to gravity. An eccentric or a crank cannot produce such a movement.

2. The use of valves between the plunger-chamber and sieve-chamber prevents the filtration and back suction of the water during the upward stroke of the plunger, and thus saves the very small coal, which otherwise will pass through the meshes of the sieve and go to waste.

3. There is a saving of motive power in the working of the washer. The body of the water in the box *A* being divided by the partition *N*, the inertia of the small part above the latter has only to be overcome.

4. The current of the water produced by the plunger *P* not only lifts up the material upon the sieve *S* to effect the separation, but also moves the separated parts, coal and impurities, towards the delivery-bridge *M* and gate *O* respectively. This is especially valuable, since the continuous and regular separation of material containing heavy impurities, such as iron pyrites, fire-clay, etc., is assured.

5. There is great economy of water. In the older machines the separated coal is floated out of the apparatus at the expense of an enormous volume of water; yet the impurities have to be removed from the sieve by the shovel, thus interrupting the working of the machine and making it intermittent and wasteful.

6. The forming of a special receptacle below the partition, *N*, allows the fine particles of

preferably called, "base bullion" in this country, in distinction from gold and silver bullion, and several other things. The base bullion is the marketable product, and is sold to the highest bidder. There are a number of refineries which make it their object to separate the silver, lead and gold, and to utilize the by-products gained in the refining process. Speiss is not utilized anywhere in the United States. Matte is either roasted and smelted again or thrown over the dump. Slag is only partially used.

Of furnace accretions there are two kinds—wall accretions and hearth incrustation or sows. The former consist of sulphide of iron in combination with sulphide of zinc and sulphide of lead, and they contain a small amount of silver. They should be roasted before resmelting; but as most smelting works have no facilities for doing this, they are usually thrown on a charge. The hearth incrustations do not contain enough silver and lead to make it worth while to have them broken up and resmelted. They are thrown over the dump.

The cleanings and furnace refuse consist of fragments of brick with metallic lead adherent; they are roughly assorted and the waste thrown away. The most important product aside from lead is the flue dust, which is generally saved and reworked, there being various methods of doing this.

are preparing special circulars relating to the Ann Arbor meeting, which can be had by addressing the respective secretaries, and special information relating to any of the sections will be furnished by their officers.

The meeting will be held to order in general session at 10 A. M. on Wednesday, August 26th, in University Hall, by the president, Professor J. P. Lesley, of Philadelphia, who will resign the chair to the president elect, Prof. H. A. Newton, of New Haven. After the adjournment of the general session, the sections will organize in their respective halls in the University buildings. After lunch the sections will meet and the vice-presidents will give their addresses. In the evening, Prof. Lesley will give his presidential address. The general sessions and meetings of the sections will be held on the following days, except Saturday and Sunday, until Tuesday night when the concluding session will take place.

The permanent secretary is F. W. Putnam, of Cambridge; general secretary, Chas. S. Minot, of Boston. The secretaries of the sections are as follows: Mathematics and astronomy—E. W. Hyde, of Cincinnati, Ohio; Physics—(Vacancy to be filled at meeting); Chemistry—F. P. Dunnington, University of Virginia, Va.; Mechanical Science—C. J. H. Woodbury, of Boston, Mass.; Geology and Geography—H. Carvill Lewis, of Philadelphia, Pa.; Biology—C. H. Fernald, of Orono, Me.; Histology and Microscopy—W. H. Walmesley, of Philadelphia, Pa.; Anthropology—Erminie A. Smith, of Jersey City, N. J.; Economic Science, and Statistics—J. W. Chickering, of Washington, D. C.

Golden Opportunity.

The continued stagnation of idle capital, says the *Shasta Democrat*, appears to indicate that there has been no marked improvement or advancement made by those controlling large sums of money. While capital has the reputation of being conservative, the history of events proves its dullness of perception, and its inability to grasp, in advance of a general movement, important points of advantage. Let the tide turn in any given direction and thousands and millions of dollars are poured thoughtlessly and recklessly and unseasonably out to secure some fancied advantage or benefit, where reason clearly indicates that there is no substantial basis of realization.

A season of general activity for a time appears to prevail, in which capital seeks the most absurd and illy-advised adventures, and is easily lured from its hiding place, even over a pathway which is marked by misfortune and disaster. On the other hand, when a reaction comes, ending in a general depression of business, the most inviting propositions, based upon the most substantial assurances of a steady and

tal turns a deaf ear and is dead and cold to every opportunity presented. In addition to this important advantage, these years of experience have furnished a class of qualified and thoroughly responsible experts, upon whose judgment millions may be safely invested. Marked improvements have been made in mining appliances. New methods of utilizing the ore product have been discovered. Marked reduction in transportation and other matters bearing upon the cost of producing have been secured, yet, notwithstanding all these permanent advantages, the plethora in capital centers still continues, and a great industry, extending over an immense portion in country, languishes in its enforced idleness.

DISPOSING OF DEBRIS.—At the Spring Valley mine, Cherokee Flat, there are two restraining dams within about six miles of the mine, which hold the heavier portion of the debris, and the latter is then carried to a canal 400 feet wide, which begins near the Oroville and Chico wagon road, and runs about 40 miles down into the tules west of the Marysville Buttes, where the company has control of 16 miles of tule land, upon which the debris is emptied, none of it going into the river. The canal crosses the railroad between Nelson and Biggs

The Desert and Its Beasts of Burden.

The conception of a desert which arises in the minds of many young and untraveled persons is often that of a sea of sand, an almost limitless area of dead-level, a waste or expanse where one sees no landmarks, as in mid-ocean he sees no land. This idea of a desert is, of course, wrong, for in fact there are hills and vales and other diversities of surface in the desert as elsewhere, and it would only require rainfall to change, in time, the marks of desolation for the beauties of the landscape such as we enjoy who live in well watered regions. The artist in the engraving gives an idea of this topography of a desert in the faint lines which appear in the background of his picture. The man is sitting on a bluff overlooking a valley, which, were there water, might be filled with growths of trees and shrubs and meadow plants and the site of many happy homes. Without water it supports no growth and is but the abode of a few hardy reptiles.

The main interest of the engraving centers in the peculiar beasts of burden which are shown and which even the children will recognize from their frequent appearance in their natural

across the desert, the former toward Berber, and the latter to the Nile near Shendi. In these marches and the subsequent retreat even the endurance of the camel has been severely tried, as it is quite a different thing to take a modern army over the Nubian or the Lihiyan desert from what it is for an Arab caravan to traverse these dreary wastes. The English soldiers have at length become familiar with the characteristics of their uncouth steeds, but it is said that the closer acquaintance has not increased their estimation of his character, and he is declared to be a sulky and troublesome beast, whose use is a most disagreeable necessity.

UNTIL firmly established upon a substantial basis, all new towns in mining camps are to a greater or less extent uncertainties. Rents and real estate assume no permanent form, but are constantly changing, and not unfrequently does property advance or depreciate 50 per cent. in 12 hours in towns of this nature, whose prosperity fluctuates with the coming in and going out of the migratory army of prospectors, etc. Everyone who is familiar with the formation of towns in the mountains knows this to be a fact.

STATE MINERALOGIST HANKS has analyzed the coal found at the Presidio and finds it to



SHIPS OF THE DESERT AT ANCHOR.—From a picture by G. RUD. HUBER.

generous return, are considered calmly and indifferently, while opportunity after opportunity, in which there is every assurance of safety and security, are passed by unimproved.

In the early history of mining enterprises, a piece of gaudily printed stock was sufficient to secure money, without investigation, examination or knowledge of the basis upon which the stock was issued. Millions of dollars have been paid for these stock certificates, in many instances representing no tangible evidence of value, present or prospective. Capitalists were eager to exchange their money for those painted bubbles, which in thousands of instances were based upon six location stakes, where there was not even a semblance of a mine within miles of the locality designated. At the present time the scene is vastly changed. Years of steady and unrelenting toil have pushed down shafts hundreds of feet throughout the mineral belt of the country, and demonstrated to a certainty the character, quality, value, cost and profit, and all the important factors entering into a demonstration of the real basis of the mining industry. In many cases the amount of ore actually in sight is greater than the amount asked for the mine. In other instances the work of development, the acquired facilities, and the demonstrated value of a property, as a producer, is equal to the amount demanded for the same. These opportunities are presented in hundreds of mining camps, from one end of our mineral-bearing territory to the other, yet capi-

stations. It has cost the company in the neighborhood of \$700,000 to provide this system and keep it in operation. Owing to the width of the canal the debris has not been carried along as rapidly as desired, and much expense has been incurred in keeping the canal from filling up. To remedy this the company has had built a dredger, and will be ready to commence operations in a day or two. It will lift the earth out of the canal and place it on the bank, thus deepening the canal and building levees at the same time. By this system it is estimated that the debris can be handled for two and a half cents per yard, whereas heretofore it has cost about 18 cents per foot.—*Nevada Transcript*.

GOLD AND SILVER IN THE ARTS.—The appropriation of gold and silver in the United States during the calendar year 1884 to industrial uses can probably be safely estimated at \$14,500,000 of gold and \$5,500,000 worth of silver, a total of \$20,000,000. All of this, however, was not withdrawn from the existing stock of bullion and coin available for monetary uses, for those reports and the statements received from the mint at Philadelphia and the assay office at New York, show the use of \$1,882,600 gold and \$414,600 silver of old jewelry, plate, etc., which, deducted from the total consumption, would leave the amount of coin and new bullion consumed in the arts and manufactures about \$12,500,000 gold and \$5,000,000 silver.

histories and books of travel. The camel, however, which has always been associated with the charming mysteries of the caravan trade of the deserts of Asia and Africa, or as the faithful friend of some nomadic sheik, has in these later days become an adjunct of modern industry. In Nevada camels were introduced some years ago to draw heavy freight wagons across the wastes of sagebrush. Afterwards we heard of them as doing some service in connection with the mining industry of Arizona. In some parts of Australia they are put to farm work. The latest application of the camel to the promotion of modern ideas is their use by the British forces operating in Africa against the Sudanese. Along the upper Nile there are stretches of desert along both banks up to the great central African plateau. Long before the first cataract is reached at Assouan, five hundred miles above Cairo, these sterile wastes approach quite up to the river banks, and all travel over them is fraught with great labor and hardship.

The difficulty of sending soldiers through such a region was the most serious matter which presented itself to the British Government in organizing its expedition for the relief of Khartoum, and the idea of utilizing the service of camels therefor, was promptly adopted by General Lord Wolseley. The equipment of this unique cavalry service, without whose aid it would hardly have been possible for the divisions of Gen. Earl and Gen. Stewart to have made their forced marches from Korti

consist of fixed carbon 47.55, volatile combustible matter 7.30, water 4.40, ash 45.15. The coal produces a fair coke. Professor Hanks will personally examine the vein, and he hopes to find parallel and valuable veins. The analysis shows the coal to differ from the ordinary lignites in the small proportion of water it contains.

A STRIKE is reported in the Granite Mountain mine, near Phillipsburg, Montana. They expended some \$50,000, and took out \$300,000 from 1,500 tons of ore. In crosscut No. 5 they found a four-foot vein, a portion of which is said to average 421 ounces of silver per ton.

THERE is a rumor to the effect that an immense ledge of high grade silver ore has been struck on the Arizona trail to Planchas de Plata. It is claimed that the vein is 30 feet wide, and that the ore will mill over a hundred dollars.

THE Downieville *Mountain Messenger* says: Mr. Jackson picked up a nugget of gold valued at \$800 the other day in his claim below Foss', at Gold Lake.

THE Prescott *Courier* says that there is scarcely a gulch in that section of Arizona out of which a miner cannot pan from 50 cents to \$5 a day in gold.

ENGINEERING NOTES.

THE Cummer Engine Co., of Cleveland, O., have recently received orders for 170, 70, 100, 130 H. P. outfits complete for the Harney Peak Mining Co., of New York, Volney Q. Irwin of Crawfordsville, Ind., Temple Pump Co., Chicago, and the Forest City Carbon Co. of Cleveland, O., respectively. In each instance the competition was very close, and the Cummer people consider the selection of their engine in these cases a very substantial indorsement of its superior merits, as about every style of automatic engine of any prominence was competing. They have also just shipped a 170 H. P. engine to the Lowell Manufacturing Co. of Lowell, Mass., and have a 105 H. P. engine about ready to ship to W. Kautsky of Indianapolis. Their sales for the Jonathan Mills Reel are still on the increase, and now run up all the way to ten per day. Their orders, we learn, are coming in from all directions and are promptly filled. They started up a number of their Ballantine Refrigerating machines this season in breweries in different sections of the country, and in every instance the machines are said to be giving the best of satisfaction.

NEW STREET CAR MOTORS. Compressed air, the cable system and electricity are having a close race just now as substitutes for horse power in propelling street cars. Traction roads in Philadelphia and electric and compressed air motors in neighboring cities are all about to be given fair trials. The traction system is already in practical use in San Francisco and Chicago, electricity is employed to some extent in Europe and one or two places in America, and compressed air motors have been commercially used in some French cities for several years. But none of these systems have been given such systematic trial as we are now promised. Each has its peculiar advantages and each has its pronounced disadvantages apart from questions of cost. Both the electric and cable roads require separate constructions for the conveyance of power along the whole route, and the compressed air motors are liable to give out before completing their journey, thus rendering them not only useless, but actual obstructions to travel. How far this can be overcome by the use of auxiliary reservoirs without increasing the cost too much, remains to be seen.

ELECTRICITY AS A RAILWAY MOTOR.—This matter is receiving more practical and thoughtful attention than most of our readers are aware. Already several experiments on a large scale are planned. Two long lines of elevated roads in New York are to be transferred into electric circuits, each car to carry its own motor, and all who ride are to be shown the working of the new system. In Philadelphia another system of supplying electricity as a motor is to be tested. The route taken by the road is to be lighted by electricity, and the cars furnished with incandescent lights supplied from the same source. In the winter it is proposed to heat the cars by application of the same current. The test will be made on street railways and ordinary railway tracks. It is not improbable, as the *Inventor* has often suggested, that in the near future passengers on our railroads and street cars may be carried more cheaply as well as more rapidly by electricity than by any power now employed.

A STEEL CANTILEVER.—Dr. Thos. Rainey, of Ravenswood, whose bill extending the charter for bridging the East river at Blackwell's Island passed the Legislature at the last session, says they propose to build a steel cantilever. The total length of ironwork will be 9,210 feet. The span from New York to Blackwell's Island is 734 feet, and the span over the east channel is 618 feet. The spans will be 150 feet above mean high tide. There will be a double railway, double carriage tracks and double promenades the entire length of the bridge. To raise the money it is intended to issue 6 per cent bonds to the amount of \$3,000,000, and stock to the same amount. It will probably cost less than \$5,000,000 to build the bridge and buy the right of way, as well as provide a depot in New York City.

A NOVELTY IN SHIP-BUILDING.—A very pretty iron steam-yacht was recently launched from Cramp's shipyard in England, which embodied some novel ideas that are interesting to builders as a new departure in steam-yacht modeling. The boat is 152 feet on the water-line, 22 feet beam and 13 feet depth. The most notable departure in her lines from the usual models of construction, is the absence of any keel from a point about 55 feet forward of the screw. This, it is asserted, will enable her to turn within her own length, and to answer her helm immediately. Another novelty is the absence of a rudder-post. She carries a balanced rudder, hung in place by hearings below the deck.

RAILWAYS IN INDIA.—The Government of British India proposes to spend \$110,000,000 on railways during the next six years, \$27,000,000 of which will be expended during 1885-86, mostly for frontier lines for military purposes. Some 3,896 miles are deemed by the Government as indispensable. The construction of 1,200 miles per year in India, says the *American Engineer*, will not appear unduly enterprising to Americans, who have seen ten times that amount completed in the United States in one season by private capital.

USEFUL INFORMATION.

What is a Clearing House?

In reply to a correspondent's inquiry as to the object and business of a clearing house, the *New York Journal of Commerce* says: "There are upwards of sixty banks in this city. Without a clearing house each of these would be obliged to make a settlement with all the rest. Suppose the A bank has checks and drafts on sixty banks, making a balance in its favor amounting in the aggregate to \$500,000, but owes the sixty-first bank the sum of \$501,000; without this general clearance it must send all over the city to collect this half million dollars, and then adding \$1,000 to it must pay its debt. But with a clearing house, all it has to do is to find out whether it is debtor or creditor on the whole, and pay that sum over. In the case above described, after the exchange had gone around the room, it would be found that the A bank had nothing to collect, and had only \$1,000 to pay. Instead of handling \$1,001,000 by receiving \$500,000 and paying out \$501,000, it handles only \$1,000. The representatives (clerks) of all the banks meet in a large room. Each has a little desk with an outside ticket hole. The managers then start on their rounds, and each exchanges slips with all the others. When through it is found who is debtor and creditor in relation to the whole body, and exactly how much. Those who are debtors then pay in what they owe, and the clearing house pays it out to the creditors, and not a cent is left on the counter. The sum of three or four millions as the resulting balance will settle daily exchanges for \$100,000,000, as only those who owe a balance on final settlement are called upon to pay anything, and only those who have a credit on final settlement will receive anything, and one must exactly balance the other."

BURNING SAWDUST.—J. N. Henning, Vandalia, Ill., tells in the *Indianapolis Wood-Worker* how he burns sawdust in his boiler furnace, as follows: "I have no trouble in burning sawdust. I have a 24 foot boiler, five flues, iron stack 25 inches in diameter, fifty feet in height. My furnace is open back of the bridge wall as low as the bottom of the ash-pit. We clean all the ashes out of the furnace, back of the bridge wall, about every two or three months. My grate-bars are four feet long; my bridge wall is about eight inches from the boiler, running from one side of the furnace to the other. Start your fires in the center with wood; use wood about once in two hours, then push the wood all to one side and fill up with sawdust. If you have any planer chips, mix some of them with the sawdust. When the wood is about burned down, and the sawdust is burning freely, move the wood to the center and fill up the side as before with sawdust. When the first side of sawdust gets burnt down clean off the grates, fill up again as before. You must work it so as to fill up one side at a time."

IVY AGAINST BRICK WALLS.—The widespread belief that ivy trained against the walls of a house is productive of general unhealthfulness, has been proved to be fallacious. The very opposite is the fact. If any one will carefully examine an ivy-clad wall after a shower, he will find it dry and dusty. It will be seen that the overlapping leaves have conducted the water from point to point until it has reached the ground, without wetting the surface of the wall. Moreover, the thirsty roots of the plant which force their way into every crevice where a firm hold can be obtained, act like suckers, and absorb all moisture within reach for their own nourishment—the ivy, in fact, acting like an overcoat, keeping the house dry, and warm as well. It also has the additional virtue of covering the ugliest structure with a mantle of beauty that is always agreeable to the eye.

An inventive Australian has devised an arrangement by which the doors of railway carriages are closed and kept closed while the train is in motion, by a lever worked by the motion of the carriage axle. When the train stops the device ceases to work and the door may be opened. It might be useful in Australia and Europe, where, except in Switzerland and some parts of Southern Germany, the doors of railway carriages are on the side, but would be of no use in this country. In England, however, there is a growing prejudice to the locking of carriage doors, and it is now done on very few, if any, of the lines.

A SUBSTITUTE FOR WHALEBONE that is claimed to be more elastic, cheaper and more durable than whalebone, is made from quills. The quills are split up into fibers, and these are twisted and bound together by a thread, so as to form a string as long as may be desired, and a sufficient number of these fastened to each other side by side make the article complete. At Three Oaks, Mich., there is at present a large factory where seventy hands are employed in manufacturing it.

A VALUABLE PAPER.—For making paper capable of resisting fire and damp, Herr W. Herre proposes to add to the pulp during the process of grinding in the rag engine solutions of certain salts, which, by mutual decomposition, form insoluble compounds. The solution with is added first contains zinc sulphate or chloride, or calcium chloride, or acetate, whereupon tallow, soap, glue and alum are added.

After having been thoroughly mixed the mass is formed into paper, which, however, before being dried, is once more passed through a bath of the same or similar composition to the solution used for mixing with the pulp in the rag engine, and ultimately impregnated with a solution of catechu.

REMOVING A TALL CHIMNEY.—Wonderful things are constantly being done in this way of moving buildings and large masses of brick and stone. We have frequently heard of tall chimneys being righted up when the ground has settled so as to give them a slightly inclined position; but the first attempt to move one of these tall, slender structures was the recent removal from its original position of a tall factory chimney in Salem, Mass. The chimney was 90 feet high and only six and a half feet square at the base. Yet by the aid of only six men and the necessary appliances this tall structure was removed to a distance of 100 feet from its original position. The dexterity and skill of the work will be more fully realized when it is stated that a sway of only about three inches would have brought the whole structure down upon the workmen. The load weighed fully 130 tons.

THE ERIE CANAL FOR SHIPS.—The New York papers are giving wide publicity to the fact that a most determined effort is to be made before the next Congress to secure money to enlarge the Erie canal to accommodate ships. They will undoubtedly pool with the Hennepin Canal people of the West, and now stand a good chance to put through both projects. Both of these schemes have in them much merit, and ought to be supported by the entire Northwest.

CAYENNE PEPPER is almost always adulterated. It is mixed with burnt rice, flour and ground mustard husks, which are generally colored red with red lead, which is very poisonous. To detect the poison of red lead, sprinkle a little on some white letter paper and draw your finger over it. If a number of small red lines appear on the paper, it may be set down that they are due to the presence of red lead.

BONES IN THE OCEAN.—The fact has been established that bones dissolve in the ocean. By dredging, it is common to bring up teeth, but rarely a bone of any kind; these dissolve if exposed to the action of the water but a little time. On the contrary, dentine, the peculiar material of which the teeth are formed, and the enamel covering them, resist the destroying action of the sea water indefinitely.

SILVER SOAP.—The following are among the many preparations used: Mix $\frac{1}{2}$ pound of jeweler's rouge with $\frac{1}{2}$ pound of prepared chalk. Or, $\frac{1}{2}$ pound levigated putty powder, $\frac{1}{2}$ pound burnt hartshorn, 1 pound prepared chalk, and 1 ounce rose pink. Or, $\frac{1}{2}$ pound fine chalk, 3 ounces pipe clay, 2 ounces white lead, $\frac{1}{2}$ ounces magnesia (carbonate), and the same quantity of jeweler's rouge.

The lance has disappeared from the list of weapons used in the Austrian army. The lancers will be converted into light cavalrymen.

GOOD HEALTH.

The Philosophy of Vaccination.

Prof. Tyndall explains the philosophy of vaccination as follows: When a tree or a bundle of wheat or barley straw is burned, a certain amount of mineral matter remains in the ashes—extremely small in comparison with the bulk of the tree or of the straw, but absolutely essential to its growth. In a soil lacking, or exhausted of, the necessary constituents, the tree cannot live, the crop cannot grow. Now, contagia are living things, which demand certain elements of life just as inexorably as trees, or wheat or barley; and it is not difficult to see that a crop of a given parasite may so far use up a constituent existing in small quantities in the body, but essential in the growth of this parasite, as to render the body unfit for the production of a second crop. The soil is exhausted, and, until the lost constituent is restored, the body is protected from any further attack from the same disorder. Such an explanation of non-recurrent diseases naturally presents itself to a thorough believer in the germ theory, and such was the solution which, in reply to a question, I ventured to offer nearly 15 years ago to an eminent physician. To exhaust a soil, however, a parasite less vigorous and destructive than the really virulent one may suffice; and, if, after having by means of a feeble organism exhausted the soil, without fatal result, the most highly virulent parasite be introduced into the system, it will prove powerless. This, in the language of the germ theory, is the whole secret of vaccination.

IMPORTANT, IF TRUE.—A correspondent of the *Stockton (California) Herald* writes as follows: I herewith append a recipe which has been used, to my knowledge, in hundreds of cases. It will prevent or cure the small-pox though the pittings are filling. When Jenner discovered a cow-pox in England, the world of science hurled an avalanche upon his head, but when the most scientific school of medicine in the world—that of Paris—published this recipe as a panacea for small-pox it passed unheeded. It is as unailing as fate, and conquers in every

instance. It is harmless when taken by a well person. It will also cure scarlet fever. Ivers is the recipe as I have used it, and cured my children of scarlet fever; here it is as I used it to cure small-pox, when learned physicians said the patient must die if cured: Sulphate of zinc, one grain; foxglove (digitalis), one grain; half a teaspoonful of water. When thoroughly mixed add four ounces of water. Take a spoonful every hour. Either disease will disappear in twelve hours. For a child, smaller doses, according to age. If countries would compel their physicians to use this, there would be no need of pest-houses. If you value advice and experience, use this for that terrible disease.

PUT THIS IN YOUR PIPE.—An English workman, just past the middle age, found that his pipe, which for many years had been a great comfort to him, was beginning to seriously affect his nerves. Before giving it up, however, he determined to find out if there was no way by which he might continue to smoke without feeling its effects to an injurious extent. He accordingly wrote to a medical journal, and was recommended to fill the bowl of the pipe one-third full of table salt, and press the tobacco hard down upon it, as in ordinary smoking. This result was very satisfactory. During the process of smoking, the salt solidifies, while remaining porous, and when the hardened lump is removed at the end of the day's smoking, it is found to have absorbed so much of the oil of tobacco as to be deeply colored. The salt should be renewed daily.

EFFECT OF ELECTRICITY ON THE HEART.—A case illustrating the power of electricity to stimulate the action of the heart occurred recently in Vermont. A three-year-old child was by mistake given a dose of morphia, and was so affected by it as to be apparently beyond help. Dr. Sherwood was called, but to all appearance the child was dead, except that there was an almost imperceptible beat of the heart. An application of electricity was made and continued four hours, at the end of which time resuscitation was complete and the child lives. During the process of restoration, if the poles of the battery were withdrawn the activity of the heart would subside, and it is very evident that but for the use of electricity death would have ensued.

THE OXYGEN CURE.—Three prominent men are stated to have lately tested the "oxygen cure." The first drew a long, deep breath from the receiver and reported that the sensation was delightful; he felt it tingle to the ends of his fingers. The second took an inspiration and became pale and agitated; he was told that the oxygen had found the weak spot in his anatomy. The third man declared he felt nothing; he could take the stuff in all day. Then it was discovered that the "Professor" had forgotten that morning to connect the tube with the oxygen reservoir. The patients had been breathing ordinary atmospheric air. The imagination has very much to do in regard to the effect of medicine on the human system.

A CHOLERA PREVENTIVE.—There is no good reason to doubt the truth of the following, which is worth bearing in mind. During the first visit of cholera at St. Petersburg, in 1832, a firm of iron founders employing 500 men, informed them that all those who would not take a teaspoonful of powdered charcoal on entering the works in the morning, must leave their employ. The consequence was that they did not lose a single man, when myriads were dying around them.

WASH THE HEAD.—A distinguished medical authority says that keeping the head clean is a great aid to health. A distinguished physician, who has spent much of his time at quarantine, said that a person whose head was thoroughly washed every day rarely ever took contagious diseases, but when the hair was allowed to become dirty and matted, it was hardly possible to escape infection. Many persons find relief for nervous headache by washing the head in weak soda water.

TRICHINIASIS.—The fact has at length been made abundantly clear that trichiniasis is contracted mainly by those who consume pork derived from the more carnivorous wild swine which abound in forests. Persons whose pork diet is derived from animals carefully fed on large dairy farms, do not suffer from the affection. —*London Medical Press.*

BATHERS' CRAMP.—The occurrence of cramp in swimmers is generally ascribed to the effects of cold—the low temperature of the water when considerably below that of the body, acting upon the great nerve centers. Although this theory may not be very satisfactory, it is the best which has yet been given.

HEALTH STUDIES IN SCHOOL.—The teachers in the Bangor public schools have during the past year been given a regular course of instruction concerning the first symptoms of contagious diseases, with a marked effect for good.

LIGHT AND HEAT.—Evidences of the sanitary value of sunlight is afforded by the recent experiments in France of Mons. E. Duclaux, who finds that the light of the sun, in its action on germs, is fifty times as destructive as its heat.

EFFECT OF MORPHINE ON THE HAIR AND TEXTURE.—It is claimed that the habitual use of morphia produces baldness and loosens the teeth.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

IMPORTANT DISCOVERY.—*Ledger*, July 19. W. B. Vandament, who has been prospecting in the vicinity of Pine Grove for the last two months, has made a discovery of considerable importance. At a point a short distance in the rear of the hotel, at the depth of 12 feet, he has uncovered a body of quartz from 40 to 50 feet wide, containing about 20 per cent of sulphurets. An assay of these sulphurets gives \$300 per ton, \$75 being in silver, the balance gold. In addition to this, the ore is said to yield about \$70 per ton in free gold.

McKINNEY.—This quartz claim, situated at Middle Bar, and owned by A. McKinney and Jos. Crannis, has suddenly loomed into prominence. It is in the midst of the group of mines where that heavy, dull, lead-colored metal is met with, carrying a large percentage of gold. The metal has been taken out in considerable quantities on both sides of the McKinney—from the Farrell claim on the south, and the Marlette, St. Julian and Mammoth mines on the north. For several months prospecting has been conducted on a small scale. A shaft was sunk to the depth of 100 feet, when a drift was run some distance, but nothing of importance was encountered. It was then decided to return to sinking. After going a few feet deeper indications of quartz began to appear, and at the depth of 107 feet a three-foot vein of splendid ore was struck, abounding with that heavy gold-bearing metal for which this camp is already so famous. Two or three boxes of the richest rock was taken to McKinney's store, the value of which is estimated at several thousands of dollars. One specimen, measuring 1x6 inches, is on exhibition at Ginochio's store, Jackson. For this piece the owners have been offered \$200, which was refused. This will give an idea of the amount of gold it contains. Assays of ore taken from different parts of the ledge, and representing a fair average of the rock, give an average of over \$200 per ton. The strike is undoubtedly the most important that has been made at Middle Bar for some time.

SOUTH SPRING HILL.—The last monthly clean-up of the ten-stamp mill yielded over \$4,000. Including sulphurets, the run is estimated at \$5,000, giving an average of \$70 per ton. At the 600-foot level the ore-body shows 20 feet wide in the stopes. The mine never appeared to better advantage than at the present time; and the prospect is regarded by good judges to be amply sufficient to justify the enlargement of the mill to 20 stamps. The contract recently let to run a drift 100 feet in length at the 700-foot level was at \$3 per foot, contractors to furnish powder, fuse, caps and candles. The size of the drift is 8 feet high, 6 feet wide at bottom and 4 feet on top; the price agreed upon is remarkably low.

SUTTER CREEK.—The Mahoney mill has been running on rock from the Washah mine, between here and Amador City. About 350 tons have been run through—fully sufficient to test the quality of the quartz. A clean up will be made this week, and all indications point to a satisfactory result.

The prospects of the Lincoln are decidedly improving. A quantity of broken quartz was discovered on the surface in working at a point about midway between the two shafts, and on the west side of the road. A crushing of the rock from this ledge, mixed with a large percentage of dirt, has been made, consisting of about 60 tons, and gave the satisfactory yield of \$5 per ton in free gold. The discovery is believed to be an entirely new ore body, as there is no knowledge of the underground workings having reached anywhere near the spot where the ledge has been exposed. There is evidently a ledge of considerable size, too. Mr. Stewart has commenced a new shaft, for the purpose of opening this ledge, and the mill will be kept running on this ore as much as possible until the ledge known to exist in the 200-foot level, and toward which operations in the south shaft are being conducted, is tapped.

There is some talk of the Mahoney being started again, under the Valentine management.

Calaveras.

WEST POINT.—*Cor. Calaveras Chronicle*, July 19: The mining boom is daily increasing here, and will soon attain proportions that will astonish the outside world, a result that has been hitherto looked for with patience. This will have the tendency to make our little town the leading mining camp of this county. The Russell Furnace has been shut down temporarily, owing to the lack of water to run the machinery. However, operations will be resumed on the different mines belonging to the same company. The latest report that is rife here at present is the bonding of the Keltz mine to Mr. Harvey, of San Francisco, for \$30,000; \$10,000 payable in ten days and the rest within sixty days. The Keltz mine outcries any previous discovery that has ever been made in the upper country. As depth is attained the body of ore increases in width, length and richness. At present it is 40 feet in length, 3 feet in width, and will average \$200 per ton, all being a glittering mass of sulphurets, galena and gold. It is the intention of the prospective purchaser to place powerful machinery on the mine and sink 1,000 feet. A quartz mill will be erected near the mine. Twenty-five tons of the ore are being crushed at Rufino's mill, which, from present indications, show that the yield will be over \$200 per ton. Work is being prosecuted in the Scorpion mine. A level is being run to connect with the south shaft for the purpose of ventilation. As soon as this is accomplished, sinking will be continued in the present working shaft, which is 120 feet in depth, till 220 feet is reached. The present hoisting engine will then be inadequate to perform the work required, consequently heavy machinery will be placed over the south shaft, which is 130 feet south of the present one. A building, 64x40 will enclose the works. The old Soap Root mine is undergoing development through the agency of Messrs. Henry & Haskins. They have extracted some valuable sulphureted ore, which lies in the ore yard, and will stand the scrutiny of the passer-by, being rich in quality. This mine is situated in close proximity to

the Scorpion. Discoveries, on a smaller scale, have been made of late by prospectors on small ledges and seams in which this country abounds. Chick & Brown are taking out ore from their mine; they have 10 tons on the dump, and will obtain as many more; ore valued at \$50 per ton. N. Markett is steadily working his little mine, and has about 8 tons on the dump that will yield \$80 per ton. Alec Fischer is continuously adding "ducats" to his coffers by perseverance and toil. He is at present extracting ore out of his mine, situated near North Fork, that will yield \$100 per ton. The recent test of the ore from the Black Mammoth, made at the Simpson Furnace, resulted favorably in the extreme. First lot worked yielded at the rate of \$40 per ton, and the next gave a result of \$78 per ton. Work on this mine will soon be commenced, and by a small expenditure of labor thousands of tons of ore, equally as good as the above mentioned, will be placed in sight.

Inyo.

THE BROCKMAN AND OTHER MINES.—*Inyo Register*, July 19: Last Saturday we paid a visit to the above named mines, located some 16 miles northerly from this place, on the western slope of the White Mountains. The C. & C. R. R. runs along in front of the series of mines, of which these are part, and from two to four miles distant. On the Brockman are two tunnels, one a short distance above the other; the lower one is in about 60 feet, the upper one about half that. The ground is blocky slate, and requires timbering. On the bottom and sides, of the lower tunnel particularly, are to be seen bodies of beautiful ore, difficult to estimate as to thickness or quantity, but certainly it can be broken out in chunks of several hundreds pounds weight. Lying on the dump are from 40 to 50 tons of ore, in quantity apparently sufficient to about half fill the entire tunnel. This ore is throughout astonishingly uniform in its make-up, so much so as to be hardly sortable at all by hand. In the main it is a bright green carbonate of copper, with whitish quartz, everywhere with spots or small chunks of so-called black metal, probably copper-silver glance. This portion is said to assay to \$300 in silver and about 40 per cent copper. The entire output looks as if it might average half as much. This tunnel was run on croppings of what was supposed to be a feeder of the main ledge cropping out about 100 feet higher up on the mountain side. On the latter, 800 feet north, an open cut has turned out about a dozen sacks of ore very similar to that already described. The character of the ledge there has not been developed, the opening being but about four feet deep. About 1,000 feet south considerable work was done years ago, and some ten tons of ore shipped to Reno, where it was worked, yielding \$200 a ton, according to report. The formation is solid slate, and the ledge, though divided into several 8 and 10-inch streaks of good looking ore, looks decidedly promising. Like the stratification of the slate, the ledge bends down the hill at the mouth of the tunnel, but at the inner end goes down vertically, so far as can be discerned by the little digging in that direction that has been done. Immense croppings, plain to view a mile distant, mark the ledge for two miles or more, all the way in slate, capped a short distance above, in a parallel line, with a mountain of metamorphic rock—a very favorable condition for rich deposits in the underlying slate. Good ore, we are assured, is found all along this ledge. In other places visited, but to which we can make no further allusion now, the ores run somewhat to black and red oxides of copper, copper pyrites, etc. These were not in the slate, however. As there is a permanent stream of the very finest mountain water just in the right place, we strongly urge any one desirous of establishing cheap concentrating works to pay that locality a visit by all means. In that view, we are positive there is enough there to justify any competent person or company in at least a thorough investigation.

Mono.

BERTON.—*Cor. Inyo Register*, July 19: At the Silver Wave good ore is being taken out.—Frank Gillespie is working the Benton mine, and has taken out several lots of good ore. This is the old claim that Lewis Lewis worked for years, clearing from \$2,000 to \$3,000 a year by his own individual labor.—Further up the grade Jim McClure has opened up a new vein this summer, running east and west, and crossing the Comanche and North Kerrick at right angles, from which he has made several shipments of rich ore. Select samples assay as high as \$3,000 to \$3,500. The average milling value is from \$400 to \$600.—North of the Elmira toward the Laura is the Deronda, owned by John Tucker, John Lynch and W. D. Mitchell. This vein has been opened by a tunnel on the ledge, now in about 200 feet, and gives promise of making a No. 1 mine. The ore consists of several grades. Lead ore running from 30 to 60 per cent in lead, and from \$200 to \$300 in silver; black ore milling \$500 per ton and iron ore milling from \$80 to \$150.—West of the Deronda is the Vedette, opened up by several tunnels, and carrying black and lead ores in their various combinations. This is owned by W. T. Redd, one of the oldest pioneers of the camp, a Mexican War veteran, etc.

MEN AND WAGES.—*Bodie Miner*, July 20: During week ending July 18th, the Standard Con. Company have employed 44 miners, 5 carmen, 2 station tenders, 1 timberman, 1 blacksmith helper, at \$4 per day; eleven laborers at \$3.50 per day; two engineers, 1 ship boss, 1 carpenter, 1 blacksmith, 1 pumpman, at \$5 per day; one foreman, at \$200 per month. These being about the rates of wages paid by the other companies in and about the town of Bodie. The Standard mine is looking well. Ore shipped to mill last week, 420 tons. The work of development is being actively pushed on the Bodie Con., employing 29 men; also, on the Mono, employing 5 miners and 1 engineer. The Con. Pacific having completed, winze station will begin sinking at once.

Nevada.

SPANISH QUARTZ CLAIM.—*Transcript*, July 18: Four months ago some Spaniards made a rich strike on the north end of the Spanish quartz claim at the head of Wood's ravine. They sunk down a few feet and got into a bunch of ore that, in two or three instances, is represented to have yielded from \$20 to \$50 to the pan. A. R. Lord & Co., owner of the claim, discovered what was going on, drove off the Spaniards and leased the claim to Baldrige, Ragan & Co., who have started in to extract 500 tons of the ore. The lessees have sunk one shaft 40

feet deep, and are now drifting into the pay chute, which is believed to extend downward in the form of a reversed letter V with the point at the surface. The drift is in nearly 20 feet. The vein is from 2½ to 3 feet thick, and good judges calculate the ore will pay from \$6 to \$8 a ton. A tunnel run into the claim by parties formerly working there gives good drainage.

Lockin & Organ are getting some excellent ore out of the Evangeline mine.

At the Double Eagle, in the same part of the district, the vein is improving with depth. The shaft is now down to water.

ROUGH AND READY.—A crusher has been put up on the Banker Hill mine, near the old town of Rough and Ready. The claim prospects well, small quantities of very rich quartz having been taken from it in times past. Several other quartz veins are being prospected, with good results, near the town.—Davy & McCormick are putting down a prospecting shaft in a ledge on Gold Flat, which, though small, has yielded some hundred-dollar ore.—Work is about to be started upon the Horse Shoe mine, to which end a large water-wheel is being put up, the wheel and pumps being obtained from the Washington mine.—Ferguson is making rapid progress in the erection of his new quartz mill, near Onega.

Sierra.

FOREST CITY.—*Sierra Tribune*, July 19: The Extension Co. have cleaned up 194 ounces, proceeds one week's work in the South Fork ground.

A 20-stamp mill is to be erected at the American Hill mine within the next 60 days.

At the Bald Mountain mine the windlass is being used again in drawing the cars up the incline. The steam and gas given off by the little engine rendered it impossible to continue its use. A handsome nugget was picked up in this mine last week.

Bald Mt. Extension Co. had a clean-up, Sunday, of 193 ounces. A quartz nugget that yielded eighteen and three-quarters ounces of gold was found at the head of the sluice. The average yield was about \$3.20 per car-load. Sixty-nine men are employed.

Dr. Sanders, of San Francisco, is up here to develop the Pilgrim Quartz mine, above Cornish Ranch, and will build a 20-stamp mill. It may be completed within 60 days.

Wm. Hanley has the contract to raise a shaft from the lower tunnel to the upper level at the Rainbow Quartz mine, at Alleghany. The chances for this company opening up another body of rich ore are now considered good.

The Young America Drift Co. will soon commence the development of their ground. A new tunnel, 30 feet lower than the old one, will be run about 1,700 feet to reach the pay lead and drain the mine. This is the old claim that paid well in early days. The front ground has been worked out. These diggings embrace a large tract of unprospected ground, extending from Oregon Creek back to the Henness Pass Road, 3,000 feet, and along the ridge for the same distance.

Sutherland & Lindley's quartz mine, at Poker, pays uniformly and well. Many other mines about the Sierra Butte are looking or paying well, the most of them being fortunate in having such experienced miners as Johns, Deidesheimer and that class of men to superintend them.

Shasta.

DEADWOOD.—*Shasta Courier*: Things are lively here, reminding one of the mining camps of Nevada in its palmiest days. Cord wood piled on every hillside, men busy as bees, digging, blasting and shoveling. With what success, the output of gold from this part of the county speaks for itself. And other industries outside of mining, such as stores, hotels, boarding-houses, etc., all of which are prospering. The McDonald mill is crushing rock from their own mine at present. Last month they crushed over 400 tons for other parties, with satisfactory results to the owners. At the Watts mine there is quite a large force of miners at work; the ore is of low grade, but the returns pay a good dividend. Other mine owners are taking out rock for grinding during the winter, as that is the only season they can get water for running their arastars.

ELSEWHERE: The Niagara Co. contemplate running a tunnel on their claim 1,000 feet in length, also to open the Summit mine in the same manner. The Highland mine, long idle, is now being worked, and shows good ore. The recent discovery of Esbey and Hill on Boswell Gulch, is looking well. They have a tunnel running along the ledge for 90 feet, and in good ore all the way. Thos. Green is opening his mine in better shape than heretofore.

REPORTED.—The discovery of rich silver ore on the Sacramento river near Portuguese Flat. A big strike of free gold on Motion creek. Reid & Co.'s quartz mill will be running in about two weeks. They have 400 tons of gold ore to start on.

SOLD.—Thos. Harrison has sold his quartz mine, owned over 20 years, to parties in Colusa county. He has worked the ore, which is highly sulphureted to some extent with an arastar, but of course, with only indifferent success, as it carries not over six or seven dollars per ton in free gold. A company put up a 10-stamp mill on the property, but not knowing how to treat the ore, it proved a failure. With the present knowledge as to working this class of ores success is now counted upon.

San Bernardino.

PROVIDENCE MINES.—*Cor. Calico Print*, July 19: Kerr & Patton's mines have been sold or bonded through a Mr. Spencer, some say to a Los Angeles company, others a syndicate of Australians, at any rate the representatives have already on the ground derricks for sinking for water to put up a mill. I understand they will put a force of men on at once and commence the better development of the mine. Kerr lately shipped some ore to Kingman going over 200 ounces.

MISCAL CAMP.—STRUCK IT RICH.—W. A. McFarlane & Sime Barrett the owners of the Cambria mine have struck it very rich. They are running the old Con. mill, of Ivanpah, on ore from that claim for the past month and four men have taken out ore enough to keep the mill pounding away every day. It is their intention to run night and day as soon as they can get in supplies. The first two bars of bullion (\$2,720) was shipped by Wells, Fargo & Co. today. More on the way and lots of it in sight. Luck be with them, they deserve it. Sime writes Cambria stock is on the market.

MOZART GROUP OF MINES.—Contracts have been let for building a road to the mines and also a main shaft. The contractors went to work today. It is said that they intend putting on more men to take out ore on this group. The Mineral Point tunnel is in ore of good quality. Belle McGillroy group continues to take out ore for shipping and milling. They have a nice pile of good ore on their dumps. Bonanza King is running through some 24 tons daily; there have already been 24 bars of bullion shipped that speaks for itself.

Tuolumne.

WORK ACTIVE AND PROSPECTS GOOD.—*Independent*, July 19: Not for many years has the mining outlook been so favorable. Prospecting is being carried on with a vigor and much success. Fifty tons of ore from Nervie's mine at Italian Bar, yielded about \$200 per ton. As the five-stamp mill is run by water, the crushing can be done cheaply. To the south, the Page mine, though not paying just now, is a good property; also, the Hart & Jacobs. Next we have the Ham & Bering mines, from which a recent crushing of 12 tons of ore with an arastar, yielded an average of nearly \$36 per ton. The Oakland mine, in the same vicinity, is a good one, as has been proven by working tests of the ore. Harkness and Garrett have been "taking it out big" during the last week—yesterday's "pan out" being \$7,800. Long & Hampton are making preparations to add forty stamps to the Willietta ten-stamp mill at Jacksonville—increasing the crushing capacity to 150 tons per twenty-four hours. As for ore there is an inexhaustible quantity in sight. They have also had the route for a water ditch surveyed and located, and will shortly set men to work to dig it. When completed the ditch will afford them a never-failing water supply. The new ditch will be 1½ miles in length, and will be fed directly from the Tuolumne river.

NEVADA.

Washoe District.

MAXIM MILL.—*Inyo Independent*, July 18: The Maxim mill is likely to pass under other management. Mr. Stansfield settled with Harris & Rhine and gave up all claims to the property, they acting as agents for parties in New York. Within the past few days Mr. John Alexander has made proposals for the use of the mill that have been accepted by Harris & Rhine, subject to the approval of the people in New York. These proposals have been forwarded, and no doubt is entertained but that they will be approved. Mr. Alexander will then at once begin work crushing and concentrating ores. All the ore that the mill and concentrators can work, can easily be supplied from Cerro Gordo, Swansea and the White Hill; Welch & Downs have already a large amount of ore in sight at the latter place suitable for concentration. The partners of Mr. Alexander in the White Hill mine are not concerned with him in the Maxim mill.

RICH STRIKE.—A rich strike is reported from Cerro Gordo. Some time since Conklin, Lasky & Moreno put a force of men to work in the Guymas mine running a tunnel. This is one of the old mines from which rich ore was taken in the flush times of Cerro Gordo. The tunnel was run toward an old shaft, which was reached at a depth of 188 feet from the surface, and struck a vein of silver ore one and a half feet wide, that gets \$700 per ton. This is the best thing yet found since work was resumed at the old camp. From the mouth of the tunnel a chute of about 200 feet in length will convey the ore to the road so that no packing will be necessary. The example set by Thomas Roland has induced others to take hold at Cerro Gordo, and now the old town begins to resume signs of returning prosperity.

HALE AND NORCROSS.—*Enterprise*, July 18: But little progress has been made in sinking the deep winze below the 3,000 level, owing to the work of placing the compressed air engine and hoisting gear in the chamber at the head of the winze. Considerable cutting out had to be done for the gallow frame, but all this preparatory work will be completed in a day or two, and sinking deeper actively resumed, following the ore vein, which was reported to hold out well in the bottom of the winze at latest accounts. The sinking of the Combination shaft deeper progresses at the rate of about two feet per day. The bottom of the shaft or sump was 60 feet below the 3,000 level, and the entire depth is now 85 feet below that level, consequently the actual additional amount sunk thus far is 25 feet.

WHITE HILL.—Assessor Irwin was up at the White Hill last Tuesday, and visited various mining claims there. In one of the claims of Welch & Downs he found an open cut in which there is a breast of ore twelve feet in depth and five feet wide. Both walls are hard and smooth and the ledge appears to go nearly straight down, the ore in the bottom of the cut being of the same character as that in the breast. On the surface Mr. Irwin says the ledge crops out over a distance of a mile and a half. Adjoining the above claim the same parties have another location, on which no great amount of work has been done, but so far as prospected it appears to have the same general character as the first mentioned.

BULLION.—The west drift on the 160 level is in about 130 feet. The water which has heretofore impeded progress somewhat has slackened off considerably, owing to the drift having passed through the heavy clay and quartz formation into more solid vein porphyry of a very favorable nature. The main ore vein is thought to be from 50 to 100 feet further west. The tributors conducting this bit of a mining operation are hard working, industrious men, worthy of liberal encouragement and of any good success they may achieve, to say nothing of the fact that a good ore development by them at this point would be of great importance to that heretofore barren section of the Comstock.

CROWN POINT.—The old bonanza stopes and workings continue to yield about 350 tons per day, and the Belcher, which is being worked through this mine, yields from 100 to 150 tons per day, all of which is reduced at mills on the Carson river. The Kentuck yields 50 or sixty tons a day, which is worked at the Rock Point mill, just below Dayton, on the Carson river. All this ore from the three mines mentioned, is of low grade, being merely the leavings or gleanings of the old high grade bonanzas which were worked out years ago.

SIERRA NEVADA.—On the 520 level the north lateral drift has been extended 75 feet during the past week, making a total length of 864 feet. This drift, running nearly in a northwest direction, partakes of the nature of a crosscut diagonally across the ore channel, and the favorable clay, quartz and vein porphyry material encountered during the last week or two indicates advancing or increasing proximity to the ore veins known to lie to the westward, and which it is proposed to crosscut more directly into in due time.

MINETTA.—This claim has already been described in the former issues of this paper. Mr. Irwin says ore can be got out anywhere along the claim. He saw one little prospect hole from which a dab of ore was taken in two days by two men, that will net forty dollars to the miners. This hole was surrounded on all sides by solid ore. Mr. Irwin thinks there is a large amount of ore at this point. Where men can start in on the surface and earn ten dollars per day, would, he thinks, be a good place to keep on trying.

JUSTICE.—The Justice Company are running a drift southwest to intercept the vein formerly known to exist in that portion of the mine, and will be in about the roth of August. It is the general opinion that they will get a large quantity of good ore in the south end of their mine. The management intend to prospect north and south after they cut the vein, and hope to work a good many miners at no distant day.

UNION CONSOLIDATED.—The main drift running north on the 500 level, hitherto known as the joint Union and Mexican drift, is now into Union ground about 90 feet, and the expense of running it will hereafter belong to the Union Consolidated alone. It is making very good progress in favorable working ground.

CON. CALIFORNIA AND VIRGINIA.—About 100 tons a day are yielded from the 1,750 level on company account, battery samples assaying \$28 per ton. The Jones lease portion of the mine, above the 1,300 level, shows a large falling off in quantity of ore extracted. Battery samples \$19 per ton.

OVERMAN.—Owing to the Vivian mill, which has been doing the ore crushing, being otherwise engaged, the shipments of ore have to be discontinued for the present, and work confined to explorations for further resources, and something better than lower grade ore, perhaps.

UNION MINE.—In the Union mine, near the foot of the White Hill, Sielas Reynolds and Tom Treglow have a good body of ore in sight. These men have enough ore now out to enable them to make a shipment with the addition of what will be taken out in another day or two.

GOULD AND CURRY.—The crosscut east, next to the Savage line has been extended 50 feet during the past week, giving a total length of 278 feet. The general vein of formation looks very favorable and promising.

YELLOW JACKET.—The middle portion of the old upper workings, about the 400 level, makes a very good showing in the way of good regular yield, and the general character of the mine shows improvement.

MONTE CRISTO.—The mill being shut down at present, no ore is being extracted from the mine, but development work is going ahead with a view to future milling and bullion production.

ALTA.—A shift of men continue working in the explorations in the 900 level, taking out small stringers and bunches of fair grade ore, and looking for something better.

BEST AND BELCHER.—On the 1,000 level, crosscut No. 1 west has been extended 49 feet during the past week, making a total length of 224 feet.

Columbus District.

MOUNT DIABLO.—Candelaria *True Fissure*, July 18: The west drift on the sixth level has advanced 14 feet during the week, and the face shows a small streak of ore assaying \$11 per ton. The east drift on this level is in 120 feet. The east drift on the fifth level is in 179 feet. The intermediate, between the fifth and sixth levels and west of the incline, is in 32 feet, and shows a small seam of \$100 ore. The stope above the fifth level are looking much the same and yielding considerable \$70 ore. The west drift on the third level is giving a small amount of ore of fair grade. The intermediate, between the second and third levels and west of the shaft, is turning out considerable ore. This stope has been worked through the second level in several places, and stopes have been started on the ore above that level. The intermediates, between the first and second levels, are giving a small amount of high grade ore. A small amount of fair grade ore is being taken from the west drift on the first level. A bullion shipment was made on Thursday.

Eureka District.

ORE SHIPMENTS.—Eureka *Sentinel*, July 19: Shipments of ore from the surrounding mines to the two reduction works in town are about the same as a week ago. The Prospect Mountain properties are looking very well, and while the shipments from there during the past few days have not been as great as they might have been, yet the number of producing properties is gradually becoming greater. Work is being actively carried on in at least twenty mines in this section, and from nearly one-half of them ore is being extracted for shipment. Among the properties there that have sent down ore to the Richmond furnaces during the past five days are Dunderberg, 11 tons, and the Home Ticket, 5. The Adams Hill properties are doing good work, there having been shipped to the Richmond works from the Wide West 35 tons; the Altoona, five sacks of \$400 ore, and the Silver Lick, 26 tons. To the Eureka Con. furnace the Bowman shipped 4 tons. The Jackson mine, on Ruby Hill, sent to the same furnace 37½ tons, and the Albion 24½. The Bay State mine, Newark District, sent in 24 tons of \$300 ore to the Richmond works, and the Myntner mine, Silverado, shipped 4½ tons of rich ore. The Blue Run mine, Secret Canyon, also sent in to the same works a ton and a half. Sixteen sacks of high grade ore were received at the Eureka Con. furnace from some Mineral Hill properties, and 10 tons of ore were brought in from White Pine District to the Richmond works.

Golconda District.

MANGANESE MINING.—*Silver State*, July 19: J. R. Jennings is at Golconda, making arrange-

ment, to commence work on the manganese mines in that vicinity. The mines are about three miles from Golconda, and, perhaps, half that distance from the railroad. They are accessible for teams, and Mr. Jennings, who is acting for Virginia City men, says he can readily dispose of all the ore that he can ship, as it is in demand for making steel.

Tuscarora District.

INDEPENDENCE.—*Times-Review*, July 17: The usual progress has been made with the work the past week, and there is no material change worth reporting.

NORTH BELLE ISLE.—Work the past week has been confined to cleaning out and repairing the chute leading from the 150 to the 300-foot level.

BELLE ISLE.—Crosscut west from the west vein, 350-foot level, has been extended a total distance of 92 feet. East crosscut from the north drift, 150-foot level, has been extended 16 feet.

GRAND PRIZE.—During the past week the south drift in the 200-foot level has been extended 25 feet, the 300 level 30 feet, and the 400 level 25 feet. Stopes continue to furnish a full supply of ore for the mill. No material change to report in any part of the mine, everything going ahead all right at the mine and mill.

NAVAJO.—Crosscut and drifts on the 650-foot level were extended the past week 53 feet. North drift on the east lateral vein has been advanced a total distance of 148 feet, the face showing a large width of vein matter; south drift, same vein, 272 feet. The vein at this point is showing a better character of quartz, but the assays run low. The flow of water at this point has increased. No. 2 crosscut east, from the north drift, has been extended 58 feet and work suspended. The rock has been very hard, and no mineralized vein encountered. Are preparing to start a drift south, on the west vein, 92 feet west of the shaft.

GOLD HILL.—Quite a number of the boys have gone off prospecting through the mountains south of here in search of adventure and cooler weather. In those claims not fully under cover it is impossible to work, and as a consequence no surface prospecting is being done. On the contrary, where shelter from the sun is obtainable work is being pushed with more or less vigor. Standard, as usual is keeping the lead, developing continually, and extracting ore only as they advance. Treasure Box is beginning to loom up as one of the future bonanzas of the camp and the vein continues to hold out as well as ever, and gives promise of eventually proving one of the biggest veins in the camp. The shaft will, in all probability be continued to the 100 level, water permitting. Work has been commenced on the Under Dog, but it is too early to report progress. Nothing is being done on any of the bonanza silver claims. Work, it is expected, will be commenced soon on the Lone Hand. Messrs. Clark and Derbyshire had hardly got thoroughly warmed up to their work when they struck a large body of very rich ore which promises to be a permanent thing. Shaft is down 20 feet and the vein, which is broken up as yet, shows up strongly, being three feet between walls and widening as depth is attained. Sulphuret ore of a very high grade is encountered in considerable quantity, and pockets are occasionally found of a rich, gray, carbonate ore, resembling that found in the Sierra mines at Lake valley. The carbonates carry but little, if any, lead and appear to exist in quantity. Samples have been sent in for testing but no returns have yet been received. The ledge is nearly what might be termed a blanket vein, and pitches to the southward. Messrs. Clark, Derbyshire and Flood have a six months' lease upon the property, with the option of purchasing the same. About three tons of first-class ore are now on the dump. Work on this claim will be pushed vigorously and additional force put on as fast as circumstances will justify the expenditure.

ARIZONA.

DOING WELL.—Prescott *Courier*, July 19: John Curtin has been doing well in the Tiger mine. He took out several tons of black sulphuret ore. Water is scarce at the Del Pasco. Mill not running. About 1,000 tons of tailings will be worked at the Tuscumia mill. Mr. Dawes appears pleased with the yield of Peck tailings. James Daly and others have given the Yuma mine, Centennial district, Yuma county, a thorough prospecting. The shaft is 100 feet deep; the pay streak runs from 18 inches to two feet in thickness; rock samples \$50.22 to the ton in gold. Sulphurets have not, as yet, been encountered. There are, according to Mr. Wilson, a Prescott assayer, over 2,000 tons of rock in sight. Returns from the Selby smelting works have been received concerning the ore shipped from the Avas Supai mine, situated on Cataract creek, this county. About 10 tons of ore was sent as a venture, which netted over all expenses, \$67.50 per ton. This clearly demonstrates the fact that this mine is of such character that great possibilities may be expected of it and the locality in general, as there are several mines close by the original.

COLORADO.

LEADVILLE SMELTERS.—*Mine, Stock and Rail*, July 19: A few weeks ago we rendered an account of the state of smelting affairs in Leadville. A visit was made this week to the Pueblo works. At the Pueblo Smelting and Refining Company, Mr. Geist was found in Denver, but the works were there to be sure, and what has not been seen for some time, all the furnaces were in blast, thirteen, doing away with not less than 550 tons of ore a day. This running full capacity is evidently due to the momentarily favorable condition of the lead market, which is not expected to last. This running in full is making deep inroads upon ore reserves, and it is doubtful that one week's run is on the beds. The ore receipts, therefore, although large, are not sufficient for the use of full capacity, and it may be argued from this that the war between this and Leadville smelters will go on. At the Colorado Smelting works, Mr. Anton Eilers was perambulating in his garden surrounding his residence, to momentarily seek oblivion of the increasing perplexities of the ore market, which seem to have spread from the lead ore transactions to the silicious elements. When dry ores are treated as low as five dollars per ton, refractory ores will soon be treated at six dollars, and then the best and least profits will have to be made out of—what? The lead ore

supply at the Colorado Smelter is large. Eureka Hill furnishes most of the silicious ore used at these works, the Madonna nearly all the lead except that which comes with the Leadville sulphide. All the four furnaces were in blast. At Denver, the Omaha & Grant Smelting Company are also running full capacity of their eight furnaces. The Terrible mine ore and concentrate is already used. The concentrate is added to the charges from the ore beds like yeast to the dough. The receipts at these works have been very large last month, as the stock on hand has increased 4,000 tons during the last four weeks, notwithstanding the large consumption by the furnaces. All the roasting furnaces, including those of the new hall recently finished are in operation. The tracks in the yards are crowded with cars containing ore, fuel and fluxes. Mr. J. N. Palmer, of Denver, started on Thursday morning for Custer county, to take charge of the Terrible mine and mill for a short term. The Boston and Colorado Smelting Works are not frequently mentioned in these columns because they mainly draw their supply from the same sources and use no lead. The business, however, remains in a prosperous condition. Two McNair furnaces are being erected, and nearly complete, near Denver, on the Denver & South Park. Another smelter is being erected by Mr. Builey, on the D. & K. G., near the exposition hall. It is said to be a process which will revolutionize the smelting industry. A reaction toward conservatism might, however, be more in place. Colorado needs no more smelters than she has now. Still, if anybody can improve upon present methods and processes, let him come forward by all means. A pleasing feature of our review of smelting affairs, made the last three weeks, is the confidence which is shown by so many improvements and new enterprises, and to tell the truth, the grand total of last month's ore supplies to Colorado smelting furnaces is indicative of a prosperous mining season this year. There will be ore enough for everybody, only for carbonate lead ores the demand will be stringent. Roasting operations will, consequently, be extensively increased.

IDAHO.

THE LAKE CREEK CONCENTRATOR.—*Keystone*, July 19: The foundation for the new concentrator at Lake Creek has been laid and work of putting the machinery together is being pushed as rapidly as possible. Wm. Pinney, the superintendent, expects to have the machinery all ready to start up by the first of the month. There will be a force of from 12 to 15 men kept busy in and about the concentrator when it commences running at full capacity, and that will be as soon as completed, as enough ore can be taken from the mines in that neighborhood to keep it running almost indefinitely. It is expected over 100 men will be employed up there upon the different mining properties as soon as the ore can be treated by the new machinery. Lake Creek mines are all good, but the ore being largely of a concentrating character but little has heretofore been accomplished in the ore output from that section. However, the new concentrator will enable large shipments of Lake Creek ore this season.

THE ARGONAUT AND DIXON.—Henry A. Swift has taken a lease on the Argonaut and Dixon mines on Lake creek and has commenced active operations taking out ore and further developing the properties. He sent up seven men and supplies a few days since and expects to send up seven or eight more in a short time, or as soon as they can be put to work at advantage. He will bring down a sample lot of ore to Ketchum to-morrow as a trial lot, and ascertain just how it runs. A galena vein from 3 to 18 inches in width is now in sight in the Argonaut, and a good ore vein is showing up in the Dixon. Mr. Swift will push work on these properties this season.

A \$2,000 CLEAN-UP.—*Wood River Times*, July 19: The *Times* is informed that at the last clean-up of the Camas No. 2 mill a bar of bullion worth over \$2,000 was obtained. If this proves true the mill is doing fully as well as was anticipated. The water-supply proving inadequate, it may be necessary to move the mill to some point on Camp creek, but this will not hurt the reputation of the district to any extent.

MONTANA.

TERRITORIAL NOTES.—*Inter-Mountain*, July 18: The new 50-ton concentrator in the Ten Mile district made its first run last week. Forty-three quartz locations were recorded in Lewis and Clarke counties in June. The Teston smelter, east of Townsend, will be ready for work about the first of August. A. M. Esler will soon commence the erection of a new concentrator on Ten Mile, a few miles west of Helena. John Longmaid has purchased the old Penobscot property, 18 miles west of Helena, for \$40,000. This is the property that once made Nate Vestal wealthy, and which sold for \$350,000. It is rumored that the Gregory smelter and concentrator near Wickes, which have been shut down for several months past, will soon resume operations. Seventy-five men are now employed at the mine. A five-stamp mill has been ordered for the J. B. lode on Quartz creek, Missoula county. Recent assays of the ore from the J. B., show it to be very rich in gold, and the owners are confident that the lead will prove a bonanza. Messrs. Kane, Stevens, Hatt and Noel own the Lexington lode, in Emigrant gulch, Gallatin county. The ore is decomposed free-milling quartz, and carries \$50 in gold to the ton. They have just put up an arastra, worked by a 12-foot overshot wheel, which they will begin operating in a few days.

NEW MEXICO.

GENERAL MINING MATTERS.—*Silver City Enterprise*, July 17: Pumping machinery has been put up at the St. Louis mine. The Lake Valley Press states that the company at that place will resume operations in about six weeks. Juniper Springs district is expected to contribute a considerable amount of ore to the Silver City concentrating and reduction works. It is probable that work will be resumed on the Golden Rule mine in the near future. An arrangement has been formed between the directors of the Old Dominion Company, of Globe, and interested parties in the East, looking to resumption of work at the mine and smelter. It is probable that arrangements will soon be made whereby work will be commenced on the Houston &

Thomas property, at Pinos Altos. This is undoubtedly one of the largest lead mines in the Territory, and when ore can be shipped from the mine to Chicago at a profit, there is no reason why it should longer remain idle, now that we have taken it home. Mr. Harsch, of Leadville, has taken hold of the Caribou mine at Fleming, and is now sinking and timbering a double-compartment shaft. He will also put in a Cornish pump, after which he will thoroughly develop and prospect the lower workings of the mine. Should there be found a sufficient amount of water in the Caribou to justify, no doubt the Old Man Company will erect a mill at Fleming, as they have an abundance of second-grade ore which could be treated at the mine at a profit. There is now more activity among the mills at Silver City than at any other period in the history of the town. The Bremen is running steadily day and night, crushing and concentrating from twelve to fifteen tons of ore per day. At the Flagler works the roaster has been completed, and the works are now prepared to treat all kinds and grades of ore successfully. Exceedingly low grades of ore can be treated by the new lixiviation process now in successful operation at these works. The vanners of the Silver City concentrating and smelting works, were put in motion on Tuesday. Mr. Shoefelt is now prepared to buy, treat or sample any kind or grade of ore. He has already bought a number of second-class dumps at Lone Mountain and other places, and says he is satisfied that he will not lack for ore. This new plant consists of three True vanners, ten stamps, a crusher, Cornish rolls and a rapid concentrator. Parties who desire to ship their ore to other markets can have the same sampled at a small cost before shipping. There is no longer any reason why the miners of this section should complain for lack of an ore market.

OREGON.

THE QUARTZ MINES.—*Jacksonville Times*, July 19: Prospecting continues in nearly every mining district. Ore from the quartz ledge of Grob, Braendel & Co., on Jackson creek is prospecting very well and the vein is increasing in size. Neitz Bros. and E. B. Caton returned a few days since from Galice creek where they located a number of claims. They say that the Yank ledge has been located for miles, and more means have been received from San Francisco to push work upon it. There is a probability of several quartz mills being set up in Southern Oregon the coming season. This would open a new era in this section, rich in minerals but undeveloped because of the lack of capital.

BUILDING A RESERVOIR.—A few days since Captain Ankeny returned to Portland from Southern Oregon, where he has been superintending the construction of a large reservoir in connection with the Sterling mine, of which he is the principal owner. He states that the reservoir is now up 20 feet, and the water is being used to make a cut in which to lay the flumes. They have 60 boxes in now, and expect to put in 120 boxes before bedrock is reached. It is expected that the work will be completed by October 1st. The reservoir, when completed, will be 50 feet high, and will furnish an adequate supply of water to run the mine.

UTAH.

REVIEW.—*Salt Lake Tribune*, July 18: The week has been sultry, with one of the heaviest storms ever known here in July. The Signal Service recorded a temperature of 98 degrees on the 14th, and 100 the next day. We believe these figures to be unprecedented in the meteorological reports here. The shipments of the metals from this city for the week ending Saturday, July 11th, inclusive, were 2,471,971 pounds. These figures include some shipments made in fact before the date given, but not reported till then. The receipts of bullion and ore in this city for the week ending July 15th, inclusive, were \$32,078.44, in aggregate of which \$66,592.44 was bullion and \$15,486.00 ore. The week previous the receipts were \$73,246.10 of bullion and \$14,072.00 of ore, a total of \$87,318.10. The Ontario shipped the current week 45 bars of bullion, valued at \$29,702.44; total output this year to date, \$868,039.65. There is considerable activity in the Ontario and vicinity this season; the true course of the ledge, at a distance from the Ontario ground, is better defined than ever before, and confidence in its great extent and continued richness is higher than ever. The Vienna sent down from Sawtooth, Idaho, three bars of bullion on the 9th, valued at \$5,650. The product of the Hanauer smelter for the week was 10 cars of bullion, \$27,200—a splendid week's run. The Stormont yielded for the week from its sandstones, \$3,340. Ore receipts were \$5,686 from the Honerine and \$2,700 from the Crescent, Utah; \$5,500 from the Queen of the Hills, Idaho, and \$1,600 of Nevada ores.

VIOLA.—*Salt Lake Tribune*, July 19: The Viola mine and adjacent towns are taking on a brighter look, and the prospect is that ere long there will be a boom in real estate and a lasting one as well. On the first of July workmen began grading off a smelter site, and in a few days work will be given to many more. Machinery for a smelter of two 40-ton stacks is on the road, and also for a tramway. It is probable that the tunnel will be finished and everything ready for operations to begin before winter, and when the smelter does start it will run steadily, for winter will make no difference in working these mines. A number of Italians arrived a week ago, and went to cutting wood and burning coal. Lots are being taken up, houses are being built, and several new lines of business will be opened. Texas Company is also coming to the front; a smelter will be built inside of three months, the different mine owners having subscribed \$1,500 towards the purchase of it. Sharkey, Chamberlain & Co., owners of the Copper Queen, thirty miles below Junction, are considering an offer of \$50,000 for their property.

STAR AND MILFORD.—Since the advance in the price of lead, shipments of ores to Salt Lake have become more numerous. The Rebel mine makes a shipment this week of 151 tons of lead ores. The Lucky Boy, Nabob, Blue Bird, Talisman, Stalwart, Don and a number of others make an aggregate shipment of 100 tons more. All the claims in Star, Beaver Lake and Bradshaw districts, that are now being worked, never looked more encouraging, and as soon as we can get our quartz ores worked cheaply we will make a bigger showing than ever in the history of mining in Beaver county.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - - San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

18 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

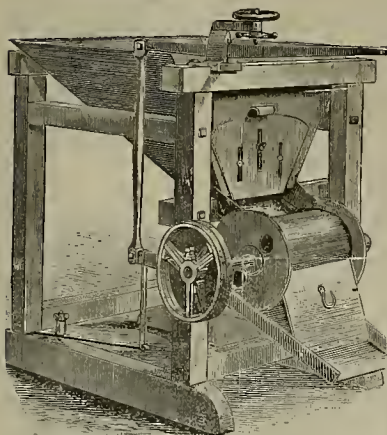
BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

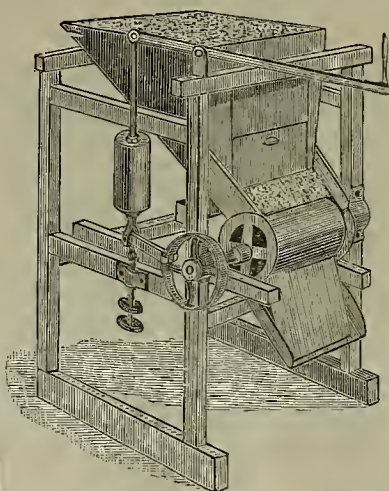
JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices - 47 Roee St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast - Joseph H. Dorety, 529 Commercial St. S. F.

THE ROLLER ORE FEEDER

(Patented May 28, 1882.)



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

327 First Street, SAN FRANCISCO, CAL.

HEALD'S

BUSINESS

COLLEGE,

24 Post St. S. F.

Send for Circular.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven M'fg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matcher Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

Lane and Bodley Saw mills.

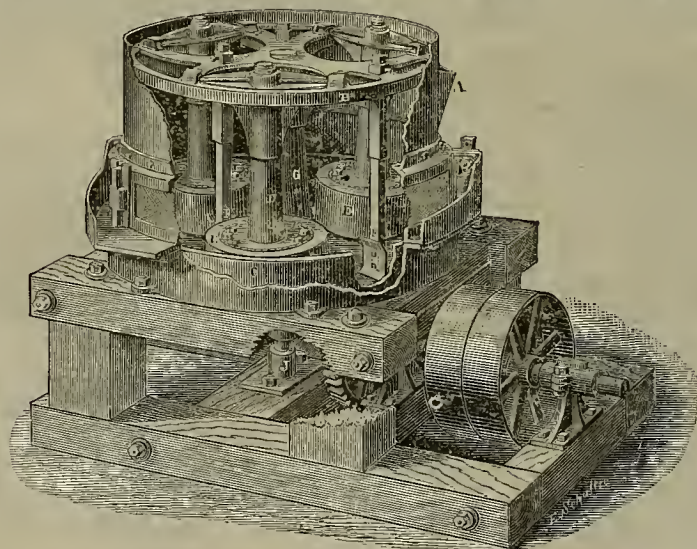
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy

in Saving Gold. Economy in Transportation of Machinery.

Economy in Cost of Erection of Mill at Mine. Econ-

omy in Time Required to Establish Plant

(one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ill.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

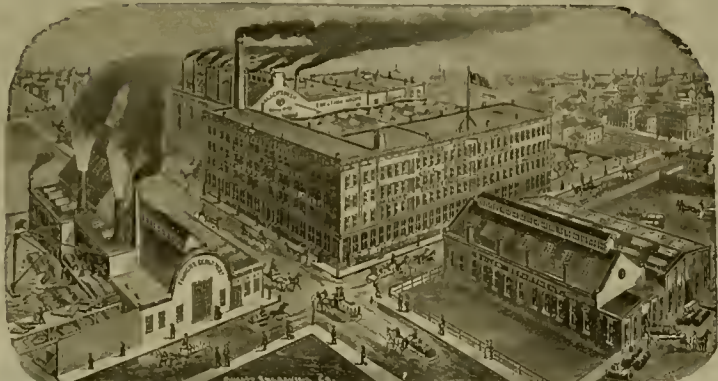
ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

Metallurgy and Ores.

THE DIXON CRUCIBLE CO. JERSEY CITY, N. J.

—Manufacturers of—

DIXON'S BLACK LEAD CRUCIBLES.
DIXON'S LEAD PENCILS.
DIXON'S STOVE POLISH.
DIXON'S AXLE GRASE.
DIXON'S PLUMBAGO.
DIXON'S BLACK LEAD.
DIXON'S GRAPHITE

J. G. ALLEN,

Sole Agent for the Pacific Coast

106 Davis St. (near California), San Francisco

Prices same as at Factory.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
624 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO., IMPORTERS AND DEALERS IN

Assayers' Materials,
MINE AND MILL SUPPLIES,
CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Cruci-
bles, Scoria, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes
will be sent free upon application. Agents for
Plumbago Crucible Co., London England.

JOHN TAYLOR & CO.

GOLD MEDAL AWARDED

—AT—

Mechanics' Fair, 1883 & 1884

—FOR—

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

1883—

For Best Hoisting Engine and

Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

22 Fremont Street,
SAN FRANCISCO.

INVENTORS. MODEL MAKER,

L. PETERSON,

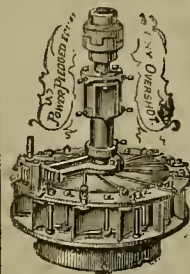
258 Market St., N. E. cor Front, up-stairs, S.F. Experiment-
al machinery and all kinds of models, tin, copper and brass.

JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address



JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics'
Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer
Amalgamator Machines made to order, corrugated or plain.
OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on
every order.

The most extensive and successful manufacturer of these plates in the
United States. Will fill orders for delivery in Rocky Mountain and Pacific
Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought
gold separated for low percentage of result.

SEND FOR PRICE LIST.

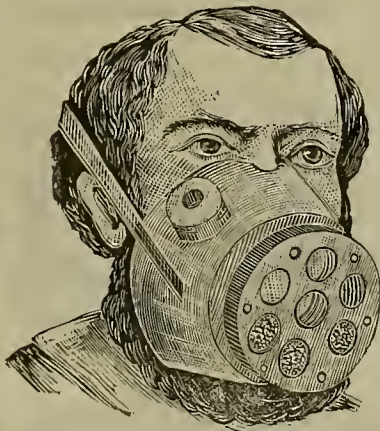
SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,
653 & 655 Mission St., San Francisco, Cal.

E. G. DENNISTON, Prop'r.

PATENT

LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning
and Salivation



The most perfect appliance for people engaged in
Smelting, Dry Crushing, Guano Works,
Quicksilver Mines, Lead Corroding, and all
other occupations where there is dust, poisonous vapor,
or bad odor.

In Feeding Threshing Machines, and simi-
lar work, they are indispensable, as no foreign substances
can be inhaled when they are worn.

The Respirators are sold subject to approval after trial
and if not satisfactory the price will be refunded. Price,
\$3.00 each or \$30.00 per dozen. Sent post-paid to any
address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 5) San Francisco.

Send for Descriptive Circulars containing Testi-
monials of well-known parties who are at present using them.

A. T. DEWEY,
W. B. EWER,
GEO. H. STRONG

Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class
Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal
nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original
cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies.
The information accumulated through long and careful practice before the Office, and the frequent examination of
Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled
us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not
few. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 262 Market St., S.F.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leideckhoff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

O. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL

H. KUSTEL



METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leideckhoff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.

Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.

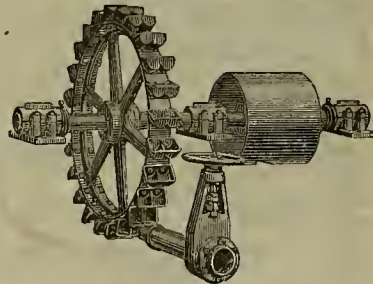
Practical instruction given in Treating Ores by im-

proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 per cent., surpassing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

SILVER PLATED

COPPER PLATES

FOR SAVING GOLD.

California Electro Plating Works,

657 MISSION STREET,

Between New Montgomery and Third, SAN FRANCISCO.

KEATING & FAGAN, Prop's.

Mining Share Market.

Our stock tables show what few fluctuations have occurred during the week past. The market remains rather quiet, awaiting, as has been the case for a long time, the progress of developments.

There is very little to be told in the way of news in the general mining situation along the Comstock. The most significant item is the first shipment of bullion from the Hale and Norcross for many years. This consisted of two handsome bars or bricks of silver and gold bullion, worth, according to assay valuation, \$5,027.

The delay in bonanza ore developments, consequent upon these preparations and operations in the way of deeper sinking, has naturally caused a temporary stand-still in the stock market. The annual election of the Savage Mining Company had no influence in the matter, as it was known that the control was not and would not be changed, and that the old officers would be re-elected, there being no contest. As before remarked, the Hale and Norcross is the king-pin and single standard of the mining situation, and the prices of all other Comstock mines necessarily are, and have to be, gauged by that one mine alone. Having no other deep working mine to compete with, it naturally establishes its own price in the speculative public estimation.

Denver Business Notes.

THE HENDEY & MEYER ENGINEERING CO. are having a large call for their Man's Patent Automatic Cut-off Engine. In the action of the valves this engine embraces an entirely new principle in the art of steam engineering, and unites simplicity of construction, sensitiveness to a variation of load, great economy, smallness of cost, smoothness of running and perfection of design, workmanship and materials used in making it. The manufacturing department of this company is under the sole management of Mr. Arthur Hendey, who, besides being a good business man is a thorough and practical machinist.

JAMES W. JACKSON, one of our most enterprising manufacturers of and dealer in mining machinery, has just shipped the last car-load of machinery to the celebrated Sovereign mine, situated on North Star mountain, Park county. The plant consists of three sets (largest size) Cornish rolls, the shells of which are made of a peculiar mixture of iron, discovered and used by Mr. Jackson, for which are claimed superiority of hardness and wearing properties; one Blake and one Dodge crusher, 9x15; twelve Hartz gigs, all run by a patent adjustable cut-off engine, 18x36. The machinery alone for the plant will cost upwards of \$30,000, and it will have a capacity to treat upwards of 200 tons per day.

Bullion Shipments.

Clipper and Silver Bow, July 14, \$20,000; Barber's Mill, 19, \$7,020; King, 19, \$3,224; Stormont, 15, \$3,340; Hanauer, 16, \$3,200; Ontario, 16, \$29,702; Queen of the Hills, 17, \$2,916; Hanauer, 17, \$3,300; Hanauer, 18, \$7,200. The banks of Salt Lake report the receipt for the week ending July 15th, inclusive, of \$6,592.44 in bullion, and \$15,486 in ore, a total of \$22,078.44.

COMPLIMENTARY SAMPLES OF THIS PAPER are occasionally sent to parties connected with the interests specially represented in its columns. Persons so receiving copies are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the measure it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. Personal attention will be called to this (as well as other notices, at times), by turning a leaf.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLE—California.
A. G. KNOX—Ventura and Los Angeles Co's.
G. W. INOALS—Arizona.
E. L. RICHARDS—San Diego Co.
F. W. SMITH—El Dorado and Placer Co's.
W. B. TURNER—Oregon.
GEO. McDOWELL—Fresno and Tulare Co's.

THE range of mountains between the Comstock and Walker River, taking in Como, Red Canyon, Silver Lake, Silver Glance and Wellington Districts, is yet undeveloped. In Red Canyon surface prospectors are taking out some of the richest rock ever found on the Pacific Coast, and Silver Glance probably shows a better record for the amount of work done than any gold district in California.—*Carson Free Lance.*

MULLER'S pebble spectacles are the best. 135 Montgomery St., near Bush, opposite Occidental Hotel.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCAL.	N. NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alaska M and M Co.	Alaska.	11.	40.	June 30.	Aug. 6.	Aug. 22. T. J. Hay.	306 Pine st.
Aultman M & M Co.	California.	2.	01.	June 15.	July 20.	Aug. 10. J. M. Buffington.	309 California st.
Best & Belcher M Co.	Nevada.	32.	50.	June 2.	July 9.	July 28. W. Willis.	305 Montgomery st.
Blue Bluff M Co.	California.	9.	23.	July 10.	Aug. 21.	Sept. 12. L. Stadfield.	419 California st.
Bullion M Co.	Nevada.	39.	23.	July 21.	Aug. 20.	Sept. 4. J. M. Brazell.	328 Montgomery st.
Caledonia M Co.	Dakota.	16.	15.	May 23.	July 23.	Aug. 4. K. Durrow.	328 Montgomery st.
Copper Mt. Con. M Co.	California.	14.	01.	June 17.	Aug. 13.	Sept. 17. A. L. Perkins.	310 Pine st.
Con Reforma L & S M Co.	Mexico.	6.	40.	July 1.	July 31.	Aug. 17. T. S. Gifford.	331 Montgomery st.
Entricht Gravel M Co.	California.	18.	05.	May 26.	July 14.	July 31. H. Knapp.	209 Sansome st.
Golden Gate M & M Co.	Nevada.	2.	25.	June 11.	July 14.	Aug. 1. R. Hewaton.	314 Montgomery st.
Gold & Curry M Co.	Nevada.	53.	40.	June 1.	July 8.	Aug. 19. J. A. K. Durrow.	309 Montgomery st.
Gold Canyon M Co.	California.	1.	23.	June 10.	July 13.	Aug. 4. F. A. Bertha.	429 Montgomery st.
Homeward Bound M Co.	California.	4.	25.	June 12.	June 20.	Aug. 11. D. A. Smith.	209 Post st.
Justice M Co.	Nevada.	42.	15.	July 13.	Aug. 17.	Sept. 5. R. E. Kelley.	419 California st.
Johnson Gravel M Co.	California.	1.	05.	July 1.	Aug. 25.	Aug. 25. G. Wille.	313 Fruit st.
Murchie M Co.	California.	9.	13.	June 24.	Aug. 7.	Aug. 31. W. L. Oliver.	328 Montgomery st.
Mayflower Gravel M Co.	California.	30.	40.	June 4.	July 20.	Aug. 11. J. Moritz.	328 Montgomery st.
Mono M Co.	California.	22.	50.	June 6.	July 22.	Aug. 11. G. W. Sessions.	309 Montgomery st.
Pay Day M Co.	Nevada.	3.	62.	June 6.	July 14.	Aug. 10. W. Van Bokkesses.	419 California st.
Potomac M Co.	Nevada.	19.	50.	July 14.	Aug. 19.	Sept. 10. C. E. Elliott.	309 Montgomery st.
Savage M Co.	Nevada.	63.	50.	July 1.	Aug. 4.	Aug. 24. E. B. Holmes.	309 Montgomery st.
Sierra Nevada M Co.	Nevada.	82.	25.	June 9.	July 15.	Aug. 4. E. L. Parker.	309 Montgomery st.
Starlight M Co.	California.	2.	05.	June 26.	Aug. 1.	Aug. 21. C. E. Hayes.	310 Clay st.
Silver Hill M Co.	Nevada.	22.	19.	July 1.	Aug. 4.	Aug. 24. E. B. Holmes.	309 Montgomery st.
Scorpion M Co.	California.	2.	23.	June 24.	Aug. 1.	Sept. 1. H. D. Mitchell.	128 Kearny st.
Summers Con M Co.	California.	4.	05.	July 16.	Aug. 17.	Sept. 7. F. B. Luty.	330 Pine st.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Benton Con. M Co.	California.	W. H. Watson.	332 Montgomery st.	Annual.	July 29
Derbec Blue Gravel M Co.	California.	T. Weitzel.	52 Montgomery st.	Annual.	Aug 4
Lady Washington M Co.	Nevada.	W. H. Watson.	332 Montgomery st.	Annual.	July 29
Loreto M & M Co.	Mexico.	H. G. Jones.	327 Pine st.	Annual.	Aug 6
Liberty Hill Con. M Co.	California.	F. E. Luty.	330 Pine st.	Annual.	Aug 3
McMillan M Co.	Nevada.	J. Moritz.	328 Montgomery st.	Annual.	Aug 5
North Star Hill M Co.	California.	E. B. Holmes.	311 Montgomery st.	Annual.	July 29
Original Empire M & M Co.	California.	D. A. Jennings.	401 California st.	Annual.	Aug 6

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery st.	06.	Mar 16
La Diablo M Co.	Nevada.	R. W. Heath.	318 Pine st.	20.	July 30
Nevado M Co.	Nevada.	R. W. Heath.	318 Pine st.	25.	Feb 13
Plymouth Con. G M Co.	Nevada.	W. Van Norden, Pres.	23 Nassau st. N. Y.	50.	Apr 6
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery st.	25.	July 15
Syndicate M Co.	Nevada.	J. Stadfield Jr.	419 California st.	10.	May 5

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") has been "successfully popular" as it is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Lignature; Systems of the Crucible Assay; Preliminary Assay; Dressing the Ore; Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay by Cupellation; To Assay by the Blowpipe; To Assay of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth. Price, \$1. postpaid. Sent by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Assay of Silver; Assay of Silver Manipulation; etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by Dewey & Co., Publishers, No. 252 Market St., S. F. These are much needed books for miners and other practical men, by an intelligent miner and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

Satisfactory, Etc.

NOGALES, A. T., May 27, 1885.

MESSRS. DEWEY & CO., Gents.—Yours of the 18th of May enclosing notice of allowance of my application for a patent for "Process of Treatment of Nickel and Cobalt Ores," was duly received. It is extremely satisfactory, and I must say I am surprised at the rapidity with which you have accomplished a result which I expected would have taken six months or a year to reach.

Yours, very respectfully, C. H. AARON.

Gold Mines For Sale.

Two small gold mines for sale, in Kern county, California. One has paid by arastra \$20 per ton. Worked to a depth of 60 feet. The vein is 15 inches wide. The mines are within seven miles of the Southern Pacific Railroad. The owner is not in a position to develop them without aid. The purchase price is very reasonable and there is a good opening for any one to take hold of the claims and work them. Address W. L., P. O. Box 2361, San Francisco.

Easy Binder.

Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Masonic Record, Harper's Weekly, and Scientific American, 75 cents; postpaid, 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING JULY 2.	WEEK ENDING JULY 11.	WEEK ENDING JULY 16.	WEEK ENDING JULY 23.
Alphab.	1.00	1.30	.85	.80
Alca.	.45	.60	.35	.50
Andes.	.30	.15	.30	.20
Argenta.	.10	.05	.05	.05
Belcher.	1.00	1.10	.75	.75
Belling.	.10	.10	.10	.10
Best & Belcher.	1.65	2.63	1.75	2.20
Bullion.	.35	.40	.25	.35
Bonanza King.	.10	.10	.10	.10
Belle Isle.	.10	.10	.10	.10
Bodie Con.	1.35	1.50	1.35	1.50
Benton.	.10	.10	.10	.10
Bodie Tunnel.	.25	.50	.50	.50
Bullion.	.25	.50	.50	.50
California.	1.75	2.25	1.30	1.85
Challenge.	.20	.20	.20	.20
Champion.	1.85	2.55	1.35	1.95
Chlorine.	1.50	1.50	1.50	1.50
Con. Imperial.	.15	.15	.15	.15
Con. Virginia.	1.75	2.25	1.30	1.85
Con. Pacific.	1.25	1.40	1.10	1.40
Crown Point.	1.25	1.40	1.10	1.40
Day.	.10	.10	.10	.10
Eureka Con.	7.00	7.05	5.50	5.62
Eureka Tunnel.	.10	.10	.10	.10
Exchequer.	.30	.10	.20	.15
Grand King.	1.10	1.75	1.40	1.70
Gold & Curry.	1.10	1.75	1.40	1.70
Goodshaw.	7.75	10.67	8.12	6.37
Hale & Norcross.	7.75	10.67	8.12	6.37
Holmes.	.40	.40	.40	.40
Independence.	.20	.20	.20	.20
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Martins White.	.20	.20	.20	.20
Mono.	1.00	1.30	1.00	1.30
Mexican.	1.00	1.30	1.00	1.30
Mt. Diablo.	2.50	2.50	2.25	2.45
Northern Belle.	1.00	1.20	.70	1.00
Navajo.	1.00	1.20	.70	1.00
North Belle Isle.	1.40	1.50	1.00	1.20
Occidental.	1.25	1.60	1.00	1.20
Opbtr.	1.25	1.60	1.00	1.20
Overman.	.40	.45	.25	.30
Potosi.	.95	1.25	.70	1.00
Pyrite Con.	3.20	4.65	2.55	3.40
Savage.	3.20	4.65	2.55	3.40
Seg. Belcher.	1.00	1.40	.75	1.10
Sierra Nevada.	1.00	1.40	.75	1.10
Silver Hill.	1.00	1.40	.75	1.10
Silver King.	1.00	1.40	.75	1.10
Scorpion.	.10	.20	.10	.10
Syndicate.	.35	.40	.30	.25
Thoga.	.95	1.25	.75	1.00
Union Con.	.95	1.25	.75	1.00
Utah.	2.00	2.30	1.75	2.05
Yellow Jacket.	2.00	2.30	1.75	2.05

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 23, 1885.

ANTIMONY—Per pound.	12 @
Hallet's.	13 @
Cookson's.	7 @
BORAX—Refined.	25 @
IRON—Glengarnock ton.	23 @
Eglinton, ton.	26 @
American Soft, ton.	25 @
Oregon Pig.	25 @
Schipperdun, Nos. 1 & 4.	25 @
Clay Lane White.	25 @
Shotts, No. 1.	25 @
STEEL—English, lb.	16 @
Black Diamond, ordinary sizes.	13 @
Plow.	13 @
Machinery.	13 @
Sanderson Bros.	13 @
COPPER—	
Braziers sizes.	20 @
Fire-box & heels.	20 @
Pole.	20 @
Yellow Metal.	12 @
Ingot.	13 @
LEAD—Pig.	5 @
Pipe.	7 @
Sheet.	8 @
Shot, discount 10% on 500 bag.	1.85 @
Buck, 8 bag.	2.25 @
Chill.	5 @
TINPLATE—Coke.	5 @
Charcoal.	6 @
ZINC—German.	7 @
Sheet, 7x3 ft., 7 to 10 lb. less the cask.	33 @
QUICKSILVER—By the flask.	1 @
Flasks, new.	1 @
Flasks, old.	85 @
NEW YORK PRICES—	
California Borax, refined.	73 @
Pig Iron, American.	17 @
Quicksilver.	42 @
Lead.	11 @
Copper.	22 @
tin.	22 @
Bar Silver.	1 @

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

FOR WEEK ENDING JULY 14, 1885.

322,092.—GRAIN DRIER—Geo. Cottrell, S. F.
322,055.—COT-BED—O. C. Fisk, San Bernardino, Cal.
322,171.—LADDER—R. Furlong, Saucelito, Cal.
321,962.—STRAP AND WAIST BAND FOR PANTALOONS—H. Goodman, San Luis Obispo, Cal.
322,099.—BRAKE BLOCK HOLDER—D. Hedrick, Greenville, Cal.
322,106.—STACKING MACHINE—Byron Jackson, S. F.
322,109.—VEHICLE RUNNING GEAR—R. T. Killey, Tres Pinos, Cal.
322,118.—THRASHER AND SEPARATOR—D. C. Matteson, Stockton, Cal.
322,006.—CONCRETE MINER—E. L. Ransome, S. F.
322,012.—SAFETY BRIDLE—Otto Schrader, Alameda, Cal.
322,135.—THRASHING CYLINDER—E. C. Souney, Sacramento, Cal.
322,123.—WELDING COMPOUND—E. Watkins, Eagleville, Cal.

NOTE.—Copies of U. S. and foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

THRASHER AND SEPARATOR.—Don C. Matteson, Stockton. No. 322,118. Dated July 14, 1885. The improvements consist mainly in novel devices for transporting the grain and straw from the threshing cylinder and separating them from each other, and also in appliances for more perfectly separating the grain from the chaff and other impurities with which it may be charged.

RUNNING GEAR FOR VEHICLES.—Robert T. Killey, Tres Pinos, San Benito Co. No. 322,109. Dated July 14, 1885. This invention consists in certain details of construction of the running gear of vehicles. In this gear he has horizontally cranked axles, and links pivoted to said axles at their upper ends and supporting the springs at their lower ends, combined with the coil couplings, secured to the front axle by the same belt which holds the links in place.

GRAIN DRIER.—George Cottrell, S. F. No. 322,092. Dated July 14, 1885. This is a drying-kiln specially intended for drying and cooking oats. It consists in an upper chamber or hearth, having for a hot air pan, a lower chamber or hearth communicating with the upper and having a hot air pan for a hot air, and peculiar endless and adjustable rakes, one on each compartment. It consists further in an adjustable feedhopper, the construction of the rakes and means for adjusting them, means for adjusting the steam and hot air pans, and in the general arrangement of the kiln. The travel of the oat through the hearths may be regulated by adjusting the speed of the rakes or by varying the inclination of the flanges or teeth. When these latter are set at a small angle, they advance the oats less than when set at a greater angle.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing no cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.</



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

CHICAGO PLATING COMPANY, 21 Stevenson Street.

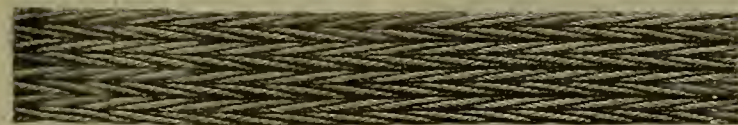
JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St., San Francisco, Cal.

CALIFORNIA WIRE WORKS.

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper and Steel, all kinds, and meshes from 1 to 10,000 to the square inch.

WIRE FENCING

Of various designs for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

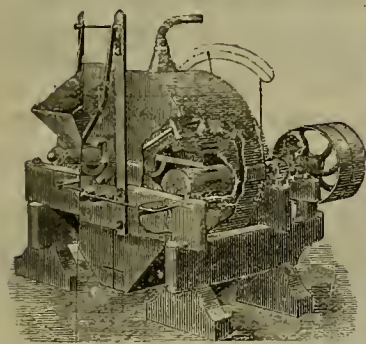
WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

Tutin's Pulverizer



WORKS ORE WET OR DRY.

Award SILVER MEDALS in 1882 and 1883

By Mechanics' Institute.

MANUFACTURED AT

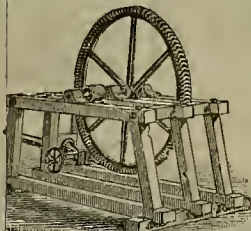
The Tutin Windmill Horse-power and Pumping Machine Works.

308 Mission Street, S. F., Cal.

By V. L. TUTIN, Inventor and Patented.

Send for Circular

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting

OVER 300 IN USE!

All Estimates Guaranteed.

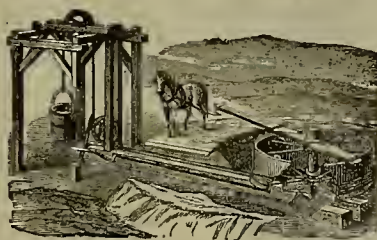
SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 at 20 Fremont Street, San Francisco

MINERS' HORSE WHIM.



ONE HORSE CAN EASILY HOIST OVER 1,000 LBS. at a depth of 500 feet. The Whim is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the bucket. The standard of the whim is bolted to bed-timbers, thus avoiding all framework. When required, these whims are made in sections to pack on mules.

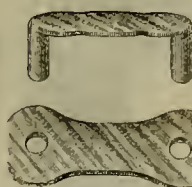
120 in Actual Use.

EDWARD A. RIX & CO.,

MANUFACTURER,

19 and 20 Fremont St., - San Francisco.

Smith's Patent Belt Fasteners.



Are positively unequalled for fastening Leather, Rubber, or Cotton Belting. THE ONLY FASTENER that will run under tighteners, on patent rolls in flour mills, and Electric Light machines. Easier to apply than Lacing and far more Economical.

Patented Sept. 20, 1881; Aug. 15, 1882; June 16, 1884.

PRICE LIST.

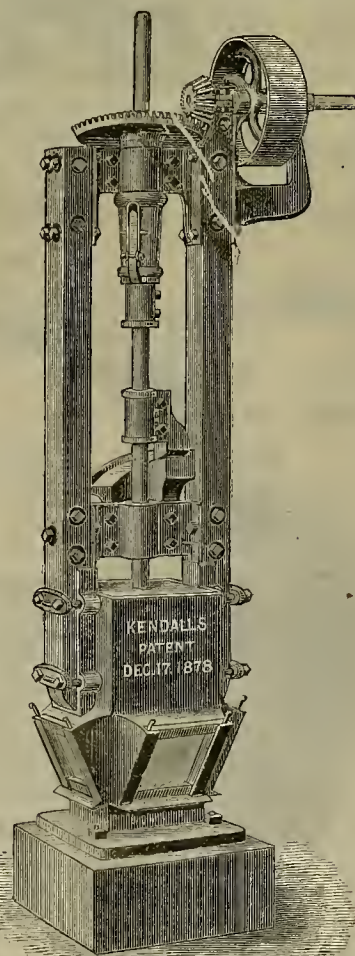
No. 1—For large drive belts, per box of 100.....\$2 00
No. 2—For Cotton drive belts, per box of 100..... 1 75
No. 3—For Rubber drive belts, per box of 100..... 1 50
No. 4—For single Leather belts, per box..... 1 25
Combination Punch with guides and nippers..... 1 25
Reamers for taking fasteners out..... 1 25

TRY THEM! They will save you loss of Time, TEMPER and Money. Manufactured by

H. D. EDWARDS & CO.,

Nos. 16, 18 and 20 Woodward Ave., DETROIT, MICH.

Manufacturers of Oak Leather Belting, Agents for J. B. Hoyt & Co., N. Y. Belting and Packing Co., Eureka Fire Hose Co., Cotton Belting Mill Supplies. FOR SALE BY Dunham, Carrigan & Co., San Francisco, Cal.



L. C. MARSHUTZ.

T. G. CATNRELL.

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts., San Francisco.

...MANUFACTURERS OF...

Stationary and Compound Engines,

FLOUR, SUGAR, SAW and QUARTZ MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL

Send for Circulars and Price List.

PATENTS. Thousands of Inventors throughout the Pacific Coast can and will willingly attest to the promptness, reliability and success of Dewey & Co.'s U. S. and Foreign Patent Agency. No. 252 Market St., Elevator 12 Front St., S. F.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.



INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING AND SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

Room 5, First Floor,
BOSTON, MASS.

PYROMETERS



GAULIETT'S, HOBSON'S, and STEINER'S
PRESSURE GAUGES
Hot-Well THERMOMETERS
ANEMOMETERS
SAFETY LAMPS
BAROMETERS
SALINOMETERS

Mining and Meteorological
Instruments

List and Description of our Ten Catalogues sent free on application.

JAMES W. QUEEN & CO.
924 Chestnut St. Philadelphia

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tanned Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

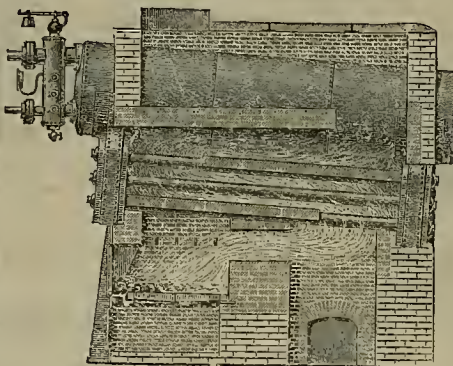
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Borax Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

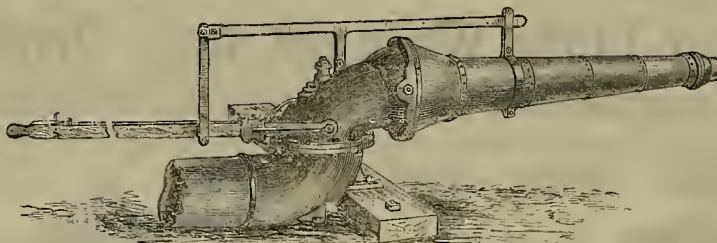
SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.



Send for Circular and Prices.

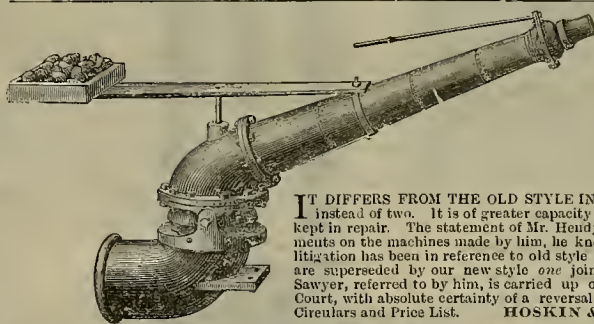
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



THIS CUT REPRESENTS OUR
IMPROVED
HYDRAULIC
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Salt Driers, Furnaces, Chess, Cement and Slant Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed.

TO CAPITALISTS.

FOR SALE—Half interest in 4,500 feet of valuable
SILVER MINING PROPERTY

In one of the best mineral locations in Arizona, having wood and water on the ground. The mines are well developed, and thorough examination is solicited. Ore will produce from fifty to nine hundred ounces per ton. The interest will be sold at a sacrifice, as capital is required to obtain machinery for hauling water. Address

GEORGE B. McCANN,
Buena Vista, Arizona.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending June 30, 1885, the Board of Directors of the German Savings and Loan Society has declared a dividend at the rate of four and one-half (4½) per cent, per annum, on term deposits, and three and three-fourths (3¾) per cent, per annum, on ordinary deposits, and payable on and after the 1st day of July, 1885. By order, **GEO. LETTE, Secretary.**

Dewey & Co. { 252 Market St. } Patent Ag'ts

Iron and Machine Works.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

419 Beale Street, San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ESTD 1870. ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kind of Machinery for Mining Purposes.

using Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Sbs and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, all Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **ESTD 1870. PRICES MODERATE.**

J. H. WEED.

V. KIRWELL.

THOMAS THOMPSON

THOMAS THOMPSON

THOMPSON BROTHER,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.



The California

Perforating Screen Co.

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

Flour and Other Mills.

Quartz Mill Screens a Specialty.

147 Beale St., San Francisco

RICHARD C. REMMEY, Agt,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA.



Manufacturer of

all kinds of

Chemical stoneware

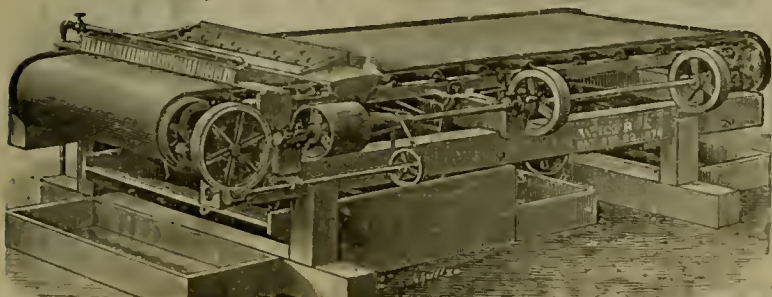
Manufacturing

emuls.

Also Chem. Brick

for Glover ver.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

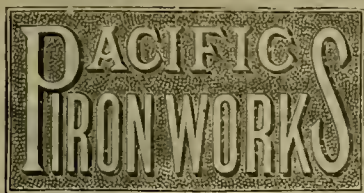
**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1880, Dec. 22 1874, Sept. 2, 1870, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

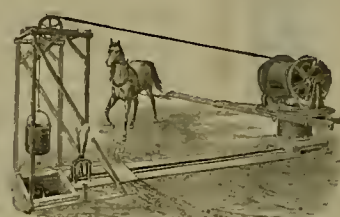
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished by order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



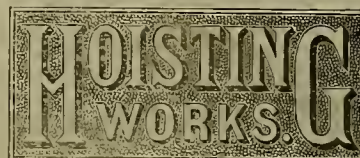
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....
Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

ALSO
HOMOGENEOUS STEEL, SOFT and DUCTILE,
SUPERIOR TO IRON FOR
LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,
22 Cliff Street, New York.



THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKE, Manager.
J. O'B. O'CONN, Secretary.

UNION IRON WORKS;

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

SOLE AGENTS
"HOYT'S" Pure Oak, Short Lap Leather Belt.
WARRANTED.

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

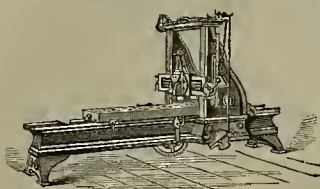
No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



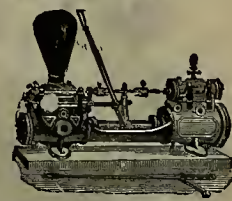
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

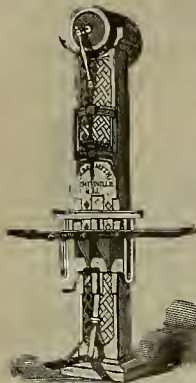
Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

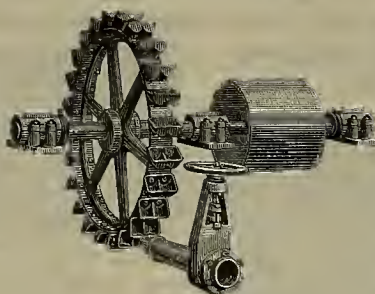
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Leffel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



JOSHUA HENDY MACHINE WORKS.

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

MANUFACTURERS OF
NEW and Dealers in **SECOND-HAND BOILERS, ENGINES and MACHINERY**
OF EVERY VARIETY.

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER AND RUBBER

BELTING.

IMPROVED SINGLE AND DOUBLE CIRCULAR SAW-MILLS.

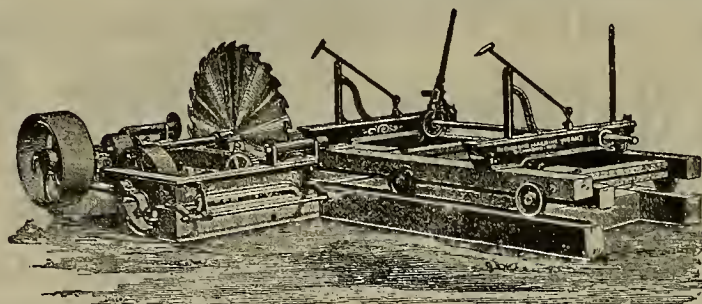
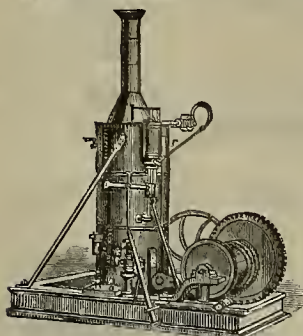
SHINGLE MILLS.

STATIONARY, PORTABLE,

.....AND.....

Hoisting Engines

.....AND.....

BOILERS.**WOODWORKING****MACHINERY,**

.....COMPRISING.....

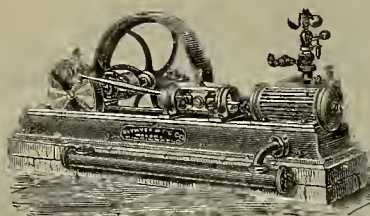
Band Saws,

Stickers,

Planers,

Shapers,

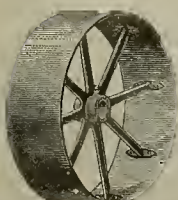
Etc., Etc.



MINING, QUARTZ, AND SAWMILL MACHINERY.

AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.

Agents for the Sale of BAKER ROTARY PRESSURE BLOWERS, AKRON (Ohio) HOT-POLISHED SHAFTING, WILBRAHAM ROTARY
PISTON PUMPS, BLAISDELL & COMPANY'S MACHINISTS' TOOLS.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.
CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington
Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and
Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

**JENKINS PATENT VALVES.****Gate, Globe, Angle, Check and Safety.**

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 1, 1885.

VOLUME LI.
Number 5.

Tin.

Tin is advancing in price after having been, like lead and copper, way down to bedrock for a long time. The price is now about what it was in May, 1883, when stocks were more than 3,000 tons in excess of what they are to-day. There are now about 13,000 tons on hand. Of the tin deposits in the Straits it is said the British companies cannot work at a profit even at present prices. With the claims in the hands of the other companies in the same locality it is different, for the cheap Chinese labor allows them to go on. The Chinaman is therefore "getting away with" the Briton in tin mining. In Australia many sets have been abandoned, and this shows a diminished supply from there. It is stated that a "ring" has been keeping the price down and is now ready to let it rise.

In Cornwall the mining community are feeling that the "turn of the tide" has come, that the period of adversity has been doomed, and that the silver lining of the cloud is now seen. Not only does the advance in tin inspire people there with confidence in existing mines, but there is reason to believe that capital would freely enter Cornwall in the prosecution of a number of abandoned sets that many believe would pay for resuscitation. Still, black tin is not sufficiently high even now to admit of nearly all Cornish mines paying, but it will make a considerable difference to many concerns. The *London Mining Journal* says: With the price £60 per ton Cornish tin mining would prosper, and not only would the adventurer benefit, but this price would allow of the poorly paid and hard-working miners receiving something like their just deserts. We venture to predict that should tin remain where it is—and we reassert that we believe it will—the surface laborers in most of the mines will benefit, and most of the meetings to be held from this date are certain to show what a difference in credits a few pounds increase in tin mean. First, referring to South Frances meeting, on Thursday, we observe that had the price obtained on the last sale of tin—£51. 12s. 6d.—been realized at the commencement of the 16 weeks, there would have been an increased profit of some £700, or £7. 10s. advance. Then Wheal Grenville meeting, on Tuesday, will show a very satisfactory profit. Last meeting of this mine was for 16 weeks, and the dividend was 2s. 2d. per share. This time the meeting is a 12-weekly one, and the profit is £1620. 10s. This would give a dividend of 5s. per share, and permit of £120 being carried forward. The average price of tin has been £48 per ton.

NO USE TRYING TO OSTRACISE SILVER.—Being principally a gold producing country not much would it damage California were the monometallic standard to be adopted by our Government. But that has nothing to do with the justice or the expediency of such measure as affecting the interests of the whole country, on which its operation could be only disastrous. We fail to hear of any glut of silver coin on this coast. On the contrary, it appears to be rather scarce, our merchants being often unable to get enough of it to make change. Silver cannot be demonetized in these United States, and it is useless to further agitate the question. What the people don't want they will probably decline to have forced upon them, whatever presidents, secretaries and financiers may think it.

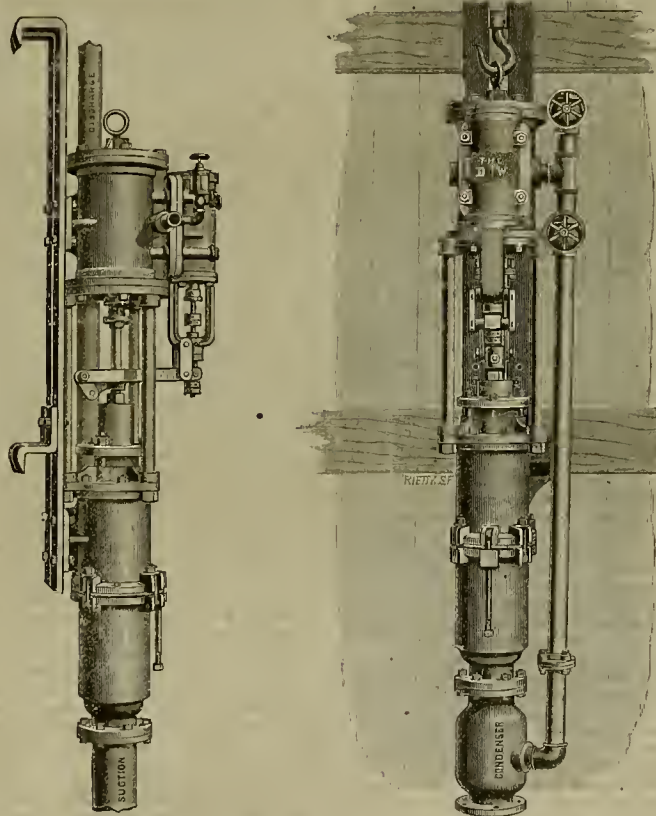
Dow's Mining Shaft Pump.

At the Dow Steam Pump Works in this city several varieties of pump made under the Dow patents are manufactured. They have been largely introduced and proved very effective machines. The valve movement is peculiar and enables the pumps to run smoothly under the highest possible lift. They possess superior advantage for deep mining. The pumps are constructed upon the templet or interchangeable system, and therefore duplicate parts which fit exactly can be procured.

The engravings on this page show Dow's improved sinking pumps, vertical-pattern, and

when desired, the utility of which is an important consideration in sinking a shaft, as it not only consumes the exhaust steam, avoiding the use of exhaust pipes leading out of the mine, or the damaging effect on the timbering if allowed to escape into the shaft, but is so constructed as to increase the efficiency of the pump by doing more work with a given amount of steam. These pumps are made in various sizes from 61 to 408 gallons a minute, at ordinary speed.

PAVING STONES BETTER THAN GOLD OR SILVER.—Charles Francis Adams, Jr., is reported to have said on a recent occasion that the pre-



DOW'S DOUBLE ACTING PUMP FOR MINE SHAFTS.

double-acting, for mining, sinking shafts, deep wells, etc. This pump is rapidly gaining favor in mining operations and excavation work, owing to its light weight, portability, and the limited space required for its operation. The action is perfectly reliable, and delivers a steady, continuous stream of water; doing the work quietly and without jar. It will not do injury to the timbering, if attached, or to itself while working suspended from tackle.

The positive valve movement is used on these pumps, which enables them to operate perfectly in any position, whether suspended from the ring bolt attached to the steam cylinder head, banging on timbers by means of the adjustable dogs provided for the purpose, or placed horizontally. The plunger barrel is easily removed, and a new one substituted in a few minutes. All parts are fitted to gauge and are interchangeable.

Improved suction condensers are attached

ent stagnation of business in Colorado is due to the manner in which the deposits of coal, iron and paving stones in that State have been neglected in the insane search for gold and silver. Now, the occasion on which Mr. Adams made this statement was probably an after-dinner speech, when his heart had been made glad and his reason become a little obfuscated by a glass of wine; hence, its foolishness. We opine the very converse of this remark would be true—such would certainly be the case were it applied to California or almost any other portion of our mining territory. Paving stones, forsooth! What amount of revenue does the man suppose these Coloradans could derive from such a source? There might, of course, arise this possible use for these misales: if an insurrection should occur out in the Rockies the malcontents might use them for barricades; they might also be convenient at such a time to hurl at the police. We await the paving stone boom!

A New Work on the California Gold Mines.

We here take occasion to call the attention of the business community to the fact that a new book on the subject of gold mining in California is now in course of preparation and will soon make its appearance. The work is in good hands, being prepared by competent parties and published by the old firm of Geo. Spaulding & Co., of this city. As we understand it, the book will be devoted mainly to an exposition of the auriferous resources of this State, their extent and variety, the facilities at hand for their profitable development, and the necessity that exists for utilizing them to a greater extent than is now being done. That this class of our resources is very great, and that they have of late years been too much neglected, must be conceded. Our people, their attention having been largely engrossed by other pursuits, seem to have almost forgotten that California was once a gold-producing country. The billion and a quarter of the royal metal taken out here the most of them have heard of, but it seems to them of no great significance—a sort of legend, inconsequential and of little practical importance. Having themselves never been much in the mines, or consisting, perhaps, largely of the new generation, they do not properly appreciate the value of this industry; know little about the enterprise it fostered and the energy it developed; the trade it built up, and the life it imparted to every other pursuit; the prosperity it brought to California, and the wealth it diffused throughout the world.

Of a score or more of our leading capitalists, merchants, manufacturers and other business men consulted not long since as to the means that in their opinion should be adopted for working some improvement in the then depressed condition of business, but one of them, Governor Perkins, even so much as alluded to gold mining as an industry entitled to mention in its bearing upon the subject calling for consideration. Much stress was laid upon our relations with Mexico, our insignificant trade with Central and South America, and a variety of other not very weighty matters, but hardly a word was said about extending aid or giving encouragement to this great ally to all our other material interests and factor of production.

We have here in California not only the greatest extent of auriferous territory of any country in the world, but the deposits exist here under conditions incomparably favorable, and in so neglecting these deposits we are losing the benefits of an industrial element that, properly availed of, would contribute more than almost any other to advance our physical well-being. As a means of promoting this end the book above mentioned ought to meet with such substantial aid as will enable the publishers to issue and put in circulation a large edition thereof. The general Government has, during the past eighteen years done a good deal towards advertising to the world the metallic and mineral wealth of California. But we incline to the belief that a work of this kind will be performed with more discrimination and judgment, where carried on as in this case by private parties than if undertaken by the Government. A book is certainly more apt to be marked by unity and system where only a few than where many persons are employed in getting it up.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

A Mining Lesson.

EDITORS PRESS:—All who know the history of Dos Cabezas mining district, in Cochise county, Arizona, will admit that it is one of the most unfortunate camps on the Pacific Coast. Though discovered and organized seven years ago, it is to-day more dead and pauperized than any other not wholly abandoned mining settlement in the whole country. As this state of matters is due in a great measure to blunders, exaggerations, stupidity, trickery, blackmailing and greed on the part of its pioneer prospectors and operators, it may serve a public purpose to let the light of day shine on the mottled picture. If the district had no lodes of promise within its bounds it would be useless now to write about it, for a wholly dead mining camp is no more worthy of notice than a dead dog would be. There is a future, however, for Dos Cabezas, because it contains mineral lodes which, as to extent, permanency and ultimate intrinsic value, will not be readily excelled anywhere. This assertion I know will go for little with most of your readers, but it is sure to be verified by developments in coming years.

The First Misfortune

Which befell the district was in its early claimants being "tender-foot" prospectors from the East. Some of these men were discharged soldiers who had come into the Territory to fight Indians. Most of them were lovers of whisky, and though there were good peaceable fellows amongst them, the pioneers in the mass were inclined to be wild and lawless.

With the usual ignorance of "greenhorn" miners, they believed that having secured a gold or silver bearing lode their fortunes were necessarily made and their days of toil and penury at an end.

From the old stage road between Tucson and Silver City, New Mex'co, by way of Apache Pass, the croppings of an immense east and west white quartz lode could be seen two miles away. Anybody could "discover" it, and when the Chiricahua Apaches were put on the San Carlos Reservation it was claimed for several miles. Some of these early locators must have had pre-eminent abilities of a certain kind. They were able to attract the attention of capitalists and created quite a general belief at a distance that it was one of the richest lodes of the country. It was examined by Hayward, Sevenoaks, Barney Hardy, Reese, Bateman and other experts. While its average yield of selected ore was beralded as running from \$60 to \$80 per ton, its bulk, when tested, without regard to occasional pockets of high grade ore, did not exceed \$8, while for long distances there was nothing but virgin quartz in view. The prices asked by the locators would have been large for rich and partially opened lodes, but for mere low grade "prospects" they were wholly beyond the range of mining reason. As a natural result capitalists and experts were tempted to do the district all the injury they could. Having traveled, as it were, a thousand miles to examine and purchase a magnificent horse, valued at a thousand dollars, their disgust at finding the brute worth a bare hundred dollars made them talk in a way to do serious injury to the sellers.

The Next Stage

In the misfortunes of the camp began with the arrival of a railroad operator from Utah, who built a 5-stamp custom gold mill. He was a pleasant sort of man, but if he had been born and reared in Ethiopia he could not have known much less than he did know about quartz milling business. Being heavily in debt his first mill-run, though on good ore, did not seem to cause him any elation, for he forthwith bid the county a long farewell. His monument stands now after four years of exposure, as an old gray ruin in the quartz mill line. Next came

A Live Colonel

From Cincinnati. He was an enterprising genius. He wanted many lodes, and was willing to give the prospector who brought him over from New Mexico a chance to make some money. The price of the best "prospec." he was prepared to purchase was set at \$25, but then as a dozen or two of such claims could be hunted up in a week, he created a diminutive boom along the mineral belt. He sunk shafts, got a 10-stamp mill built in Ohio and erected here when, alas! the discovery was made that there was no ore on which to keep it going. Then an effort was made to get custom ore, but miners asserted that they were cheated, and the supply was cut off. The company then bought a higher priced claim, and though it yielded 109 tons of \$18 ore it was subsequently shut down and the works dismantled because a second run of ore, not so carefully selected, failed to yield satisfactorily. Recently this company opened one of its \$25 lodes and found a body of low grade ore. Under a good mill superintendent, who with commendable judgment had been placed in charge, this ore was made to pay even in a small mill not conveniently placed relatively to the mine, but as the directors were quarreling, and the workmen not paid, the sheriff stepped in to adjust affairs. The company, however, is buying off the in-

debt and being by accident the owner of several really valuable lodes it will some day surmount all its troubles. About four years ago

A Chinese California Company

Bought for \$10,000 a group of lodes which some ranchmen, riding around after stock, had located at intervals. Of this sum, only one-fourth, it was said, went to them, but even then they were wonderfully fortunate as finders of money. The management seemed from the first to act on the principle that a barren quartz vein is sure to get rich if deeply opened. Though the outlay under this hypothesis was great, ore failed to make its appearance, and at last operations were suspended. The company got several of its claims patented, and perhaps a hundred years hence it may be possible to make something out of them. This incorporation deserved a better fate. It did much work, was prompt in its payments, and if it had only begun aright would no doubt have been successful. As it was, it could not have succeeded without a miracle, and that sort of blessing does not often come to stupid miners.

Our Next Adventurers

Were a lawyer and a dry goods merchant from Monticello, Illinois. They bought, mainly on their own judgment, a hillside having streaks of silver ore through the country rock, their theory being that at the depth of 250 feet the small veins would unite and make a grand, rich lode. They paid \$20,000 for the ground, but as the deed called for \$50,000, the former amount probably looked small to them. If the claim-holders had asked \$2,000 for this property it would have been considered unworthy of notice. There are two kinds of Eastern mine-buyers. One regards mining as a lottery and a \$25 claim good enough to begin with; the other supposes that if a prospector asks a low price his lode must be good for nothing. When a sharp miner meets with a buyer of the latter class he "goes for him" on a generous scale. A shaft has been put down on one of the hillside veins 130 feet without any signs of a respectable pay-lode coming in. As four workmen have a \$200 superintendent over them who knows nothing of mining, development is slow and expensive. When work is discontinued on that hillside Dos Cabezas district will undeservedly get another "black eye," but then, it is getting used to such quips of fortune. If there had been any effective mining done on the best lodes of the mineral belt and failure had resulted there would have been no need for my writing this letter. As it is, I claim that the district has never been fairly represented before the mining world. There was a time when capital would have taken hold of its low grade gold lodes and made a success of them, but the opportunity was disregarded. Fortunately, the outcome of the camp is not dependent on its east and west white quartz lode, on which some good mines will yet be opened.

Higher on the mountains than it there are a number of large and most promising lodes in a granite and porphyry formation. Some of their ores are rich in copper alone; others carry gold, copper and silver in paying amounts, and still others are quite rich in gold with a low percentage of copper. That is where the greatest mines of the district will be opened. No efforts are being made to attract capital to them. They will summon attention ere long without special attempts in that direction. One lode in

This Upper Belt

May receive a passing notice, not because it is the best, for that is a point not yet determined, but rather owing to its having a mill in operation. In a wooded ravine, high on the north-west flank of the Dos Cabezas mountains, known as Park canyon, is situated the Maple Grove lode, owned by Fowler and McGregor, its discoverers. At first a comparatively small vein of talc, rich in free gold was found.

As work progressed, other veins of quartz also carrying paying amounts of gold, were exposed, and now it appears that there is an immense lode at that point which, when developed, cannot fail to be a most profitable mine. The owners and several active young relations do the most of the work. They have a five-stamp mill with silvered plate. The ore is paying, and as twenty stamps could be supplied, the future of the property is assured. The lode will be opened by means of its own product, and no begging petitions will be sent to capitalists to come, see and buy it. When a few more of the same kind of mines existing in the district are made productive, its bad name will be forgotten, and capital will want to get in then without solicitation. In the ravine below this lode profitable placer mines have been worked. One nugget worth \$250 was taken out last summer, and several smaller pieces have been found recently. There is an ore in the Maple Grove lode which, on being assayed for silver, was shown to be rich in gold. I send you two small pieces containing spots of this metal. It looks to be an antimonial sulphuret, but its real quality has not been determined. On the smaller piece you will notice gold, surrounded by heavy metal. This richer quality of ore, some of it going as high as \$5,000 per ton, could not be saved on plates, but it will be stored for future treatment.

Conclusion.

My object in writing this letter has been accomplished. It was to say that Dos Cabezas district is not dead, but merely slumbering. It has had to carry a mighty load of mining and milling imbeciles, but the tribe is so nearly extinct now that pioneers who remained under the conviction that sooner or later the merits of

the camp would be recognized are more hopeful than ever. The "blackmailers" who for years tried to sell their own locations by belittling those of others that had brought investors from a distance, having starved themselves out at their dirty work, are now in distant pastures. The saloon keepers sit all day watching the radiating roads, vainly hoping that some thirsty traveler with coin at command may appear. The cows of a neighboring ranchman browse up to the back door of the gamblers' "club-room" without hindrance. The dog fights of booming days are unknown, for dogs with stomachs had to be got out of the way. Poor Dos Cabezas! The somnolence of her town is a pitiable sight, but from it thoughtful men may derive a profitable lesson.

OSCAR DELL.

Roessler's Estimation of Lead by the Humid Method.

[Translated for MINING AND SCIENTIFIC PRESS from the German by CH. A. SCHENK.]

A simple determination of lead by the humid way is as yet unknown. Though the precipitation of lead out of a hydrochloric acid solution by zinc in a loose, spongy form has repeatedly been recommended for this purpose, it was of no practical value on account of the increased affinity of the lead in this State to combine with oxygen, on account of the presence of earthy admixtures and other reasons.

Roessler has now made this method a practical one in alloying the lead, separated by zinc with a weighed amount of Wood's metal (1 gram Bi, 0.5 gr. Pb, 0.25 gr. Sn, 0.25 gr. Cd) which melts at 68°-73°C. From the increased weight of the regulus he determines the amount of lead. A quantity of the alloy weighing 2 grams can take up 1 gr. of lead. But in practice only so much ore should be weighed out that the resulting amount of lead be but little more than 0.5 gr., the alloy becoming less fusible by taking up too much lead.

The resulting beads should not be more than two grams, that they may be weighed on the assay balance.

Considering the foreign admixtures in lead ores the method is as follows: 1. Combinations which contain besides lead no other metals precipitated by zinc. Sulphides, which are not decomposed by boiling hydrochloric acid, as iron pyrites, etc., are also supposed to be absent. Wide test tubes containing from 50 to 60 C.C. are charged with the ore. Each tube is provided with a small funnel, from which the neck has been cut off by means of a file. A glass rod, drawn out to a point at its lower end, passes loosely through the funnel to the bottom of test tube.

Hydrochloric acid of 1.10 sp. gr. is then added to the charge (the amount of acid to be about 30 times the sulphide of lead; in case of carbonate, still more), and the whole heated as long as a reaction of the acid can still be perceived; dilute now with the same amount of water. The tube should not be over half full after this addition of water. It is not necessary, nor can it be recommended, to heat till every trace of sulphureted hydrogen is expelled; on the contrary, it is of decided advantage, as will be explained further on, if sulphureted hydrogen still remains in the mass.

For the precipitation of the lead the tubes are placed in a water bath of about 70° C. temperature, and in each one is thrown a small piece of zinc, weighing about one gramme. Zinc foil is used for this purpose, which can be obtained by pouring zinc which has been melted in a porcelain crucible, under cover of ammonium chloride, from some height into a porcelain plate. Care should now be taken to stir the contents well from time to time. If the generation of hydrogen decreases too much it is only necessary to dig with the point of the glass rod into the loosely precipitated lead to make the action lively again. The well-rinsed funnel is now detached from the tube by drawing it over the glass rod. By this time most of the lead is precipitated and more stirring becomes of importance, which can be better performed if the funnel is not in the way. Another small piece of zinc may be added in this state of the work. When no more hydrogen is evolved a test must be made to determine if there is any more lead in the liquid. For this purpose the tube is taken out of the water-bath and a small piece of magnesium of about 4 sq. m. m. size thrown into it. Care must be taken that the magnesium, by proper shaking, is moved about and comes in contact with all or most of the liquid. The solution is free of lead if the magnesium is completely dissolved. But more zinc must be added in case a small residue swimming on the surface is left, or perhaps a larger black looking globule. The required quantity of zinc to precipitate the still dissolved lead may be estimated by the size of the residue. Metallic magnesium does not precipitate lead out of a hydrochloric acid solution, except in the presence of a salt of zinc, in which case zinc is first separated, which now effects the precipitation of the lead.

The described way of testing for any more lead in the solution is preferable, in the author's opinion, to that with sulphureted hydrogen water for two reasons.

I. It is an easier and more accurate method. II. The contents of the tube, in testing for the presence of lead, with an excess of sulphureted hydrogen water must be poured into the main test-tube with all the rinsing water, in case lead is still present, which operation

would generally increase the volume of liquid so much that there would be hardly room for it in the first test-tube.

When all the lead is precipitated, an examination has to be made for particles of undissolved zinc, which might be enveloped in the spongy mass. For this purpose it is only necessary to dig with the glass rod at different places into the lead; if escaping hydrogen is neither seen nor heard, all the zinc is dissolved.

The operator, if he has satisfied himself in this respect, presses now the spongy lead together with the glass rod and decants the liquid. A loss of lead in this latter operation is not to be feared. The contents of the test-tube should be well shaken before decantation if much earthy matter is present; by using this precaution, most of the latter is poured off with the liquid. Water is now added immediately, so that the lead is just covered by it, and a small amount of precipitated calcium carbonate for nearly neutralizing the free acid, which may still be present.

The analyst has had enough time during the described part of the work to weigh out the several amounts of Wood's metal required for the number of tests and to have them, in order to avoid confusion, properly arranged in a row, corresponding to the order and number of assays. For alloying the lead Wood's metal is now introduced with care, so that it glides slowly to the bottom of the tube. Heating over a small alcohol flame, the lead by means of the glass rod is brought in contact with and pressed into the fused metal, properly shaking the tube at the same time, until all the lead has been taken up by the bead and formed the desired alloy with it. It is evident that this is completed when at last, in shaking the tube, spongy particles of lead are no more observed swimming in the liquid.

The lower end of the test tube is now dipped into cold water, whereby the bead becomes solid, when it is taken out, wiped dry and put in its place.

All the other tests are treated in the same way. The resulting beads are not yet fit to be weighed, containing in their present state always more or less water, which amount, though generally small, between one and two ingrams, may sometimes be much more, so that the operator runs the risk of making considerable errors on this account if he should weigh the beads as they are. The earliest and most practical way to prevent this consists in fusing the alloy once more under slightly acidulated water and pouring it into cold water. For this purpose a beaker is filled with cold water, and a wide test-tube, provided with a disk of cork near the bottom, that the bead dropping into it cannot break through, put into the beaker. In a second test-tube the bead is heated to fusing under very little acidulated water, carefully stirring once more with a glass rod; the test tube in the beaker is now raised with the left hand a little above the surface of the water and the tube with the fused bead brought close to the mouth of the first one. When the metal in getting cold begins to flow slow, which can be easily observed by a slight shaking, drop it quietly into the tube in the left hand. The bead may break into pieces if the metal in transferring is still too hot or becomes jagged or small folds may form on its surface, retaining traces of water. These inconveniences may especially happen if the amount of lead in the ore is only small, and the alloy, consequently, is readily fusible. In following the given directions the amount of water retained will be so small that it cannot influence the weighing. It may nevertheless be advisable, in order to have no doubt, to repeat the last described operation a second time. The determination must be considered correct if the second weighing agrees with the first or is only one or two decigrams less.

It may be well to caution the operator in this place, should he choose to do the drying by heat, the metal puffs up and may spit if it contains the smallest amount of water. This way of drying, therefore, can only be done in well-covered vessels. Two well-fitting watch-glasses enclosing the bead, the whole tared together, are best for the purpose. The heating can be performed on a hot iron plate. It may here be mentioned that the liquid enclosed by the bead is not exactly water but a weak salt solution.

Another Method.

The method, if the ore contains, besides lead, other metals which are precipitated by zinc, excepting antimony, and if it also contains sulphides not decomposed by hydrochloric acid, is as follows: The lead is converted into a sulphate, and the soluble salts are separated by washing. For this purpose a few C. C. of aqua regia are added to the substance in the test-tube; the latter closed with a funnel and the whole mass digested till decomposition is finished. The well rinsed funnel is now taken off, a little sulphuric acid poured in and the assay heated again till thick fumes of this acid appear. If a number of tests has to be made at the same time use for this second heating a small oblong box of sheet-iron and heat from the bottom to the required temperature. The test-tubes are placed in a row in this box, in an inclined position, so that the openings only protrude from slit-formed holes in one of the long sides. In this way the acid is rapidly evaporated and with perfect security. After cooling the test-tube is half filled with water and heated again for some time, to dissolve the soluble sulphates; then filter the clear liquid through a small filter, so that as little as possible of the fixed substance gets on the

(Concluded on page 86.)

MECHANICAL PROGRESS.

DECOMPOSITION OF CAST IRON BY HEAT.—Some experiments of L. Forquignon upon malleable iron led him to suppose that cast-iron, at a temperature somewhat inferior to its melting point, is decomposed into free graphite and a purer carburet of iron. He accordingly heated cast-iron in a vacuum, to a temperature of from 900° to 1,000 C., for several days, without melting or softening. The metal became malleable, and its surface was covered with a dull grayish efflorescence, which produced a mark upon paper or on rough porcelain. The fracture was sometimes of a uniform black, like that of a lead pencil, and sometimes it was dotted with black grains of amorphous graphite, regularly disseminated throughout the mass. It seems probable that this partial decomposition depends upon a tendency to equilibrium between the carbon, the iron and the carburet of iron, the relative proportion of each of these bodies being a function of the temperature. The decomposition of a homogeneous solid into two other solid bodies is a very rare, if not a unique phenomenon. Salt water acts very much like heat in the gradual decomposition of iron. Iron cannons which have lain a great number of years under the sea have become so much decomposed and so soft on being raised to the surface that they could be cut with a knife, and a common cut nail could be readily driven in to them.

A NOVELTY IN MILLING TOOLS.—Messrs. Hetherington & Co., of Manchester, have just constructed, from the special designs of Mr. Claude Carter, the manager of their works, a milling tool carrying seven cutter heads for machining at one setting 13 separate faces on a mule head stock. The machine generally resembles a planing machine, in having a bed table with standards and cross slides, the cutter heads being mounted on the standards and cross slides, in suitable projections, for operating upon the different faces of the mule head stock. Each head stock is driven independently, and allowance is made for changing positions to meet any variations in the construction of the head stocks. One counter shaft in the rear of the standards drives all the head stocks, and these are driven in iraly by belts. The table is fitted with differential feed motion, regulated by a hand wheel, which being turned in one direction gives the slow speed for cutting, and in the reverse direction the quick return motion. The traverse of the machine can be arrested in any position either automatically or by hand. The milling of the 13 faces of a mule head stock can, with this machine, be effected in an hour; whilst with an ordinary planing machine which would require about four different settings, the work would occupy about three days.—*English Paper.*

IMPROVEMENTS IN NAILS.—An improvement in the manufacture of cut nails has been patented at Wheeling, W. Va. This invention provides a new form of die for shaping the nail about the head, so its strength will be reinforced, and thus prevent the heads from being so frequently broken off in driving, as has been the case heretofore. The Russell & Erwin Mfg. Co., of New Britain, Conn., are the patentees of a new wire nail. The shank of this nail is not made smooth, but is made in several tapering or conical sections. That is to say, from the point upward the nail widens for a short distance, is then contracted, and again widens. In this way a series of barbs is formed, which act as ratchet teeth and prevent withdrawal of the nail except by great force. The wire from which the nails are made is prepared with the projections in a continuous strip, and is then cut, headed and pointed. A nail-set which will not slip off from the nail head and bruise the wood has been patented by G. W. Cannon, of Poughkeepsie, N. Y. The working end of the nail-set is made with a very small point or projection, which may be of conical, pyramidal, triangular or other form. The projection is made by filing or turning away the other parts of the face of the nail set before the same is hardened or tempered. In operation the projection enters the soft iron nail head and holds the nail-set in place.

A NEW TOOL FOR MAKING HOLES IN TUBE-SHEETS OF BOILERS AND OTHER PLATE-METAL STRUCTURES has been patented by W. F. Harrison, of Wilmington, Del. The tool is so made as to be readily adjustable for the cutting of holes of different diameters. It comprises two independently-adjustable and laterally-sliding tool-holders, extending through the cutter-head, and provided with cylindrical sockets for the reception of the cutters. A clamping-bar and nut are arranged to simultaneously clamp both the sliding tool holders. Centrally through the head project a cylindrical centering pin or bi provided with cutting teeth at its lower end. The cutters are adjusted radially to the center pin to the required distance by means of the slides, and are then clamped in place. A small hole is punched at the center of the opening to be made, and the cutter being placed in a drill press, the central pin will bore a small cylindrical guide opening, while the cutters will cut a channel through the metal concentric with the guide.

STEEL HOOPS.—The tendency to use steel instead of iron still continues to grow. More than half the current out-turn of some of the hoop firms in England is of steel, and the con-

sumers of stamping and of working-up sheets demand that metal. Steel is also coming more into demand for bridge girders. Civil engineers, both in England and in India, are specifying steel more frequently than heretofore as the material for girders in bridge building. Quite a good contract has recently been received for girders of this class by Messrs. J. Shewell & Co., Darlington. The girders are for India; and the fact that the steel for making them will have to be brought from Scotland is causing the North of England firms to feel more keenly the comparative scarceness of steel of local manufacture.

MANGANESE STEEL.—At a late meeting of the representatives of the coal, iron and hardware industries of Great Britain, the president, Mr. Percy, related an amusing anecdote of the late Mr. Joseph Gillott. He stated that about 40 years ago he and his friend Mr. Gillott were talking together in Birmingham, on the use of manganese by cast steel makers. Mr. Gillott was a native of Sheffield, and had had great experience in the use of steel suitable for steel pens. As soon as the word manganese was mentioned he showed unmistakable signs of mental disturbance, and exclaimed, "Sir, we have never had any good steel since that — manganese" (he omitted the emphatic monosyllable uttered on the occasion) "was introduced at Sheffield."

"There is no doubt," added Mr. Percy, "that there was much inferior iron used in the manufacture of cast steel, which, without the use of manganese, would not have yielded a merchantable product; but at the present time it was essential to the production of serviceable steel by methods most extensively in operation."

In answer to the question whether good steel of any kind could be made without the use of manganese, Mr. Percy replied as follows: "If not, how was the production of steel of the highest quality at Sheffield before manganese was used there to be explained? There were many points touching the manganese steel question which yet required careful investigation."

The day might come, continued the doctor, when the Institute would be induced to consider the expediency of forming a collection of specimens illustrative of special points of interest relating to the manufacture and uses of iron and steel.

THE LARGEST CANNON.—A cannon was cast at Jersey City Foundry July 21st which is claimed to be the biggest piece of ordnance ever built in the world, putting in the shade anything ever made by Krupp. The monster was cast for the New York Pneumatic Dynamite Gun Company, and if the expectations are realized nothing afloat can withstand one of its terrible broadsides. The barrel is sixty feet long, breech loading, weighs 46 tons, of heavy wrought iron, brass-lined throughout, with a full bore of eight inches. It was cast in four sections, each fifteen feet long, with iron collars welded together with stout steel bolts. The barrel is bolted to eight reservoirs, where the compressed air necessary to fire it is stored. Its projectile is equally formidable, carrying a charge of 180 pounds of dynamite. When completed the gun will be tested at Fort Lafayette by the Government Board. The company expect to sell it to Secretary Whitney.

EFFECT OF COAL SMOKE ON IRON.—The western approach of the Callowhill street bridge in Philadelphia, is in a shaky condition. The bridge is an iron one, and its western end spans the tracks of the Pennsylvania Railroad Company at a point where locomotives are continually passing, and it is said that the sulphurous acid from the smoke stacks of the engines has been the cause of the trouble. A great deal of the iron work above the tracks most used is being gradually eaten away, and the ground beneath is thickly strewn with thick iron scales that have dropped from the bridge work, which has not been protected by proper paintings. Several iron posts have been weakened and are bent in such a way as to indicate a slight movement of the bridge to the south. It is estimated that \$12,000 or \$14,000 will be required to restore the bridge to a good condition. The river span, which is not reached by locomotive smoke, is not affected, and is in excellent condition.

SUBJECTS IN REGARD TO WHICH WE ARE IN THE DARK.—In the metallurgy of iron, according to Dr. Percy, there are many subjects as to which we are still sadly in the dark. Who, for instance, could tell what were the physical properties of pure iron after fusion? Who had an accurate knowledge of the properties, chemical as well as physical, of compounds of pure iron and pure silicon in various proportions? Who could give certain information as to the modes of existence of manganese, silicon and phosphorus when present together in pig iron? Who could state positively and explain satisfactorily the *modus operandi* of manganese in the various processes in which it was used by iron and steel manufacturers?

A NEW AND MORE RAPID SEWING MACHINE.—A Brooklyn mechanic has invented a wonderful sewing machine, which, it is claimed, will do 80 per cent more work than any machine now in the market. An experiment with steam power moved it with a speed of 2,200 stitches a minute, and it was started and stopped instantly. It is simple in construction, is easily operated, and sews all kinds of fabrics, from leather to fine linen.

SCIENTIFIC PROGRESS.

An Accelerating Cartridge.

Among the very recent inventions is that of A. S. Lyman, the veteran inventor, of this city, of what may be termed an accelerating cartridge. It consists of an ordinary cartridge shell firmly packed with powder meal, through the center of which is a longitudinal perforation. Powder meal is used in order to compact the explosive into a single piece or block, and prevent the nearly instantaneous ignition which takes place with granulated powder.

When this new cartridge is fired, the ignition begins within the walls of the perforation, slowly at first, owing to the small surface exposed to fire producing a low gas pressure, by which the ball is started; but as ignition proceeds the perforation enlarges with increasing ratio, the charge burns with augmented rapidity, and the gas pressure steadily rises, expending nearly its whole effect upon the ball.

The few experiments thus far made with this novel invention have yielded remarkable results, and they indicate a coming revolution in the range and penetration of projectiles. From a small, smooth bore gun, four feet in length, five-sixteenths inch bore, with a powder charge of nine-tenths of an ounce, made in the new form, a projectile nine inches long, weighing 3½ ounces, has been driven into a target composed of nine plates of boiler iron, each one-fourth inch thick.

Eight of the plates were pierced, the forward end of the projectile then curved upward, boring up within the body of the ninth plate, and making an aggregate penetration of iron by the projectile of over four inches. It is estimated by the patentee that, with a three-inch gun and 40 pounds of powder, a projectile may be sent through a solid iron armor plate three feet thick. Should these expectations be realized by actual experiment, it would seem as if, in the naval battle of the future, the elements of light vessels, great speed, and rapid firing qualities would become prominent.

As to land defenses and military operations in general, radical changes would necessarily follow from the introduction of small arms and artillery having the extraordinary ranges and power which this new invention promises.—*Scientific American.*

EARTHQUAKES AND THE PHYLOXERA.—A curious phenomenon is reported from some of the vineyards in the province of Malaga. According to Spanish papers plants attacked by the phylloxera and given up as practically dead have begun to show marked symptoms of vitality, due, it is believed in the localities, to the destruction of the insect by gases or electrical conditions consequent on the earthquakes in that district. That earthquakes exert a destructive influence on the phylloxera insect of the grape, is the opinion of S. Villalogue, who has told the Paris Academy of Sciences of a vineyard near Malaga which had apparently been destroyed by the parasite, but which vigorously burst into leaf after the recent earthquakes in Southern Spain. The destruction of the phylloxera by earthquakes, if such is the case, is undoubtedly due to certain deleterious gases which are thereby liberated in the lower strata of the earth which find a gradual access to the surface through a crevice thus vertically opened.

RECOVERING VOLATILIZED METALS.—A. F. Wendt, of New York City, has patented an apparatus for recovering the volatilized metals from the smoke or waste gases of blast and other furnaces. The apparatus consists of a horizontal inlet-pipe connected by a series of vertical stand-pipes to a horizontal outlet-pipe. Within each stand-pipe there is placed a cylindrical wire screen reaching from the bottom of the stand-pipe to the upper side of the outlet-pipe. The screens are braced in proper manner, and are set in a sand packing below and in a flanged ring above. Suitable openings in the inlet-pipe, directly below the stand pipes, permit the withdrawal of the metallic deposits from time to time. As the gases pass through the screens, the metal will be deposited in a finely divided state, and may be removed by sharply tapping the screens and opening the lids over the discharge opening. The gases that have passed through the apparatus are said to be clean and to burn with a clear blue flame, without appreciable smoke.

THE SENSE OF TASTE AND SMELL.—How much of the pleasure of living comes from the exercise of the little considered sense of taste or that of smell it is hard to estimate. Harriet Martineau, the English authoress, seems to have been one of the few persons having no sense of taste, as a recent writer asserts that she was entirely destitute of it. She reported that the faculty came to her once, when the deliciousness of a leg of mutton aroused an eager anticipation of the enjoyment of her next dinner; but nothing came of it, for her tasting power was withdrawn as suddenly as it had been given. The sense of smell was also denied her, as it was Wordsworth. In his case the lacking sense also appeared on a single occasion, when he "smelled a hean field and thought it heaven."

TEMPERATURE AND THE HUMAN BODY.—Travelers in polar regions have survived exposure to a cold as great as 75° below zero, Fahrenheit.

On the other hand, the inhabitants of some parts of the globe are forced to endure at certain periods a natural temperature considerably higher than 100° above zero. A still greater heat—greater even than 200°—may be borne by the human body for a short time. Brewster mentions that Chantry and five or six friends remained two minutes in the sculptor's drying furnace, bringing out a thermometer which stood at 320°. Chantry's workmen entered the furnace when the temperature was as high as 240°.

WHY THE SWISS CAN DRINK SO MUCH.—Owing to the small proportion of moisture in mountain air and the low barometric pressure, evaporation is very rapid. Even after the heaviest rain the ground dries in a few hours. This quality of the air tends to make perspiration more profuse and the skin dry faster than in the case at lower elevations. There is greater thirst, the tissues waste faster, and a high authority has said that a man's tissue is the only thing which it is his duty to waste, new tissue being out of all comparison better than old. It is probable this rapid evaporation at great heights, and the thirst which it engenders that the Swiss have to thank for their wonderful drinking powers. The other week the marksmen of Canton Vaud held their annual rifle meeting at Payerne, a picturesque village on the Broye, and the local papers mention with something like pride that the shooters and their friends drank the place dry. Everybody who has been in the Highlands of Scotland, or any other mountain land, and tried the experiment, knows that he can drink with impunity much more whisky, or whatever the vi du pays may be, than he can drink at home. This, it may be as well to observe, is mentioned as a dry fact, not as an additional reason for going to the mountains.—*London Times.*

THE PHILOSOPHY OF FLAME.—In the study of furnaces, Mr. F. Siemens says that large ones must replace small ones. He claims to have proven that solid substances interfere with the formation of flame, and that flame injures solid substances with which it comes in contact. To account for the phenomena he advances, preferably, an electric hypothesis. Accordingly he explains flame as the result of an infinite number of exceedingly minute electrical flashes, the flashes being due to the very swift motion of gaseous particles, and a solid body which opposes itself to these flashes is cut by them, while the motion being more or less arrested by the solid body the flame is damped. Mr. Siemens insists, therefore, that flame must not be allowed to impinge on bodies to be heated, but must simply heat the bodies by radiation, and furnaces must be so constructed as to allow the flame to develop out of contact not only with the substance on its bed, but with the walls and roof of the furnace itself.

MOUNTAINS OF THE MOON.—Many readers are aware that the mountains and hollows of the moon have been accurately and thoroughly mapped by astronomers, and baptized by appropriate names. For the benefit of students of astronomical geography, we subjoin the names of all those which have been christened. Mountains—the Appennines, the Caucasus, the Alps, Taurus, Bamus, the Altai Mountains, the Cordilleras, the Rhiphe Mountains, the Carpathians, the Hercynian Mountains. Hollows or valleys—the Chisian Sea, the Sea of Fertility, the Sea of Nectar, the Tranquil Sea, the Sereno Sea, the Sea of Dreams, the Sea of Death, the Dreamy Marsh, the Cold Sea, the Sea of Vapors, the Middle Bay, the Sea of Clouds, the Sea of Mist, the Bay of Epidemics, the Stormy Ocean, the Showery Sea, the Sea of Rainbows, the Sea of Dews, Humboldt's Sea.

FORESTS AND TEMPERATURE.—Prof. Muttrich, of Berlin, has reached the following conclusion from his forest meteorological researches: (1) That the forest exercises a positive influence on the temperature of the air; (2) that the daily variations of temperature are lessened by the forest, and in summer more than winter; (3) that the influence of the leafy forest is in summer greater than that of the pine forest, while in winter the tempering influence of the pine forest preponderates over that of the defoliated forest. An attempt to determine the influence of the forest on the mean annual temperature led to no sure results.

INTERESTING EXPERIMENT.—A sheet of ordinary paper warmed in front of a fire, will, in a dark place, give a very decided electric spark upon the application of the knuckle, with a crackling sound. Place a sheet of gold leaf between two sheets of paper thus electrified, and pass a pencil point over them in a zig zag course, and a luminous flash quite strong will appear.

ELECTRICITY AND BOILER INCORUSTATION.—Experiments have been made in France with electricity as an agent to prevent the incrustation of boilers. The passage of a current through the boiler not only causes the impurities of the water to settle as loose powder, but detaches the old incrustation.

GUN COTTON AS A MOTOR.—A motor driven by small charges of gun cotton is an English novelty. It is said to be applicable wherever small powers are required.

A NEW ASTEROID.—No. 237 was discovered at the Vienna Observatory on the 29th of June by Dr. Palisa. It is of the twelfth magnitude.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 13 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... 25 80 22.20 85.00
Half inch (1 square)..... \$1.50 4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. TRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 1, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Tin; Dow's Mining Shaft Pump; A New Work on the California Gold Mines, 81. Passing Events; Chicago Dolor; Steel Cruiser; New Water Pressure Engines for Mines, 84. North and Middle Forks of the American River, 85.

ILLUSTRATIONS.—Dow's Double Acting Pump for Mine Shafts, 81. North and Middle Forks of the American River, 85.

CORRESPONDENCE.—A Mining Lesson, 82. MECHANICAL PROGRESS.—Decomposition of Cast Iron by Heat; A Novelty in Milling Tools; Improvements in Nails; Steel Hoops; Manganese Steel; The Largest Cannon; Effect of Coal Smoke on Iron; Subjects in regard to Which we are in the Dark; A New and More Rapid Sewing Machine, 83.

SCIENTIFIC PROGRESS.—An Accelerating Cartridge; Earthquakes and the Phylloxera; Recovering Volatilized Metals; The Sense of Taste and Smell; Temperature and the Human Body; Why the Swiss Can Drink So Much; The Philosophy of Flame; Mountains of the Moon; Forests and Temperature; Interesting Experiment; Electricity and Boiler Incrustation; Gun Cotton as a Motor; A New Asteroid, 85. USEFUL INFORMATION.—The Four Largest Incomes; Natural Soap; Pyrotechnics; The Great Eastern and Noah's Ark; English Elm; Chinese Bandoline; Visiting Cards; Bicycles; Varnishes and Paints; Miles of Pipe, 87.

GOOD HEALTH.—The "Work" in Going Upstairs; Poisoned by Flies; Whooping Cough; Cure for Biliousness; Cause of Bright's Disease; Disinfectants; Sunstroke; A Warning to Drinkers, 87.

MISCELLANEOUS.—Roessler's Estimation of Lead by the Humid Method, 82. Treatment of Dry and Base Silver Ores, 86. El Dorado County Notes, 87.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon and Utah, 88-89.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 92.

Business Announcements.

Rural Health Retreat—St. Helena, Cal.

See Advertising Columns.

Passing Events.

Surveying the entire field, there is apparent just now an unusual activity in the business of mining for the precious metals on this coast. Receiving papers, communications and verbal reports from all parts of the country, we are enabled to form a pretty accurate judgment as to the situation, which denotes a confidence in mining circles never before so obvious as just now. The miners, claim owners, as well as workmen, appear to be pretty well satisfied with their condition and prospects. The dwellers in Arizona seem to have a good opinion of that Territory. They who tarry in Nevada like the sage-brush; the Gentiles in the sterile mountains of Utah take to the land of the Saints, and so on through the entire list of mining States and Territories. A great contentment seems to pervade those who sojourn there, all believing the place where their lot has been cast, or their enterprise has carried them, to be preferable to any other. This is as it should be, since men not only enjoy themselves the best, but accomplish the most who are satisfied with their surroundings. Moreover, there is nothing to be gained by miners in a country where things, taken as a whole, are so evenly balanced, shifting their places of abode in the hope that much is to be gained thereby. The industrious and frugal can do

well enough almost anywhere in this land of the Far West, those who fail heing, as a general thing, themselves most to blame.

We have elsewhere spoken of the general condition of mining affairs in California, the same heing healthful and the outlook all that could be asked for. Over in Nevada, viewing the State at large, the state of things is not quite so cheerful; on the Comstock, however, a good deal of work is heing done and with better results, or at least better prospects than have attended operations there for some time past. All the mills that have water are running. The ore, it is true, is of low grade, but it affords some profit. A great many men are now heing employed in these mines, and more would be if a larger number of mills could be kept running. With this increased output and reduction of ore, business in Virginia City has improved to a corresponding degree, and the place has put on a more lively appearance.

Chicago Dolor.

It appears from the Chicago papers that business in California is at present very bad. If such is the case it is time the people of this State were advised of the fact. The year is now well advanced, and yet we have been living on in profound ignorance of the true condition of things, fancying ourselves comfortable and fairly prosperous, whereas we have been all the while fluttering on the very verge of bankruptcy—real estate depressed, our factories closed, trade annihilated and the gold mines "played out"—are, in short, a dead-broke, gone-in community. This is deplorable, but now that we have found out how it is, nothing remains hut to go into liquidation and make an assignment for the benefit of our creditors, deporting ourselves as hecomms a people so impoverished, afflicted and essentially used up. This is clearly what will have to be done, unless, to he sure, our Chicago friends have been drawing on their imagination for their facts, or some wag has been guying them sadly, for we can assure these good people that California, everything considered, never seemed in a more prosperous condition than at this very time.

Be that, however, as it may, there is this much to be observed: there have occurred in this State during this present year fewer business failures than in any other part of the country. We have had none of those riots growing out of labor strikes, such as have been common of late all over the East, and as are just now rife in Chicago, Cleveland and neighboring cities. We have here no great masses of men clamoring for work or fighting against a reduction of wages, all who desire employment being able to get it and to earn enough to subsist them decently. If in San Francisco building has been greatly overdone, there stands yet this fact that rents are nearly twice as high here as in Chicago. There may have occurred in this city such tumble in the prices of real estate as these Eastern journals describe, but if so the extensive sales recently effected in this line of property fail to show it.

It is true this cereal crops have this year fallen considerably below the average. But for all that we shall have many thousand tons of wheat to spare after supplying all home requirements. It is, moreover, the case that the completion of overland railroads on the north and the south has somewhat curtailed the trade of San Francisco in these quarters. But this loss is not serious, and is heing fast repaired by our growth of population, due to immigration and natural increase. For the same reason, territory that formerly obtained its machinery here is now getting it in part from Western cities. But this, while it has diminished orders with our foundrymen and machine builders, has caused none of these establishments to close up, nor will it prove of more than temporary inconvenience.

The fact is, the resources and industries of California are so varied that even though some pursuits be much depressed, those that remain unaffected suffice to maintain the general prosperity very nearly at its common level.

Thus, while our grain crop is this year a trifle short, this shortage is hut little felt, heing made up by an abundant vintage and an average yield of vegetables and fruits of nearly every kind. Then we have other sustaining and staying industries, such as dairying, wool and stock raising, our lumber, manufacturing and fisheries, with innumerable smaller pur-

suits, not to mention gold and silver mining, which, so far from "heing played out," are to-day yielding more satisfactory returns than ever before. We heg, then, our Chicago friends not to worry about California. She is getting along very comfortably, despite the few drawbacks mentioned, and which are hardly more than we require as counter irritants to too much prosperity.

We only wish the inhabitants of Illinois and the city by the lake were as well off as the people of San Francisco and the Pacific Coast generally. We grieve that this is not so. It pains us to hear of the business failures, the stoppage of rolling mills, factories and other works; the closing of coal and iron mines; the falling off in railroad earnings; the high death rates, poor living and low wages; the idleness, suffering and want, and the general industrial depression everywhere noticeable in the States east of the Rocky mountains. Our sympathies go out in a special way for the street-car strikers who, after standing out to the point of starvation, have been forced to accept the old wage of \$12 for seven days' work of 17 hours duration each, with only 20 minutes for meals, enough, no doubt, for the scanty fare the poor fellows get. A company who would force men to work on terms like these would be indicted and convicted of a public offense in San Francisco. And yet, incredible as it may seem, there is score of applicants for every one of these overworked, ill-paid positions.

Out in the country the laborer fares even worse, receiving during harvest but 90 cents per day, finding himself; at other seasons of the year his pay amounts to hardly more than 50 cents per day, with sometimes a sack of corn or slash of "sow-helly" thrown in. Harvest hands receive in California from \$1.75 to \$2 per day and board, at other times farm hands are paid from \$25 to \$35 per month, board and lodging included; most other kinds of labor heing paid in this same proportion.

New Water-Pressure Engine for Mines.

Mr. J. N. S. Williams of this city, has just received a patent through the MINING AND SCIENTIFIC PRESS Patent Agency for an improved water-pressure engine. It consists of two or more cylinders having pistons, two or more series of valves for admitting and exhausting the liquid, a connection between said valves and cylinders, and a mechanism by which the piston of one cylinder operates the valves connected with and operating the piston of the other cylinder. It consists, further, in the construction of the valve-chests, and in the series of inclined planes heing arranged upon sliding bars connected with the pistons in such a manner that when the pressure valve is open the exhaust valve is shut, and vice-versa.

The style of valve gear in Mr. Williams' engine is cheap and simple, doing away with the costly system of hydraulic rams and the complicated piping necessary on the single-acting water-pressure engines that are in use. Further, the motions of the pistons being, as it were, at right angles to each other, the motion derived from them is steady and uniform to a degree not attained in any other construction.

In mines the object of this engine is to do away with the cumbersome shear-rod and substitute a column of water, thereby affecting a marked improvement in economy of working and repairs, and also cheapening the construction of such works. In its application to such pumping machinery, the discharge column of water being in constant motion, the heavy shocks due to the water column coming to rest and being set in motion again, as in the ordinary systems of pumping, are entirely done away with, it is claimed, and thus allowing the constructor to make his pipes of less strong material, there heing no liability to failure, owing to the steady motion in the discharge column.

The valves may be plain disks with springs or they may be slide, rotary or puppet valves, as may be most convenient in practice, and this mode of lifting the valves may be either inclined planes or by a combination of jointed levers, or by cams rotated by the most convenient way.

The whole construction of the engine is novel and useful when applied to pumps that require to be placed underground, as in mines and other industrial works of a similar nature. It may also be applied to winding engines, ventilating-fans, and all purposes requiring the conversion of rectilinear into circular motion.

Steel Cruisers.

A Proposal from a San Francisco Firm.

Among the proposals submitted to the Navy Department at Washington, for building the new cruisers authorized by Congress, was one from the Union Iron Works of this city the only private shipyard that offered to build. Plans were submitted to the department, after careful consideration of recently constructed vessels of the class. An outline of the proposal is as follows:

Main deck at or about the water line covering the boilers and engines; armament on the spar or upper deck, with full poop and forecastle decks to work bow and stern guns; not less than three-fourths sail power; coal bunker capacity for a full power run of 3,000 miles in eight days; capacity for a half power run of 5,000 miles in sixteen days; capacity for a one-third power run of 6,700 miles in twenty-four days.

In working out the plans to obtain results as stated above, we have reached a displacement of 4,750 tons, with the draught of water forward at 20 feet; aft 22 feet 6 inches. This allows for the weight of hull, exclusive of armament, ship stores, war stores, etc., 1,950 tons. Boiler and engines, including pumps, pipes, ventilation, etc., 1,040 tons; coals in bunkers, 1,100 tons; armament and stores of all kinds, 660 tons. This maximum power to be developed under the best conditions of weather and with the best fuel and skillful management would be 6,000-horse. In making the computations for speed, we have allowed 500 horse-power margin, and taken the full power at 5,500, the result heing as follows: Displacement, 4,750 tons; draught of water forward, 20 feet; draught of water aft, 20 feet 6 inches.

From calculations an estimate of a full power speed of 17 knots is reached. In order to have the machinery practically under the water-line the horizontal type of engine is adopted, this arrangement providing for three distinct compound surface condensing engines, acting on three cranks set at an angle of 120 degrees with each other, each part of each engine to be a duplicate of the corresponding part of the other engines; thus one spare crank shaft would fit any of the three engines—the same with pistons, piston-rods, valve stems, etc. The boilers are arranged in two fire-rooms, six boilers in each compartment, the steam pipe through the after-boiler compartment to be in a water-tight case, so that steam could be used from this forward boiler should the after fire-room be flooded. A water-hallast compartment is arranged under the engines to hold about two hundred tons. This would be filled when the coal was burned out of the bunkers. The bunker capacity, as shown on the plans, is about eleven hundred tons, arranged on each side of the boiler and engine space and across the forward end of the same. All the bunkers are water-tight compartments with drop doors. The rig, as shown by the rigging plan, is that of a four-masted ship, heing square rigged on three masts with a polk-gigger, all parts and sails for the three masts being duplicates of each other, all top-sails and topgallant sails interchangeable. The poop and forecastle-decks would be arranged to receive say 8 or 9-ton guns, while the broadside would consist of six 6-ton guns.

Construction of the Hull.

The construction of the hull is of the usual type, frames spaced 24 inches, with additional girder frames, spaced 10 feet apart, as shown in the plans, and all the other scantlings fully up to the requirements of the registering societies. The vessel is fitted with a rainbow and well backed by intercostal plating, extending to the first or collision bulkhead. There will be two complete steel decks and all the main bulkheads will extend to the upper deck.

No special design for armament was made. There will be three distinct condensers, as shown on the plans, one for each engine, the cooling surface in each condenser to be 3,860 square feet.

There will be 12 single ended steel boilers, each 12 feet six inches diameter and 10 feet 6 inches long, each boiler to have three furnaces opening into a common combustion chamber.

Everything experimental in boilers, engines, etc., or in their arrangement, has been avoided. The Union Iron Works managers are satisfied that this vessel can be built, exclusive of armament, stores, furniture or any spare parts, for the sum authorized by Congress to be spent.

The Union Iron Works are perfectly competent to undertake this task and it is greatly to be hoped that the Department will look favorably on their proposals. Their new plant was partly designed for just such work and they have all the necessary facilities.

North and Middle Forks of the American River.

We present here a map* of the north and middle forks of the American river, including the "Divide," between them, as the high ridges that separate large streams in California are frequently called. The territory represented covers an area a little more than ten miles square—say 120 square miles. Hardly anywhere else throughout the entire range of our gold fields could a like scope of country be selected marked by so much worthy our attention, whether we regard the extent, variety and richness of its mineral resources or the historic interest that attaches to it. Here every form of gold-bearing deposit found in California is met with, and here have occurred some of the most romantic incidents and tragic events connected with the mining annals of pioneer days. The dotted belt crossing the map diagonally from northeast to southwest indicates the course of one of the Pliocene or "dead rivers" that here traverses the country. This is the main channel which has many branches less distinctly shown on the map. A large portion of the "Divide" is, in fact, ramified with the confluent of the "dead river" here laid down, fragments of them being found at Iowa Hill, Grizzly Flat, Yankee Jims, Deadwood and elsewhere on the ridge. Not only so, but later developments tend to establish the existence of two, if not three, channels, occurring at various depths, the one above the other, along or near the path of the one here seen. As regards

The Hydrography of This Region.

While it has been pretty accurately sketched by our artist, is slightly at fault in one or two particulars. What is put down on the map as the west fork of the North Fork should have been made the north fork of that stream. The two considerable confluent running off easterly from the middle fork, as displayed on the map, have in reality no existence. There are deep canyons there through which run winter torrents, but no large or permanent streams. The style of designating the larger branches of the rivers, as adopted in California, is well illustrated on this map. We have, to begin with, the main trunk of the American river, not here shown. This river divides itself first, into a north, a middle and a south fork, each of these forks dividing themselves again in the same manner. Thus, we have the north fork of the North Fork, the middle fork of the North Fork, the south fork of the North Fork, and so on through the whole category, there being many other large rivers in the State which with their tributaries are divided up in the same way. These rivers run in deep, narrow, and precipitous canyons, the latter ranging from 1,200 to 1,600 feet in depth, their sides having an average slope of 40 degrees. Even some of their smaller tributaries, such as Indian, Shirt-tail and Humbug canyons, are from 1,000 to 1,200 feet deep along their lower portions, with banks quite as steep as the main rivers.

A mile a half above Colfax, on the north bank of the American river is the noted locality known as "Cape Horn," consisting of a bluff point along the side of which the railroad bed has been excavated at a height of 1,500 feet above the river, of which a good view can be had from the cars when rounding this point. On this Divide stand

The Mining Hamlets

Of Damascus, Bath, Forest Hill and Todd's Valley, all but Damascus, much more populous many years ago than they are at present. Michigan Bluff, which stands on a branch or feeder of the main channel, and near the latter, has lost much of its ancient importance, the mines in the vicinity, worked mostly by the hydraulic process, being now about exhausted. Of Todd's Valley, also at one time a large and lively town, very little is now left. Ranked by population, the towns on this "Divide" stand in the following order: Iowa Hill and vicinity, 1,000 to 1,200 inhabitants, Forest Hill, Bath, Michigan Bluff and Damascus, 600 to 800, the miners working in the immediate neighborhood of each being included. Thirty years ago Yankee Jim's was the most flourishing town on the ridge; it is now about obliterated. This same remark applying also in good measure to Wisconsin Hill. The rich mines worked near

*From the report of H. C. Burchard, Director of the Mint.

Forest Hill gave to that place such importance that it imparted its name to the entire ridge between the two forks, commonly called the "Forest Hill Divide."

The Mines on This "Divide"

And along the rivers that bound it on two sides, have been among the richest ever found in the State. Even as early as 1848 some mining was carried on along these rivers, and in a few instances also in the gulches up on the ridge. Some work was done that year on most of the larger bars along the Middle Fork, as high up as the main branches of that stream. Very little, however, was done that year on the north fork of the American.

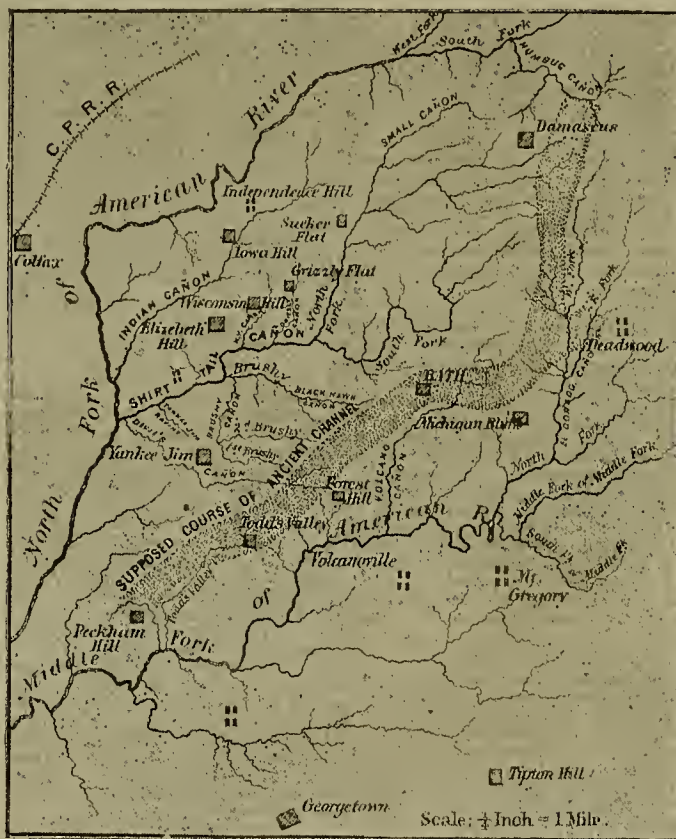
In the fall of 1848 a company of miners struck into Shirttail canyon, and for several months took out gold by the pound. Having consumed all their provisions, they left early in the winter, taking with them as much gold as they could carry. Though they did not expect to return themselves, they concluded they would so mark the spot that others could find it should they meet with any desirous of doing so. Now there had in the fall of '48 been quite a heavy trail worn along the "Divide" by miners

means, it can hardly fail to prove a great success. Indian canyon, the next considerable gulch to the north of Shirt-tail, had in like manner been filled with these gold-bearing slums. A few years ago it was emptied of its contents by a similar process, and paid well, profitable washing still being in progress there.

All the ravines and gulches on the Forest Hill Divide, as well as the bars along the rivers on either hand have richly rewarded, not only a first but in many cases a second and in some instances even a third working. Most of the drift operations here have also proved exceedingly profitable, some of the claims now being worked by this method, turning out gold almost beyond precedent. The Hidden Treasure ground at Sunny South, not far from Damascus, the Weske, near Michigan Bluff, and the Mayflower, in the vicinity of Forest Hill, are all yielding with an affluence that would have been no discredit to the flush days of gold mining.

If time and space would permit, it would afford us a pleasure to recall and fully describe some of the more interesting

Incidents and Legends, Pertaining to this Forest Hill "Divide" and



NORTH AND MIDDLE FORKS OF THE AMERICAN RIVER.

going to points above on the Middle Fork. This trail kept near the crest of the ridge, a little higher up than Todd's Valley, passing near where Forest Hill and Bath now stand, and thence on to Michigan Bluff, where it made its descent to the Middle Fork. When these miners on coming out from their rich diggings struck this main trail they put up there on a pole the remnants of an old shirt to denote the turning off place in going to these diggings. From this incident the canyon took its name, which, despite its uncouthness and some efforts made to change it, has stuck to the locality ever since. We can testify of our own knowledge that the above is the true origin of this outlandish name. In passing up the ridge in the spring of '49 we saw the garment still there, stretched on the pole after the manner of a scarecrow in a farmer's cornfield. Later in the summer it disappeared and with it this more tangible evidence as to how the deep and gloomy gorge came to receive such strange baptism.

Being the outlet to several hydraulic mines, this canyon came to be filled with tailings to a great depth many years ago, a rocky obstruction near its mouth having prevented their escape. This barrier is at the present time being removed and a sluice laid down along the canyon for the purpose of running out and rewashing these tailings, which are known to contain great quantities of gold. As the enterprise is in the hands of energetic parties having ample

localities immediately adjacent. Long will the packer and others, who in '49 traveled up and down this "Divide," have reason to remember Todd's Valley and this—not for the reason that any special good luck or dire calamity there happened to them, but because this was the only place where a white woman and frolicking children, and dogs and cats and cows could be seen, and a square meal be obtained at that day; comforts all made possible and so brought within the reach of the '49er by Jim Williams, who, in the summer of '48, leaving Santa Cruz and taking with him his family and domestic animals, repaired to this valley and there put up a stockade cabin, whereat man and beast were afterwards entertained in royal style. Now, Jim Williams was a Missourian by birth, but having killed a man in his native State, found it expedient to emigrate, which he did, first going to the Indian Territory, and later coming on to California. In this killing he was not, it seems, altogether to blame, but enough to hame to render further residence in his old home uncomfortable; hence his removal. But in coming away Williams was not the man to leave his family behind. He gathered them up, even to his mother-in-law and his wife's two sisters, very comely maidens, and brought them all out into the wilderness with him. As he was called the "Indian Fighter," it would look as if he must have been engaged sometime or another in savage warfare. But about this his guests never

found out anything definite, albeit Williams was a great talker. Now, at the period we are speaking of, this man was living as above related, and his cabin being the only place in this whole country where a christian meal could be had, few going up or down the ridge ever passed without calling—the result was, Williams made money—so much that the next year he sold out the place to one Dr. Todd, and with his numerous household returned to Santa Cruz, his successor coming in and giving his name to this valley.

Located on this middle fork, near its junction with the main river, is

Murderers' Bar,

On which six young men from Oregon were, in the month of May, 1849, killed by the Indians—hence the name. Further up on the south fork, near Kelsey's Diggings, one of the Kelsey brothers was in like manner killed the same year. By reason of these and other murders committed by the Indians, a party went out from Sutter's Mill, and having corralled a lot of the savages brought them in to the mill, where, after a sort of a trial was had, some dozen or more of the bucks were shot.

Jim Greenwood, the Mountaineer.

Had our map been extended a little further south it would have taken in the site of the famous old mill where gold was first discovered in California; also the town of Greenwood, situated in Greenwood's valley, both named after old Jim Greenwood, about the best specimen of a mountaineer and trapper that ever wore buckskin hunting shirt and moccasins. In the spring of '49 Greenwood was living with his family, which consisted mainly of numerous horses, a retinue of dogs, and several boys, at the old mill, where he was a noted character, both because of his striking personal appearance, and the large quantities of whisky he was capable of consuming without any visible effect. He had left his home in Missouri when a youth, and spent his whole after life in the service of the various fur companies, hunting and trapping in the Rocky mountains, having also served as a guide to some of the expeditions sent out by the General Government to explore the regions of the great Northwest. He was full of anecdotes and a good talker, though prone, after the manner of his kind, to paint events in vivid colors.

Though over seventy years of age when living at the mill he got about with the agility of youth and could still handle his rifle with unerring precision. That summer he left the mill, and taking his dogs, boys, traps and other things, of which he had not many, moved over to a little valley between the south and middle forks and putting up a cabin made there his future home, his death occurring a few years afterwards. His boys by his Indian wife, a Crow woman, were handsome, bright little fellows, though with the bringing up they got, they did not all turn out well. With the exception of one, Todd by name, they are all dead now. The survivor is, or was not long since, living in Humboldt county, California, a good citizen and well liked by all who know him. The valley remains, but the town of Greenwood has shared the fate common to so many of the early settlements in the mining regions. Alluding to

A Legend or Two More

And our running and disjointed remarks must be brought to a close: On the south bank of the Middle Fork, a little below Todd's Valley is "Jack Greary's Grave." Poor fellow, he came of a rich family somewhere in the East, was highly educated, of gentlemanly address and good appearance, but he died poor and alone—starved to death in his cabin hard by the Middle Fork, where we found his remains and interred them as well as we could, putting up a rude cross over the spot, which thence on was known as "Jack Greary's Grave." But the grave nor the cabin is there any more. They occupied fatal ground—ground, that containing gold, has since been washed off, and with it all there was left to mark the last resting place and perpetuate the memory of the unfortunate young man. That his friends ever learned anything of his fate is not at all probable, as all we could glean about him or them was the above scanty information, gathered from a drunken companion that we afterwards came across and who had deserted him in his extremity.

Further up the middle fork, but on the same side, under a towering pine tree that overlooks the canyon, is the grave of Roswell Partridge, who died near that spot in the fall of '49, under circumstances of the most sad and pathetic kind. Just forinst Jack Greary's grave, a company of sailors—but why recall other of these mournful reminiscences, to continue which to the end would be but to write another "Book of Lamentations," so many are they and so sad their recital? Never in time will they all be chronicled—never will the world know how many perished, one way and another, during these pioneer times; nor ever will the waiting ones at home learn what has become of the lost.

Roessler's Estimation of Lead by the Humid Method.

(Continued from page 82.)

filter; wash the residue containing the lead repeatedly with sulphuric acid water, till all the soluble parts are washed out, which may be ascertained by a special test. Place now the test-tube with the lead sulphate under the funnel; pour about 10 C. C. of hot hydrochloric acid (1.10 spe. gr.) in small portions on the filter, and wash with 10 C. C. of hot water. The smallest quantity of lead sulphate, which in decantation might have remained on the filter, is saved in this way and added to that in the test-tube. Out of the hydrochloric acid solution the lead is now separated by zinc and alloyed, etc., in the manner described. Add a small amount of sulphuretted hydrogen to the wash water for rinsing the funnel with the neck cut off, toward the end of the lead precipitation. By taking this precaution the tendency of the lead is diminished to enter into solution again, after the excess of zinc is dissolved.

As the latter point is of some importance in this method of determining lead, it may be well to consider it a little more closely. When lead is precipitated by zinc and any excess of the latter metal has disappeared, it can be noticed at once that the lead is now also inclined to dissolve in the acid liquid. The surface of the spongy mass becomes covered with small bubbles, which rise slowly and without any noise, with more or less energy, according to temperature and amount of free acid present. Supposing, for instance, that it has been shown by the magnesium test that all the lead is precipitated, and the same test is repeated after some time, then the formation of a small black globule will be observed, which clearly demonstrates the necessity of pouring the liquid from the precipitated lead as soon as the excess of zinc has been dissolved. This tendency of the lead to dissolve again is diminished if only a little sulphuretted hydrogen is present, and on this account was it advised not to expel the last traces of the latter gas in treating the ore with hydrochloric acid.

Although sulphuretted hydrogen can by no means protect the lead against the action of an acid liquid, its presence will yet be of benefit in retarding this action and decreasing an error from this source, in case it has been neglected to pour the solution in time from the metal precipitated.

Silver, if present in the ore remains with the lead sulphate and increases its weight, introducing thereby an error, if the precaution of using nitric acid free of chlorine, instead of aqua regia has not been taken.

Method When Lead and Antimony are in the Ore.

Antimony enters into the hydrochloric acid solution, out of which it is also precipitated by zinc, and would be taken up in part by Wood's metal, if it were not separated from the lead. Chloride of antimony volatilizes at about 230° C, whereas it needs a much higher temperature for the evaporation of the lead chloride. No lead is lost in evaporating the chloride of antimony. The work is accordingly done as follows:

Add to the substance under examination and charged into a porcelain crucible of about 50 C. C. volume, the necessary amount of hydrochloric acid and digest to perfect decomposition, the crucible being covered with a watch glass. Rinse the watch-glass into the crucible, evaporate to dryness, being careful to have no loss, and heat the residue at 230° C, as long as fumes are seen to escape.

If now the residue contains besides lead no other metals precipitated by zinc, loosen the dry mass by means of a glass rod from the sides of the crucible, and transfer it to the test-tube, wherein the separation of the lead is performed. Rinse crucible first with 10 C. C. of hot hydrochloric acid, and then with 10 C. C. of water, pouring the washings into the test tube.

If, on the other side, it is necessary to convert the lead into a sulphate after the described separation of antimony, on account of the presence of other metals which are also precipitated by zinc, proceed as follows: Add to the residue in the crucible a small quantity of aqua regia, and also some sulphuric acid; heat under cover of watch-glass, take off the watch-glass and rinse it when the mass is quietly fusing, and keep on heating till the fumes of sulphuric acid appear. Add water after cooling, heat again a short time to dissolve the soluble sulphates, and decant after settling to a small filter. Transfer now the contents of crucible into the test-tube, wherein the lead is to be precipitated, using for this purpose sulphuric acid water. Finish in test-tube by repeated decantation, the washing out of all soluble salts. Proceed now as already described, not forgetting to rinse the crucible with the required measure of hydrochloric before pouring it on the filter.

It need scarcely be mentioned that the heads obtained in the work can be regenerated and used over again by alloying them with the required quantities of bismuth, cadmium and tin, to compensate for the addition of lead. For this purpose each head after weighing is wrapped up in a piece of paper, marked with the amount of lead taken up. If now new portions of Wood's metal are needed for other tests, get the sum of the lead from wrappers and determine therefrom at once each separate amount of the other constituents to be fused with the beads on hand.

The results obtained by this method have been very satisfactory, especially if the percent

age of the earthy admixtures in the ore was low. They may be a little too low if the said percentage is high. It takes more time in this case to take up the lead in the alloy than it does if the ore is purer, on account of the surplus of earthy substance present. A small loss of cadmium may be caused thereby, the fused metal being longer in the slightly acid liquid.

Treatment of Dry and Base Silver Ores.

Progress in Dry-Crushing Silver Mills.

The following article, by C. A. Stetefeldt, appeared in the last annual report of the Director of the Mint:

It is not intended, in this paper, to treat the above subject in an exhaustive manner, but only to point out, in a general way, what progress has been made, and to call attention to recent improvements which eventually must create a revolution in this special branch of metallurgy.

The distinctively American dry-crushing silver mill came into existence about the year 1865, after the discovery of the Reese River mines in Nevada. What had been done previously on the Comstock was simply to copy the Freiberg barrel amalgamation. The substitution of the pan for the barrel forms the real starting point of deviation from old methods. In discussing the progressive steps taken in the construction of dry-crushing silver mills I will consider each one of the different parts of the plant by itself.

Breaking of the Ore as it Comes from the Mine.

Blake's crusher, first introduced for breaking ore in silver mills in Colorado in 1864, and since then in use all over the civilized world, marks the adoption of a principle for breaking ore which, in its application, is so simple, effective, and economical that I doubt if it will ever be superseded by any other. The idea has been taken up by many other inventors, and whatever the merits of their improvements may be, they have not achieved any important results which call for special commendation. Even in those crushers in which the jaws have received a circular form the acting principle is essentially the same.

Drying of the Crushed Ore.

The old-fashioned dry-kiln, consisting of heated flues covered with iron plates, has almost completely disappeared, at least in most mills of more recent construction. It has been replaced by the revolving dry-kiln, first introduced about 1875, where I have not been able to ascertain. There is not only much labor and fuel saved, but the moisture is more completely removed, which is essential for dry-crushing, and the annoyance of a hot floor, so unhealthy to the laborer, is avoided. A new style of drier, the shelf dry-kiln, first built at Lexington mill, Montana, in 1882, is rapidly gaining favor. Its mode of working being automatic, by gravitation, it dispenses with power. It also does away with dust-chambers, and occupies less space for equal capacity than the revolving dry-kiln.

The Crushing of the Dry Ore.

In the dry crushing of ores progress has been very slow until late, in spite of the numerous efforts made in this direction. A few years ago the idea prevailed with all experienced millwrights that the California stamp battery would keep the field as the only suitable apparatus for producing fine pulp. This assumption was based upon the fact that all machines the construction of which had been based upon other principles failed to accomplish what was claimed for them. Hence all efforts were directed to make the stamp battery as effective and durable as possible. The increase in weight of the stamps, the increased number of drops, changes in the shape of cams and mortars, the introduction of cast-steel shoes and dies, and of self-feeders, and also of improved guides, were the principal results. The stamp-battery still remains the most troublesome part of the mill plant. It is true that the battery of to-day is far superior to that of twenty years ago, not only in efficiency and durability, but in auxiliary appointments. The dusty chamber in front of the battery, where the pulp accumulated, and which had to be entered by a laborer to load a car, has given way to elegant conveyors and elevators, which remove the pulp continuously and take it to the roasting furnaces. Dust-chambers now connect with the battery-housing into which the dust, formerly escaping from every opening and settling upon machinery, is drawn by a suction-fan, to be regained, and finally mixed with the pulp before it enters the roasting furnaces. Machinery has also been perfected for the separate crushing and feeding of the salt, this being of advantage in some respects. The first decisive

Departure in Pulverizing Ores Dry

Was made by the introduction of Krom's rolls at the Bertrand mill, Nevada, in 1882. While rolls had been generally used for pulverizing ores for the purpose of concentration, it remained for Mr. Krom to construct rolls suitable for producing pulp for subsequent treatment by roasting and amalgamation or lixiviation. By providing the rolls with steel tires, running them at the high speed of 100 revolutions per minute, with pulleys only, and constructing them in a most substantial manner generally, he succeeded where others had failed. Leaving, for the moment, the purely economical question out of view, I will consider the phys-

ical difference which exists between pulp produced by each of the two machines. If pulp produced by rolls, or by stamps, is sifted through the same size of screen, the ore particles from the former are more uniform in size than those from the latter. The pulp from the rolls contains much less of such fine material which will pass, say, through a No. 100 wire screen, down to impalpable dust. Based upon experience in raw amalgamation, it was formerly assumed that the production of an impalpable powder was essential to success, even in case the ore had to be roasted before amalgamation. Hence it was the general practice to crush through a No. 80 or No. 60 screen in the older mills of Nevada. While this practice was gradually abandoned, and crushing through No. 40, and finally No. 30, screen was in most mills adopted, the subject was never fully investigated until recently. It has been found that for chloridizing roasting great fineness of the ore is entirely unnecessary, and that it is actually injurious in the amalgamation of roasted silver ores. Of course, the character of the ore has always to be taken into consideration. In the lixiviation process a large percentage of fine material interferes seriously with rapid filtration, and unnecessarily lengthens the time of working a charge. From this it follows that ore pulverized by rolls is mechanically in a more favorable condition than if stamps have been used. I now turn to

The Question of Economy.

A discussion of the subject which is complete and thorough, and compares the efficiency of rolls and stamps under varying conditions, is not possible at present, because the available statistics concerning rolls are confined to those from the Bertrand mill, Nevada. Prior to the introduction of Krom's rolls in this mill they were used in works only erected for the concentration of ores by Krom's dry system. Sufficient evidence, however, has accumulated to prove the superiority of the rolls beyond any doubt. Their introduction at the Mount Cory mill, Nevada, will soon bring additional proof. It seems to me that the application of rolls is most favorable in such cases in which the silver is extracted by lixiviation and the character of the ore permits comparatively coarse crushing without interfering with good roasting.

A Comparison Between Rolls and Stamps

Will be made from the following premises, for the correctness of which I must ask the indulgence of the reader. I assume that the crushing capacity of two sets of Krom's 26-inch rolls is equal to that of a 30 stamp battery with stamps of 850 pounds dropping from 7 inches to 8 inches 94 times per minute. Mr. Clark, superintendent of the Bertrand mill, states that he can crush, with two sets of rolls, 100 tons of ore in 24 hours to such a fineness that all will pass through a No. 16 screen, consuming not over four cords of wood for power. The ore has a quartz gangue and is by no means an easy crushing ore. The fuel required for running 30 stamps would be about six cords of wood in 24 hours, taking into consideration the construction of engine and boilers, and quality of wood. For some remote locality in the West the following prices are assumed, namely: Freight at three cents per pound; lumber at \$50 per thousand feet; wood at \$6 per cord; wages of carpenters at \$4.50 per diem, and of millwrights at \$6. Certain items of construction will be about equal, namely: Conveyors, elevators, revolving screens, and dust chambers. Revolving screens are also used in connection with a well-appointed battery in order to separate coarse material resulting from a breaking of battery screens. The building, however, for rolls will be much smaller than that for the battery, and a saving of not less than \$1,500 will be effected in its construction. Finally, the rolls requiring less power, a saving of at least \$1,250 will be made in providing and setting up engine and boilers in a mill with rolls.

Cost of Erecting a 30-Stamp Battery.

The plant, including hard-wood screen frames and guides, wooden pulleys on cam-shafts, Tulloch's feeders, and all necessary bolts, weighs 90,600 pounds, and costs in Chicago \$5,840, according to a statement from Messrs. Fraser & Chalmers. The framework takes about 36,000 feet of lumber, and the expense of setting up the battery is estimated at \$4,000. Hence the total cost of constructing a 30 stamp battery is:

Plant at foundry.....	\$5,850
Freight.....	2,718
Lumber.....	1,800
Cost of setting up.....	4,000
Total.....	\$14,368

To this has to be added, in order to compare with rolls:

Extra cost of building.....	\$1,500
Extra cost of engine and boilers.....	1,250
Total.....	\$17,118

Cost of Erecting Two Sets of Krom's 26-Inch Rolls.

The amount of lumber required for setting up the rolls alone is merely nominal. From this it follows also that the labor of placing the rolls must be trifling. The weight of one set of 26-inch rolls is 12,000 pounds, and the cost in New York, \$2,250. There is one self-feeder required, and its weight is estimated at 2,000 pounds; cost at \$200. From these figures I deduce the following:

Plant at foundry.....	\$4,700
Freight.....	750
Cost of setting up.....	700
Total.....	\$6,150

Difference in favor of rolls, \$10,938.

Wear and Tear of Stamps and Rolls.

In comparing the wear and tear of stamps and rolls we cannot very well express this item per ton of ore crushed, because the capacity of the pulverizing machinery is a function of the hardness of the ore and of the fineness of the pulp produced. A more correct method will be to take figures per running time of 24 hours. Making estimates from this standpoint, it is supposed that the wear and tear in running the machinery at full capacity is a nearly constant quantity, while the capacity is variable, as stated above. The wear of rolls is principally confined to the steel tires; that of the battery to a great number of parts. With rolls the steel tires can be consumed to within less than one-half inch of their thickness, while with stamps the shoes and dies have to be exchanged after only two-thirds, or less, of their weight has been worn, leaving other parts out of consideration. Another point should not be overlooked. The complicated construction of the battery causes considerable expense in skilled labor for repairs, which in the case of rolls is merely nominal. Advocates of the battery have argued that its great advantage is the continuance of its operation if one battery of five stamps gets out of order, while both sets of rolls, or three sets, as the case may be, have to be stopped if repairs are needed for one set. But it is just the solid construction of Krom's rolls which reduces stoppages from this cause to a minimum. How often it is necessary to hang up stamps for repairs is too well known to require any statistical proof.

Wear and Tear of Krom's Rolls.

As to statistics of wear of Krom's rolls, I am confined at present to those from the Bertrand mill. Mr. R. D. Clark states that two sets of steel tires have been worn out in crushing, in round figures, 20,000 tons of ore. As stated previously, the full capacity of the rolls is in 24 hours 100 tons, the ore being sifted through a No. 16 screen. In the beginning, however, the ore was crushed much finer, namely, so as to pass a No. 20 screen, and the daily capacity of the rolls was much less. Taking this into consideration, the actual wearing capacity of the tires cannot be estimated at less than 250 working days. The cost of wear is as follows: Two sets of steel tires cost at New York \$764, their weight being 3,264 pounds. With freight at three cents, the total cost of these steel tires is \$862.

Wear and tear of steel tires in 24 hours.....	\$3 45
Wear of other parts, screens, lubricants, and supplies.....	1 75
Wages for repairs.....	2 25
Total.....	\$8 45

Wear and Tear of Stamps.

I have been favored with statistics from three of the most prominent mills in the West, namely, the Manhattan, Nevada; the Ontario, Utah; and the Lexington, Montana. Taking into consideration the somewhat abnormal conditions of the Manhattan mill in so far as the weight of stamps there is 1,000 pounds, and the number of drops per minute greater than in either of the other mills, and that the statistics from the Lexington are those from the first year's run, where certain breakages are reduced to a minimum; finally, that freight in these localities, on account of direct railroad communications, is less than I have assumed in my premises, I arrive, by making such allowances, at the following figures for wear and tear of a 30-stamp battery per 24 hours running time:

Cost of all parts subjected to wear and breakage, screens, supplies, and lubricants.....	\$11 50
Wages for repairs.....	5 50
Total.....	\$17 00

Wear and tear of rolls.....	6 45
Difference in favor of rolls.....	\$10 55

Interest and Amortization.

In comparing the expense of running rolls and stamps interest and amortization on the excess of capital required in the original construction of the plant for stamps cannot be neglected. Considering the short life of most silver mines in this country, this item cannot be taken at a lower rate than 15 per cent per annum. If we take the running time of a mill at 350 days in the year, and consider that the mill with stamps will cost \$10,938 more than one with rolls, the interest and amortization amount to \$4.68 per day.

(Concluded next week.)

AN OAKLAND INDUSTRY.—The following editorial comment on an Oakland industry, owned by the Downie Boiler Incrustation Preventive Company, appeared a few days in the New York Sun: "It is stated that the recently patented process for the manufacture of a gum of the eucalyptus globulus, which has the effect of thoroughly removing the scales which form on steam engine boilers and preventing rust and pitting, has created a largely increased demand for it, both in this country and in Europe. The effect of this preparation in thus preventing the pitting and corrosion of boilers will, it is expected, extend the period of their usefulness 100 or 150 per cent, and at the same time insure a very considerable saving in fuel, as scale is a non-conductor of heat. The distillation of essential oils from the leaves of this tree is another branch of industry." The factory of the company is located at East Oakland, and is now turning out 1,500 gallons of their extract of eucalyptus every day.—Oakland Tribune.

PRESIDENT CLEVELAND will go to the woods of Northern New York for a six weeks' vacation early in August.

El Dorado County Notes.

[From our Traveling Representative.]

El Dorado county is Democratic now. Georgetown is not as lively as it used to be. The water supply is not so large this season as last.

Grizzly Flat mines are doing some considerable work.

Mining about Placerville is not causing much excitement.

Work on mines about Spanish Flat is progressing slowly.

A small force of men are at work on the French claim at Greenwood.

There is talk of starting up the old Taylor mine; also the St. Lawrence, near Johnstown.

Mining about Georgia's Slide is quite active, and in a number of instances is paying handsomely.

The California Water Company are working a number of mines on different parts of the Georgetown divide.

D. Blair, at Green Valley, is opening up a good property. He has a stamp mill on the ground and is doing finely.

A. J. Morrell has put a force of men on the Morrell extension of the celebrated Cedarburg mine on the American canyon, near Greenwood.

Bucknam Brothers, of Spanish Dry Diggings, have bought the Cherokee Flat mine and are working a night and day shift in the drifts. This mine has been very rich in days gone by.

The Slager, one of the richest quartz mines on the middle fork, near Spanish Dry Diggings, is lying idle. Capital and push could have opened up a bonanza in the Slager, as few ledges made the showing this one did for the work done on it.

The small number of men engaged in mining in this county this season is accounted for from the fact that last year nearly all the Democratic voters were mining; this year they are nearly all in office; hence the few Republicans are doing the work this year.

A New York company are working the Gopher and Boulder near Kelsey. They have a 20-stamp water-power mill and are running night and day. The mine was not in shape to be seen by a mining newspaper correspondent at the time of the Press representative's visit.

F. R. J. Dixon is still working the Revenge, mine, near Greenwood. This mine has paid steadily for more than a year past and has given the district a name for stability that will result in opening up more good properties. The mines on the middle fork of the American are idle, with few exceptions.

Vice-President J. P. Hopkins, of the Aultman mine, formerly the Argonaut, near Greenwood, is East making arrangements to properly open up that excellent property. The mine was purchased from Smith brothers a few years ago for \$50,000. Few mines have the showing in the way of a great ore body that this mine has. While the ore is of a low grade, yet it is in such immense quantities as to prove even more desirable than "pocket" or gash veins of high grade ore in chimneys or chutes. There is an abundance of sulphurets in the quartz, so much so that concentration would pay handsomely. It is seldom in the history of a mine with the showing made by this one that so little work has been done by the purchasers. This is accounted for on account of the death of one of the principal owners, and as soon as his estate is settled up in all probability the mine will either be sold or worked. A mine with less than one-half the showing in New Mexico or Arizona would be developed at once and as extensively as men and money could push it, and as long as it continued to make such a business-like showing as the Argonaut does at its stunts do today.

An inspection of the Lovejoy mine, near Pilot Hill, leads an ardent mining man to believe that "familiarity breeds contempt." The owners of this mine, T. T. Lovejoy and Major John Smith, have owned rich mines (Smith sold the Argonaut not long ago for \$50,000), or they would not let the Lovejoy lie idle after the output of nearly \$600 in less than 30 feet of development. The mine was discovered on the dividing ridge between the middle and south forks of the American river. It is a quartz ledge running nearly with the dividing ridge, only that it crosses through the hill and crops out upon the slope of both sides. The hill system below this ridge on both sides has been very rich, and of the same character of gold as that taken out of this mine. This vein is undoubtedly the source of the supply. The ground on which the discovery was made was patented years ago as agricultural land, and in consequence has not been get-at-able by the prospector. Waste water from a ditch uncovered the ledge, and the discovery of the mine was owing to Lovejoy's having a week's time on his hands that could not be put in at ranch work. Not being a mining man, he gophered on the surface for pasture, and the result was a good mine. The owners have been offered several thousand for the mine. It is a shame that such a prospect should stand idle while money and time is being foolishly spent every day on claims that are actually good for nothing. Major John Smith, of Greenwood, has the management of the mine, and as a recent runaway has seriously injured him he will probably dispose of it to some one who will open it up as it deserves to be developed. F. W. S.

The Vacaville Judicium says that the negroes recently brought from Kentucky have given entire satisfaction. More will be sent, for by the ranchers.

USEFUL INFORMATION.

The Four Largest Incomes.

If the value of a man's property is to be estimated by his annual income, Mr. Mackey, of the California Bonanza firm, is by far the richest man in the world. His income exceeds that of Vanderbilt in the proportion of 25 to 18. The following are the estimated incomes of the four men who are reputed to be the richest in the world:

	Duke of Westminster.	Vanderbilt.
Capital.....	\$80,000,000	175,000,000
Per year.....	4,000,000	7,500,000
Per month.....	300,000	676,000
Per day.....	10,000	15,000
Per minute.....	7	18
	Rothschilds.	Mackey.
Capital.....	\$200,000,000	275,000,000
Per year.....	10,000,000	13,750,000
Per month.....	850,000	1,000,000
Per day.....	25,000	35,000
Per hour.....	1,000	1,500
Per minute.....	20	25

NATURAL SOAP.—The discovery of mineral substances which answer quite well for many of the purposes to which soap is applied are becoming quite common—so much so that the discovery of a "soap mine" is not now considered quite so much of a myth as formerly. The latest discovery of this character is described as follows: "There is said to be a vast deposit of natural soap near Corning, Ohio. As the story runs, a party of hunters in the 'Big Woods' built a fire against a precipice of rocks for the purpose of preparing a meal. The heat split off a large fragment of solid stone and to their surprise a slippery substance of a dirty yellowish color began to run from little perforations on the face of the rock. This substance had a consistency similar to that of molasses in cold weather. After gathering a quantity of the stuff the discoverers managed to stop the outflow. Samples are said to have been sent to leading chemists throughout the country, who, with one accord, pronounce it nearly a pure article of soap. Scientists suggest that this deposit is owing to a combination of lakes of potash and rivers of essential oils within the subterranean caverns underlying the great coal measures of Southern Ohio. The story sounds like one of Munchausen's tales, yet it is said that a company with a capital of \$200,000 is being formed to work this natural soap mine."

PYROTECHNICS.—Not many people of those who have witnessed during pyrotechnic displays the hursting of those wonderful bombs which send out showers of gold and parti-colored stars have any idea how they are made and fired. The principle is the same as the military shell, the case being made of paper instead of heavy metal. Two hollow hemispheres are charged with innumerable conical-shaped stars made from compressed coloring matter, and when the halves are joined together and paper sealed they are thrown from a mortar. Unless the stars are very carefully arranged they are apt to detonate by the force of the powder exploded in the mortar. The distance to be traveled by a shell before the stars shall break is regulated with a fuse running 4, 5, 10, 15 or 20 seconds. This fuse, which is a necessary adjunct to all fancy fireworks, is a simple contrivance. It is made by soaking ordinary cotton wick in a compound of meal powder, gum arabic, alcohol and water, and is very combustible. At the moment the shell leaves the mortar the fuse ignites and is gradually consumed until the flame reaches an interior cavity of the shell holding a charge of powder. Instant explosion ensues, the shell breaks with a loud report and sheds the hursting stars in a perfect shower of beautiful colors.

THE GREAT EASTERN AND NOAH'S ARK.—Somebody is comparing the size and cost of the Great Eastern and Noah's Ark. The cost of building and launching the Great Eastern was \$3,650,000, and this broke the original company. A new company was formed, which spent \$600,000 in fitting and furnishing her. Then this company failed and a new company was organized with a capital of \$500,000. At the close of 1880 this company sunk £26,715 upon the vessel, thus making her total cost \$4,703,575. Nothing ever built can stand comparison with the Great Eastern except Noah's Ark, and even this vessel could not match her. The length of the Ark was 300 cubits, her breadth 50 cubits, and her height 30 cubits. The cubit of the Scriptures, according to Bishop Wilkins, was 21 65-100 inches, and computed into English measurement the Ark was 547 feet long, 91 feet beam, 54 7-10 feet depth and 21,762 tons. The Great Eastern is 680 feet long, 83 feet beam, 56 feet depth and 23,093 tons measurement. So Noah's Ark is quite overshadowed by the Great Eastern.

ENGLISH ELM.—For English carriages elm is largely used. It is found in the hedge-rows of most of the counties and many of the avenues of the parks of the United Kingdom. It also occupies a wide range over Europe, preferring, generally, low lying ground with a moderate degree of moisture, but it thrives well in every variety of soil. In English elm the wood is brown in color, of moderate weight, hard, tough, porous, and sometimes much twisted in grain, which makes it difficult to work. Elm, if used either where constantly wet, or in any situation where it is perfectly dry, excels almost any other wood in durability, but otherwise it decays rapidly. For elm is felled it

should be converted as soon as possible, for if exposed to the weather it becomes doated and much inferior in quality to its natural state. The elm principally used in carriage building is known as the common elm, and is a fairly reliable timber, having very little heart, cup or star-shake, and when grown in a rich, soft ground, it is very suitable for boot-sides, toe-boards, rockers, etc., but it is not good for bottoms, through constant damp rotting it, the bottoms of boots being very apt to decay, also through want of ventilation. The sap of elm is from two inches to three inches thick, and is considered as durable as the heart, so that all parts can be used with safety.

CHINESE BANDOLINE.—Pau-fa or the "Chinese shavings," which the ladies now use so much in dressing their hair is composed of real shavings taken from a species of elm, something similar to our "slippery elm," fragments of which, soaked in warm water one night, produce a vegetable mucilage or bandoline as useful for dressing, curling, and crimping the hair of the Chinese beauty as is the quince seed oil to-day here.

VISITING CARDS.—The significance of the different ways in which visiting cards are turned up is given as follows: "Turning the upper right corner of a card implies a visit; turning the upper left corner, congratulations; turning the lower left corner, condolence; turning the entire left end, a call on the family."

BICYCLES.—The manufacture of racing bicycles involves very nice manipulation, and hitherto English mechanics have stood unrivalled in this branch. Some machines of this kind, however, recently produced at Chicopee, Massachusetts, are said to rival anything of the kind made over here.

A NEW INDUSTRY has sprung up in Uruapan, Mexico. The famous coffee of that region is now put up in bottles, in the form of an extract, which is shipped to all parts of Mexico, and an effort is being made to introduce it into the United States.

VARNISHES AND PAINTS.—All varnishes crack from the surface and all paints crack from the underside. The presence of ammonia in the atmosphere is the greatest enemy to varnish, as it weakens the cohesion between the oil and the gum.

MILES OF PIPE.—It is estimated that not less than sixteen miles of tubes were taken out of the U. S. steamer *Florida*, which was lately broken up at the New York Navy Yard.

TO REMOVE VARNISH without injuring paint, brush on spirits of ammonia or hartshorn, which soon softens the oil, allowing of its being rubbed off easily.

GOOD HEALTH.

The "Work" in Going Upstairs.

Many persons complain of the fatigue of mounting long flights of steps and feel that they are failing before their time. There need be no anxiety on this score. Going upstairs is simply performing so much work in a given time. Mr. G. Farmer, who has investigated this subject, says: "Just for curiosity I sent my assistant, who weighed 152 pounds, to climb the stairs at the Forty-second street station, to note the time in seconds which was required to climb them leisurely. He counted the stairs, 36, and it took him 34 seconds to climb them. The rise of each step was 8 inches; total rise, 8 x 36 = 288 inches = 24 feet. Now, his weight, 152 pounds, multiplied by the total rise, 288 inches = 43,776 inch pounds = 3,648 foot-pounds of work done in 34 seconds. Now 1 horsepower does 550 foot-pounds in one second, and in 34 seconds will do 34 x 550 = 18,750 foot-pounds; now divide 3,648 by 18,750, and we get 195, almost one-fifth of a horse-power, which this young man exerted while he was climbing these stairs leisurely. He said he usually went up two steps at a time when in haste. Now let us compare this work with that done ordinarily while walking on level ground. His average step when walking rapidly would be not far from 26 inches, and the distance from the ground to the thigh-joint would be not far from 33 inches; thus at every step he lifts his center of gravity 2 1/2 inches—all, or nearly all, his weight above the knees will be raised 2 1/2 inches at every step. Assume that 130 pounds would be lifted 2 1/2 inches at every step, this would equal 341 inch-pounds per step. Now, divide 43,776 by 341, and we get 128.4 steps, which, multiplied by 26 inches, gives us 3,338.4 inches = 278.15 feet as the distance he would have to travel in 34 seconds to do work equivalent to climbing those stairs.

287.2 x 3,600
34 x 5.280
This is = 5.58 miles per hour, which I think is an under-estimate. How few invalids—ay, how few tired persons could maintain this pace even for half a minute without great fatigue!"—*Exchange*.

POISONED BY FLIES.—A bald-headed man in Louisville was recently much annoyed by large numbers of the common house-fly that settled on his head and prevented his taking any rest or comfort in life. The number increased to a swarm, and he was compelled to seek the shel-

ter of his room. As he left the porch where he had been seated, several of the insects settled on his forehead, and before they could be knocked off had bitten him in several places. In a few hours the places began to swell and became inflamed, until one of his eyes was closed. He suffered much pain from the bites, and continued to grow worse, until it was feared that his blood had become poisoned from some matter possibly contributed to his system through the medium of the proboscis of the insects. What should induce them to so persistently follow him is unknown. Some apprehensions are felt as to the ultimate recovery of the gentleman, who is about 70 years old.

WHOOPING COUGH.—Dr. C. R. Hingsworth writes in *The Lancet*: "I have found a popular remedy very efficacious in the treatment of whooping cough. I refer to picked oakum, worn by the patient either round the neck in muslin or on the chest as a pad stitched to the underclothing. Locally I apply the glycerine of tannic acid with a laryngeal brush two or three times a day, and internally I prescribe one, two or three grain doses of chloral, one, two or three minims of belladonna, one grain of alum and one minim of carbolic acid, in syrup every two or three hours. A liniment of turpentine, acetic acid and yolk of egg is an excellent application for the chest, back and neck, night and morning, with the liniment of belladonna added in the proportion of 1 to 7. In children of two years or more, I have applied carbolic acid and glycerine, in the proportion of 1 to 15, to the larynx with success, each application checking a paroxysm at once. With the above mentioned treatment I cure the worst cases in from 7 to 10 days."

CURE FOR BILIOUSNESS.—The way to get the better of the bilious system without blue pills or quinine is to take the juice of one, two or three lemons, as appetite craves, in as much water as makes it pleasant to drink without sugar before going to bed. In the morning, on rising, at least half an hour before breakfast, take the juice of one lemon in a goblet of water. This will clear the system of humor and bile with efficiency, without any of the weakening effects of calomel. People should not irritate the stomach by eating lemons clear; the powerful acid of the juice, which is always most corrosive, invariably produces inflammation after a while, but properly diluted, so that it does not burn or draw the throat, it does its medical work without harm, and, when the stomach is clear of food, has abundant opportunity to work over the system thoroughly.—*Medical News*.

CAUSE OF BRIGHT'S DISEASE.—The latest theory concerning Bright's disease and other affections of the kidneys is that they are due to immoderate use of ice water and other chilled beverages. Thirty or forty years ago, a physician asserts, when people slaked their thirst with fresh water from well or pump, kidney disease was virtually known. Now, however, the general use of ice in every household and saloon and the multiplication of soda fountains, cause thousands of persons to abruptly shock their heated internal organs with freezing draughts, and kidney troubles have become very prevalent.

DISINFECTANTS.—It is often asked what is the best disinfectant for a cesspool? Two pounds of copperas, or sulphate of iron, dissolved in a pail of water, will greatly assist in purifying a privy or cesspool. A pound of nitrate of lead dissolved in the same way is excellent for sinks, drains or vaults. Chloride of lime is also effectual, or a layer of charcoal dust will prevent offensive odors arising from any decomposing substance. The quantity of these substances will depend upon the amount of filth to be deodorized, and the length of time during which they will be effectual will depend upon local conditions.

HEALTH, like success in life, says the *Herald of Health*, is to be gained by paying attention to details. It is better to try to keep from catching cold than to be always trying to avoid infection. More can be done to check cholera by keeping houses clean than by using disinfectants. Nature gives health. It is man's perversity in departing from Nature's teachings that leads to disease. Nature intended all to have fresh air, sufficient plain food, uncontaminated water, and exercise. Let us accept Nature's bequest if we prefer health to disease.

SUNSTROKE.—In cases of heat or sunstroke lay the person in a cool, shady place. Loosen his clothing. Let the bystanders rub the arms and legs with pieces of ice wrapped in towels until the excessive heat of surface is allayed. Give twenty drops of aromatic spirits of hartshorn in a little water every twenty minutes or half hour. No effort to rise or walk should be allowed till the patient is quite restored. Hartshorn is said to be better than brandy in cases of sunstroke.

A WARNING TO DRINKERS.—*Le Journal d'Hygiene* publishes a comparative table of the probabilities of life for moderate drinkers and total abstainers. According to this, a moderate drinker at twenty years of age may expect to live 15.6 years; at thirty, 13; at forty, 11.6; at fifty, 10.8; at 60, 8.9. The probabilities for total abstainers are: At twenty years, 44.2; at thirty, 36.5; at forty, 28.8; at fifty, 21.23, and at sixty, 15.285.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ABOUT SUTTER CREEK.—*Ledger*, July 25: The Mahoney mine has shut down for want of water. The superintendent will try and induce the company to erect steam power, so as to keep the pumps going independent of water supply. Whether this will be done remains to be seen, but the prevailing belief is that the mine is practically abandoned, so far as the present owners are concerned. Drifting in the Eureka is making rapid progress. Four hundred feet having been reached, without any noticeable change. The formation is slate, considered a good indication. The Lincoln mill started up a few days ago, with the prospect of a long run, as there is considerable ore on the dump.

GENERAL.—J. A. Steinberger and F. B. Latham have made a thorough examination of the Amador Con. mine and it is thought that drifting will be continued.

OTHER LOCALITIES.—At the Wadley mine five miles above Volcano, shaft now down 160 feet proceeds with good prospects. The ledge, three feet wide, shows at the rate of \$47 per ton. It is a remarkable feature of this mine, that the ore frequently shows native silver and free gold close together, and visible to the naked eye. A tunnel is to be run into the St. Julian mine to tap the ore body below the point in the shaft where operations were suspended on account of water. Bids were received last Monday for running 160 feet of this tunnel, the first 100 feet will be merely an open cut. At the Kittredge, two and a half miles west of Jackson, three men are employed in prospecting. The face of the tunnel shows a ledge from four to five feet wide, the ore to all appearance being of good quality. There is a two-stamp mill on the ground, but it cannot be started on account of lack of water. The Oneida Mining Company, are negotiating for the mining claim lately discovered near Pine Grove. There is a large and rich ledge in sight, justifying the sanguine expectations indulged in of a big mine being developed. At the Lighthouse mine near Butte City, owned by W. E. Stewart, operations were resumed last Monday. Four men are at work running a tunnel at a point much lower down the gulch. This tunnel will be 400 feet long.

Butte.

HYDRAULIC MINING ON BUTTE CREEK.—*Record*, July 25: John Adams brought to Chico \$3,000 taken from his hydraulic claim at Centerville, 12 miles from town. This has been done without damage to the farmers below. Mr. Lusk agent of Senator Stanford, and Mr. Goodspeed, agent of Judge Pratt, large landholders along the creek, visited the Hupp and other mines, and found nothing to call for an injunction to stop the work of mining. The gold has been taken out in a legitimate and proper manner. We are glad to chronicle the success of the mines on Butte creek, and hope they may send down a like amount weekly until the rainy season closes them out.

Calaveras.

ANGEL'S CAMP.—*Al. Echo*, July 22: Quite a large amount of machinery has already been received by the Angels Mining Co. This company evidently means business. The Stanislaus River Mining Co. has commenced bar mining at Reynolds' Ferry with a force of 18 men. A substantial dam is being put in, which will shortly be completed.

Inyo.

KRAMER CAMP.—*Independent*, July 25: Reports from this locality, in San Bernardino county, are less favorable. Kramer is 40 miles from Mojave, in the midst of the desert, and four miles from the railroad. The water used is brought on the railroad. But four or five persons are now at the camp. The ledges are large and straight, with nearly east and west course, slightly north dip, but almost perpendicular. The prospects run, by the horn spoon process, from \$10 to \$50 to the ton. These figures, however, are the extremes. Buyers of ore charge \$5 per ton for sampling, \$14 for working, \$18 for shipping and then discount the product \$8 per ton. So you see there is worse than nothing left for the poor miner, and Kramer, with its 25 ledges and probably 50 or more valuable mines, must lie idle and 1,000 men out of employment until her rich ores can be milled at a profit.

PINE MOUNTAIN.—A pack train is now at work getting out ore from Pine Mountain to be shipped to Nisby & Co., San Francisco. A large amount of ore is in sight in several claims. The Pine Mountain district would be a first rate field for the concentrating process introduced at the Maxim mill; there are great quantities of ore that are just too low grade to bear the cost of packing, but that would pay well to concentrate. The country is favorable for mining operations, and has an abundance of wood and water.

MODOCK MINE.—Superintendent writes July 14th: I start the furnace on the 25th inst. Ore on hand, 228,000 pounds. Would start to-morrow if I had enough of men to run. Am working six men (in South Lookout) on ore. Average car samples 83 ozs. silver, \$17.21 gold per ton. Total number of miners employed, eight.

REPORTED STRIKE.—*Register*, July 22d: It is reported that A. L. Cain and David Norrie have found and located the cement gold deposit discovered some 20 years ago, but never prospected, as the Indians were hostile and shot the locators. Since then scores of miners have hunted for it, but it has been left for Al. Cain to capture the prize, if it is the veritable deposit, of which there is little doubt. Mr. Cain was put on the track of it through information obtained from an Indian, and he was accompanied by Mr. Norrie, who possesses a mineral divining rod, which located the richest spot, some 90 feet square. At a depth of 15 feet they struck the rich cement, specimens of which show nearly half gold, and will assay about \$60,000 to the ton. Two locations have been made, the Cain and Found at Last, and duly recorded in the County Recorder's office. This find is in Mono county, about two miles from the old Mammoth mill in the Mammoth district, and if it is only half as good as represented it is the biggest thing out of doors.

THE DARK HORSE.—Across the river is a gold bearing ledge and situated pretty well up on the mountain, in the vicinity of the Plute mine, and some five miles distant from the railroad. A great deal of prospecting work has been done at intervals along the ledge for a distance of 2,700 feet; a fair, uniform prospect of free gold is obtainable in every shaft and tunnel, and generally throughout all the ore. The ledge is a monster in size; at 82 feet in depth, and all the way down, the ore body measures 16 feet wide. It is asserted that not a hornful of it but will yield a fair color. Tunnels have been run at this depth from 30 to 50 feet, ore nor conditions showing no material change. If any of it will pay, all of it will. It can be mined for a mere trifle, as a single shot in a stope will loosen tons of it. It prospects well all the time, but its working value, mill process, has never been tried. The location is such that the ore has to be packed, else expensive wagon roads built, three or four miles long. By means of a three mile ditch a sufficiency of water for milling and contingent purposes can be brought quite near the mine.

Mariposa.

THE DILTZ MINE.—*Gazette*, July 25: This mine has lately been timbered up and the car tunnel put in shape. There is a great body of milling ore now in sight, and it will take years to find out its extent; besides there are plenty of sulphurets which assay away up.

NEW ENTERPRISE.—M. Hulings, owner of extensive mining property at Hornitos, is going to run a narrow gauge railroad from there to the Merced river, six miles distant. A large mill to be run by water is to be erected on the river and other improvements carried out that will require a large outlay of capital. The cost of milling the rock at the new works will be very small and ores of all grades at Hornitos will pay. The enterprise will surely be put through this season.

Mono.

BENTON ITEMS.—*Correspondent Bodie Paper*: Half a dozen ledges or more are being opened with good prospects in this vicinity. On the eastern side of the hill, on the Borasca, some 12 men are steadily employed, taking out ore and prospecting for new developments. The mine is well ventilated by means of a furnace at the mouth of the tunnel, with air pipes running to the working parts. The furnace draws out the foul air through the pipes, leaving the fresh air to flow in through the tunnel.

Passing along by the Alabama, we cross over to Alex. McKeever's, who is opening up the Black Bess ledge by a new tunnel. Higher up, Mike Harrington is working the Comet ledge with good prospects. One or two tons of ore worked at Miller's mill some time ago, milled over \$800 per ton. Tom Walker is working part of the mine on lease and is taking out good ore. Further south, near the old Peterson mine, Herman Konrad has opened up two or three ledges this last year, and has taken good ore out of each. Since the mill closed down, times appear rather quiet in town.

Nevada.

LOOKING FOR MINES.—*Transcript*, July 25: Several more mining men have arrived here in search of good quartz mining property. There are about a dozen or fifteen experts here examining several properties hereabouts. It is said that several sales have been made and will be made public in a few days. Nevada county quartz mines are now attracting more attention than ever before. For meritorious mines this section is unequalled.

THE DERREC drift mine is looking splendid, and some good sized nuggets are being found almost daily. The rumor that it was soon to be closed down was unfounded. Some men who were employed in the tunnel were discharged, which gave cause for the rumor. The upper part of the mine, where most of the work is being done, never looked better than now.

THE CROWN POINT MINE, situated at the head of Hill's Flat, half a mile from Grass Valley, is one of the most promising properties in that district. It is owned by A. Gauthier. The shaft is down 880 feet and shows a ledge from 2½ to 3 feet thick. The ore averages \$12 a ton. It has been crushed in a custom mill at a cost of \$50 a ton, including the hauling, thus leaving a liberal balance to cover the cost of mining and declare dividends from. The hoisting and pumping machinery is run by an overshot wheel, 34 feet in diameter. A ten stamp mill has just been erected, and will start next Monday. The overshot wheel will give sufficient power for all the machinery on the mine.

WILL BEAR WATCHING.—The old hydraulic mining spies in the upper part of this county have been superseded by a new crowd. The people up there should renew their watchfulness and keep their homes and barns securely bolted day and night. If the meeting about to be held up there should adopt resolutions giving some of these worthless notice to leave, it would not be surprising.

NEW VENTURE.—*Grass Valley Union*, July 24: The King's Hill and Phoenix locations have been consolidated, and work is now to be entered upon, the machinery of the Imperial mine on Deer Creek now being used upon it. The new company has been incorporated with a capital stock of \$250,000 and \$50,000 shares, 41,200 of which have been taken.

Plumas.

THE ALTOONA.—*Greenview Bulletin*, July 22: During the past two weeks, the Kettle mill has been running on ore from this mine. After crushing 208 tons, a "clean up" was made, proving that the Altoona produces good paying ore. Work on the vein continues. Another run will be made as soon as a sufficient quantity of ore can be extracted.

Placer.

THE BIG OAK TREE MINE.—*Herald* July 25: Near Colfax a parallel ledge to the Rising Sun is beginning to attract considerable attention. The main shaft is down more than 100 feet, steam hoisting and pumping works have been put up, and the prospects heretofore, as well as the ore now coming to the surface, all indicate a good mine. The May Flower mine at Forest Hill is keeping up its lick. On the 18th 28½ pounds of gold were cleaned up from the riffles that escaped from the battery during the week. The week ending July 11th no less than 42½ pounds were cleaned up from the same source. Last Tuesday Superintendent Chappell shipped to San Francisco 41 pounds of bullion, the product of the batteries for two weeks. The yield of the

mine in June was \$52,000. Later—\$10,000 is reported as having been taken out in one night this week. An encouraging development has been made in the Succor Flat drift mine near Iowa Hill. There is talk of the Belmont mine near Ophir being started up again soon. The same of the Julian mine at Jenny Lind Flat.

Sierra.

THE BEST YET.—*Tribune*, July 25: The extension clean up last week was 203 ounces. This is the largest yield for any one week's work yet done in the South Fork ground.

WILL ENLARGE THE MILL.—The Alaska mine, at Pike City, is in full blast and paying well. It is the intention of the Company to add twenty more stamps this summer to the twenty already in operation at the mill. They have already commenced grading for that purpose.

WHAT IS NEEDED.—A vast amount of prospecting is being done all over Sierra county, by people who live and have their homes here. We have no fault to find with the work that the present population is doing. As a whole they are most nobly carrying on the brave work of developing the inexhaustible resources of the county. But, on the other hand, the welfare of our county does demand that capital seeking investment in mines should not be allowed to pass us by and go to other fields possessing not one-half the merit of this, the banner county of the State.

MISCELLANEOUS.—Work on the Marguerite mine will start up about the first of August; the property is looking fine. The quartz mining industry about Downieville is improving every day. It is now on a solid basis, and investments in that line are regarded as safe as in any other class of business. Dr. Holdsworth was down from Milton this week. He had some specimens of rock which were covered with coarse gold. One of the pieces, he said, came from a ledge fifteen feet wide. The old gentleman says the country up that way is actually alive with rich gold-bearing quartz lodes, and he can't understand why it is that people who have means to invest in mining enterprises don't come up there and investigate so promising a field.

ALL SOLD.—The 100,000 shares of stock, reserved as a working capital by the Young American Mining Co. have been sold to the last share. The principal portion was disposed of in San Francisco at forty and fifty cents per share—the latter price having been obtained for most of it. The buyers of the stock will probably find before many weeks roll around that they have made a lucky deal, as the shares of that mine are quite likely to double up in value at a lively rate as soon as the mill gets to crushing the rich ore lying around up there. This will yet prove one of the big mines of the State.

San Bernardino.

STILL ACTIVE.—*Calico Print*, July 26: It is a fact that there are more mines being worked to-day in Calico and more chlorides at work on leases than there ever was before and yet there are men foolish enough to make the assertion that the bottom is knocked out. Last Wednesday Milo Page, his brother Thurlow, and the latter's wife and children, and Frank Suiter, left for the gold mines in Butte valley, where these gentlemen will resume operations on the mines opened up there. Their prospects are good, and it is hoped before many months a lively camp will be started up there. Reports continue favorable from all parts of the mines especially so from the Providence district where the Bonanza King Company are doing remarkably well. The new mill of the Calico mining and reduction company is running successfully, \$10,000 having been produced since it started on the 6th inst. The product of all the mines in the district for the month ending on the 20th inst., is estimated at \$113,000 in silver bullion.

Shasta.

LOOKING FOR MINES.—*Democrat*, July 22: For the past ten days Redding has been full of mining men looking for investments in the county. Among others is Mr. Minear, an old Comstock miner.

THE SCHEARER MINE on Salt creek continues to hold out as depth is attained. The vein is better defined than ever, and still yields rich tellurium. Mr. Schearer has returned from Denver. He tells us that the ore he took with him is pronounced to be the richest ever treated at the Argo smelting works. The first grade yields nearly \$35,000 and the second grade a little over \$4,000. The best yields 78½ ounces of silver. Mr. A. P. Waugh has made a location across the river opposite, but a little east of his ferry, which is thought to be an extension of the Schearer tellurium mine.

OTHER MINES.—A San Francisco company has bonded the Northern Light mine, and is to commence work prospecting it soon. This mine has always had the reputation of being good property. Last week the new Winthrop company, while exploring the mine, struck a large body of the richest ore ever found in Copper City, considerable of which assays way up in the hundreds.

UGHT TO GET THE MONEY.—Mr. Loveridge, superintendent of the Oregon gulch hydraulic mine near Junction City, Trinity county, passed through Redding yesterday morning, on his way to San Francisco, to try and negotiate a loan on the property to raise money with which to build 20 miles of ditch to bring water on to the mine. This is said to be the best property of the kind in the northern part of the State. It embodies nearly 500 acres of gravel on the divide between Weaver Basin and Junction City. It pays from the grass roots down to bed-rock, and much of the gravel bank is 200 feet in depth. For the past three years, on account of the scarcity of water, the company has only been able to get the property well opened for extensive work. Surveys for the proposed ditch have been made, and all necessary data as to cost, etc., has been obtained. It is estimated that the ditch when completed will furnish an average supply nine months in the year of 2,500 inches, and will cost \$160,000.

AT LOWER SODA SPRINGS Hersburger, Carpenter & Co. have sunk 52 feet on their quartz ledge, and commenced tunneling to tap 250 deep. They are in 25 feet and expect to have the tunnel completed in about four months. Their ledge is a true fissure, and promises to pay.

Siskiyou.

CALLAHAN'S.—*Yreka Union*, July 23: The town is supported mainly by the mining and agricultural industries, but derives revenue from other sources,

The country surrounding will admit of much prospecting for mineral wealth, more so, perhaps, than any other portion of the country, for the reason that the footsteps of the prospector have not been directed this way of late years. The developed mines have paid well, and will continue to do so for many years to come. The Montezuma, a mine which has yielded several fortunes in its time, closed for the season several weeks ago, and the clean-up, as usual, was entirely satisfactory. Most mining operations in this vicinity are over for the season, which has been a short one. Along the Klamath nearly all the hydraulic miners are still running, having plenty of water and taking out big money.

Trinity.

NEW RIVER.—*Journal*, July 25: A party recently from New River expresses the utmost confidence in their richness and extent, and is firm in the belief that intelligent prospecting and practical work will develop a number of good mines in the district. After the boom it was only to be expected that everything there would be dull, but the bed-rock having been reached a reaction will soon set in and New River gradually work its way upon its merits.

NUGGETS FROM COFFEE CREEK.—Rumfelt & Co. who are drifting on the east fork of Coffee Creek, are taking out much coarse gold, and recently secured a piece which weighed \$280. It was round and smooth, about the size of a fore-finger and shaped like a rolling-pin. They expect to find plenty more large pieces.

QUARTZ MINES.—The McDonald mine at Deadwood is yielding right along regularly from \$80 to \$140 per ton. Every ten days they clean up from \$10,000 to \$12,000.

BULLYCHOOP.—The Potts & Foster wagon road has been completed to the Eureka mill site; this has gone to San Francisco to purchase a Huntington quartz mill; Stevens & Smith are erecting a hotel at Bullychoop; and the district is generally prosperous.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, July 27: The deep winze below the 3,000 level is down about 40 feet, and still in good ore. The hoisting machinery in the chamber at the head of the winze works very effectively, and, consequently, good progress is made in sinking. Water does not interfere, as the ore vein seems to exist in a comparatively dry section of the great ore channel. Water has been tapped to the east and the west of it, but not in the ore vein itself. Thus it is that the lateral drift north, being run from crosscut No. 2, makes steady and safe advancement, and will doubtless run through to the Savage mine without any trouble from water. It is skirting along the east side of the ore vein, and is an important drift. As before remarked, the simultaneous sinking of the Hale and Norcross deep winze, with its eastern dip, and the Combination shaft, vertical, brings them nearer and nearer together as depth is attained, and the all hopeful bonanza is corralled, so to speak, between the two, within circumscribed limits, unless it lies to the west of the winze, instead of to the east, as indicated at present. A car-track is to be constructed to run the ore from the Combination shaft around and across the ravine to the main track of the Virginia and Truckee railroad, near the Julia hoisting works, where a dump is to be constructed to receive it, for convenience in loading the regular ore cars of the railroad.

CON. CALIFORNIA AND VIRGINIA. The low stage of water in the Carson river having seriously interfered with milling facilities, the quantity of ore extracted from both the Jones contract section and the lower levels on company account is very much reduced, and quite a number of miners are drafted out of employment. The average assay of the ore shipped from the lower levels during the past week was \$20 per ton, and that from the Jones lease section \$16 per ton.

BELCHER.—The mining force being much reduced, the amount of ore extracted from the old upper workings is correspondingly reduced. Some very good old bonanza ore is reported to be developed in the lower depths above the water level—about the 1,700 and below. The Gold Hill mines may have to be pumped out yet.

SIERRA NEVADA.—The face of the main lateral drift north on the 520 level continues in vein porphyry, clay and quartz, the general appearance of the material being considered to be of a very favorable nature, indicating approaching proximity to possible ore developments in an interesting quarter.

CHOLLAR.—All the work on the 3,000 or lowest level continues suspended, pending the putting in of the additional hydraulic pump at the Combination shaft. Work is also suspended in the extraction of ore from the old surface workings of the mine by reason of the lack of milling facilities.

ALTA.—The upraise from the 900 level has passed above the 800 level, following the footwall of the ore vein. No ore is met with at present worth saving, but the explorations are being continued in the hope of eventually finding a paying ore body, of which there is good promise.

KENTUCK.—Extracting a reduced amount of low-grade ore from the old upper workings, sufficient to keep the Rock Point mill, on the Carson river, running to about half its full capacity.

BULLION.—The main drift west on the 160 level is now in 145 feet and the face is in porphyry, quartz and clay. Water interferes but little, and the main ore vein is evidently not far away.

MEXICAN.—The joint Ophir and Mexican crosscut east on the 500 level is progressing well, and the upraise from that level in the Ophir mine is making about 25 feet per week.

BEST AND BELCHER.—Crosscut No. 1, west, about 100 feet north of the old Consolidated Virginia line, made about 50 feet last week, and is running in very favorable formation.

GOULD AND CURRY.—Crosscut No. 1, east, at the north line of the Savage mine, on the 1,000 level, is now in or out about 330 feet, with no features of interest to note.

MONTE CRISTO.—No work is being done in the mine at present. A contract has been let to sink a shaft 200 feet further east.

JUSTICE.—The drift southeast to intercept the

vein formation in that portion of the mine is making good progress.

UNION CONSOLIDATED.—The main drift north on the 500 level is progressing well in favorable working ground.

Columbus District.

MOUNT DIAHLO.—*True Future*, July 25: In accordance with an order received from the San Francisco office of the company to clean up all ore at the mill by July 31st, and close the mine at that date, the force has been reduced, and the men remaining, who are now putting the mine in shape—cleaning out the chutes, etc., will be discharged as soon as possible and the mine closed down. A bullion shipment of \$14,347.73 was made July 16th.

Osoeola District.

GOOD GOLD ORE.—*Hard Reflex*, July 27: Eleven tons of gold bearing quartz were lately put through the five-stamp mill from Boone Tilford's claim that went \$94 to the ton, also five tons from the same claim that went \$35 to the ton. Work has been commenced on Capt. Akie's ore. Pat Keavy will also have some ore worked.

Paradise District.

WORK PROGRESSING.—*Silver State*, July 25: Superintendent McMurtry, of Paradise Valley, is in town. He says the mines are looking well and the water at the mills holds out. Last week the rock-crusher was broken, but he had the quartz broken by hand and run through the Cornish rolls, until a new casting for the rock-breaker arrived from San Francisco. He is now having a shaft sunk below No. 4 tunnel, the lowest depth yet attained in the mine, and the vein in the shaft is from ten to twelve feet wide, and the quality of the ore is steadily improving.

COAL DISCOVERY.—A coal mine has been discovered in the mountains on the east side of Reese River Valley, about twenty miles south of Lewis. The discoverers have been quietly prospecting the vein, and at a depth of thirty feet have found a seam of good coal. They are now perfecting their title to the vein in Lander county, and they hope to be able to supply all the towns along the Central Pacific with coal of good quality next winter, as they will build a road from the Nevada Central railway to the mine.

ARIZONA.

RUNNING AGAIN.—*Ref and Bullion*, July 25: The Columbia Copper Smelter, sold two years ago at Sheriff's sale, is again in operation. The property is situated 30 miles southeast of Tucson and is now running on ore from the Warren mine. It has run four and a half days on this ore and turned out 12 tons of copper matte that will go 60 per cent copper, worth about \$1200. The Mexican teamsters employed to haul the ore refused to work any more at the price paid—\$5 per ton. It is good news that arrangements have been made to run this smelter regularly, as it is capable of employing, directly and indirectly, from 60 to 120 men, who would all trade in Tucson. The superintendent desires it to be known that he is now in the market to purchase copper ore at favorable terms.

BETTER TIMES FOR LOMBSTONE.—A few days ago steam was let into the engines of the new Grand Central pumps and everything worked to a charm. Yesterday the Contention pumps were also moved for the first time in fourteen months, and showed their operators their rest had not impaired their ability. This is encouraging news, for when these huge machines are both in use the dull times will disappear and the bustle and push which once characterized our city become the rule again. The courage the companies named now display will prove contagious, and one after another the bonanzas will become tenanted, the machinery active, our men busy and the hills resound to the echo of the pick and blast.

WALNUT CREEK PLACERS.—*Prescott Miner*, July 25: There are at present about 50 men engaged in working the Walnut Creek placer mines, with an average yield of about two dollars and a half per day to the man. On account of scarcity of water work will soon have to be stopped on several claims until flumes have been constructed for a larger and steadier supply of water, when a good showing will come from these gold beds.

COLORADO.

LAKE COUNTY.—*Tribune Republican*, July 25: Tim Ryan is working three jigs, concentrating the waste dump at the Brookland shaft of the Adams Company. Cleary is working the Comique lode on the northern slope of Fryer Hill. He is drifting on a promising body of iron. A fifteen-horse-power hoister is to be placed on the Best Friend mine at the head of Big Evans Gulch—one of the oldest properties in the country. It is a true fissure, and in the past has yielded a great deal of rich ore. Work will be resumed on the Leo shaft at Oro City next week. The shaft, when work was suspended, had attained a depth of 412 feet. At 350 feet from the surface a drift was driven to the westward for quite a distance, in anticipation of catching the vein in its eastward course, but without success. The shaft is sunk in the hopes of opening up a productive contact. The Chrysler Mining Company is giving employment to about 120 men, distributed about the mine, concentrating and amalgamating mills. The mine is producing 25 tons of smelting or first-class ore per week, and considerable milling and concentrating ore. The amalgamating mill of the company is now treating about 45 tons of ore a day, secured from the company's property, which averages 11 ounces in silver to the ton.

THE ADAMS COMPANY'S MINES.—In the southern portion of the Brookland mine, where the bulk of the product shipped during the past six months has been obtained, there are to be seen some of the largest and most wonderful ore faces to be found anywhere in Colorado. A continuous breast of ore is disclosed here of several hundred feet, and possessing a height or thickness of two to twenty feet. The more recent developments, extending to the northward from the Brookland shaft for about 140 feet, almost without exception show fine ore, including for quite a distance a four-foot breast of mineral highly impregnated with chloride of silver. The heading of the principal north drift is still in good ore, and 250 feet ahead of this drift and slightly to the westward the Maid of Erin mine, an adjoining

property, discloses vast bodies, leaving little or no doubt that the Brookland ore body will be extending equally far to the northward, and assuring a supply for ore that cannot be extracted in the next three years. The entire property of the Adams Company embraces over nine acres, out of which between two and three acres have been proved up, and seventeenth of one acre has been worked out. The productive ground opened up embraces a square area of 400x250 feet, through which the ore is estimated to average four feet in thickness, giving a total of 400,000 cubic feet of ore, or allowing nine cubic feet to the ton, 44,444 tons. Between one-third and one-half of this ground has been stope out, and yielded in round numbers 20,000 gross tons of ore, leaving at present a reserve in sight of 24,444 tons. The ore being very desirable for smelting, it is treated at a nominal price, and, being over the average in lead with a fair contents in silver, it nets about \$25 per ton above smelting charges. Up to date the company has paid in dividends \$217,500, and this amount will be increased to \$300,000 before the close of the year.

EAGLE COUNTY.—The Horn Silver is turning out some El Dorado mineral, and is now showing its best. As exploitation is pushed on the Combined Discovery and Uncle Sam, the vein improves in a highly satisfactory manner. Next to the Iron Mask comes the Black Iron on the shipping list. Some number one carbonate mineral is being forwarded from here at this time. The Iron Mask takes the lead on the shipping list of the carbonate mines. Ten cars of heavy lead mineral have been forwarded from here in the past week. To-day this is the best showing lead producer in the camp. If operations are conducted with good judgment and economy, more ore will be turned out from this property the present season than from any mine on Battle Mountain. New properties are stepping to the front daily. Last week a third interest of the Percy Chester was sold for \$5,000. A wire team is being put up and will be in operation by Monday next, no accident preventing. The Ben Butler is being worked, and shows finely. The same can be said of the Copper King and Pine Martin. Ten days ago the Rocky Point was sold for a handsome figure, and it is to be started up the coming week. A strong seam of bonanza mineral is here exposed. Some fine rich pay is also showing in the Wonder. Last on the list is the First Chance above the Last Chance fissure. All the above are in the quartzite, and each has pay mineral in good quantity. At Holy Cross it can be said the mining season has at last opened. The snow is about all gone. Some twenty men are at work here. The Knapp mill will start up to-day or Monday. From all appearances there are better indications of something of moment being accomplished at this camp at this time than ever before.

OURAY COUNTY.—Joe Funk is running a cross-cut on the Eureka, with fine prospects of striking it rich. Weston & Corson are working three men on the Blackbird taking out ore. They have considerable sacked ready for shipment. The Yellow Jacket is being worked by Mr. Ellis under a bond. Messrs. Hite and Brodie are developing some property on this creek. A 100-foot contract is being worked on the Belle of Ouray, under the direction of A. Humphrey. W. H. Fourrell is working his Bear Creek property. Riche and Hook have the Victory under lease and bond, and are drifting to gain depth. They will work the property for the purpose of production. Smith and Kimball have one shift engaged on the Poughkeepsie. Prospectors and claim owners are flocking to the gulch, prepared to do their assessment work. The snow is all gone, except on the high ridges, and things are beginning to assume a business aspect. A large amount of ore will be marketed, in small lots, from now on. A great many miners have been saving the best of the ore that they have taken out in development, and will sell it, to place them on their feet for another year's work. Sprinkle and Hammen are industriously pounding away on the Spar, and are making their labor tell. Their pay streak is now about 8 inches wide, and runs up to a satisfactory notch. The tunnel running above the vein, a winze was sunk about 6 feet and drifting resumed. R. D. Price has shipped a quantity of ore from his Paquin property and awaits returns. The Bonanza at the Lake, near the head of Poughkeepsie gulch, is showing up well under the management of C. N. Chase. The Dallas Placer Company have engaged the services of an old hydraulic miner from California, and turned the water in their pipes again. The trails are drying up fast and the corduroys that were placed along the moist places are now discarded.

IDAHO.

SHUT DOWN.—*Wood River Times*, July 25: The Wood River Mining Company has suspended operations, discharged all their hands, and will wind up present affairs with a view to resuming at a future time on a new and more favorable basis. The mines have produced well, but expenses have been too heavy, and require to be reduced, which can only be done successfully by closing out and making a new start.

SMOKE ORE TO COME IN.—The miners and prospectors in Smoky Ore are busy making branch roads to connect with the new wagon road. There is ore sacked up at the Galore, Tyrannis, King of the West and other mines, which will be brought in as soon as the roads shall be completed. The first shipment will be in Bailey in about one week.

A RICH STRIKE has been made on the 600 level of the Vienna mine, as a consequence the mill of the company, long idle owing to litigation, will now be started up.

WILL PUT UP A WISWELL MILL.—J. H. Pennington has purchased an undivided one-third interest in the High and Chief mine, in Lava district. The mine is a very valuable one, crops out for over 400 feet, and 4½ feet in width. Assays prove it to carry four ounces free gold per ton, worth \$82. Mr. Pennington has sent men to develop the property, and will make arrangements to put up a mill at once—probably one of the Wiswell Electric Pulverizers and Amalgamators, of which we hear good accounts wherever they have been used.

A PAYING MINE.—To-day the Queen of the Hills paid off its second dividend, aggregating \$12,500, and making \$25,000 paid in dividends during the past few months, notwithstanding the serious inconvenience and shutting down caused by the miners' strike last winter. The total output of the Queen of the Hills to date is \$190,000. The company is out

of debt, owns a plant which cost \$50,000, and a mine estimated to have \$1,000,000 worth of ore in sight, or about to be shown up.

MONTANA.

HELENA DISTRICT.—*Independent*, July 24: The shaft on the Helena mine is down 117 feet. The tunnel which is being run from the working shaft to the main perpendicular shaft only lacks a few feet of completion. When this is finished, so that good air can be had, sinking will be resumed. The ore is good and there is plenty of it. The Christmas Gift shaft is down 76 feet and shows plenty of fine ore—carbonate and galena. This mine is in the center of a group of leads owned by Mr. Sperling, who has concentrated most of his work upon it. The other veins show up well for the amount of work performed and will eventually prove to be good ore producers. Men are now at work sinking a new shaft south of the old one, with good results. Work is progressing on other mines in the vicinity, and the camp is assuming a more business-like and prosperous air. Ten Mile, as generally understood, embraces a section of country about 50 miles square, in which are hundred, of lodes, the largest group being on Red Mountain, a large, cone-shaped peak, standing out boldly and alone, like a giant among the smaller mountains that surround it. A quartz mill of 10 stamps is to be put up near the top of the Main Range, west of Red Mountain, and the road will connect with the Ten Mile road near Rimini. A fine group of free gold bearing leads surround the spot selected for the mill, and considerable work is now being done.

BLACKFOOT VALLEY.—*New Northwest*, July 24: Is surrounded by mountains rich in gold and silver and gulches that in the past have been classed with the richest in the Territory—Lincoln and McClellan. Next comes Stonewall and Keep Cool, Liverpool and Sour Kraut. All these have been rich in places and are not half worked out. All have abundance of water, and with modern appliances can be made to pay well. The Cameron Bros. are putting in a flume in Stonewall gulch. Other parties are mining at the head of the gulch. James Hansen is piping off some bars in Poor Man creek, between McClellan and the main range, with good results. Old Lincoln, for the work done, has paid well for drifting, and a claim that has been worked with a pipe has yielded well. The quartz from the Giant lode, in Stonewall, owned by Cameron Bros., will speak for itself with mortar and pan; also rock from the Comet lode, in Poor Man district, owned by Win. Chnran. It assays high in silver and gold; it is on the Lincoln stage road. There are timber and water on the claim in abundance for working purposes. It will compare favorably with the best quartz in Butte. There is a mountain of it, with over 20 locations, but very little development. Next comes Ivan Hook district, at the head of Big Humboldt, rich in silver bearing rock, but little development, owned by Johnson, Lund and others, all in Deer Lodge county, and in the near future will be better known to the county assessor and treasurer.

GENERAL MINING NOTES.—The Hecla, of Glendale, is shipping two carloads of base bullion every day. The foundation of the new Tosten, Missouri valley, smelter, is completed and work has commenced upon the stack. The Virginia Belle tunnel, in the Boulder district, Jefferson county, has encountered a large body of high grade galena ore. Longmaid has purchased the old Penobscot property, near Marysville, for \$4,000. It was only a few years ago when this property was sold for \$500,000. He has put men to work fixing it up in shape to begin development and the extraction of ore. The erection of a mill is also contemplated. The new smelter at Tosten started up on the 8th inst. The 664-foot tunnel on the Oro Cache lode at Maiden, is about completed. A connection with the drift from the winze is hourly expected. Three days work last week by Henry Edgar and Harry Ammie in their placer ground in Welcome gulch, Missoula county, resulted in a cleanup of \$48.35. There are about 40 men in that gulch. Three companies are working with money results, and it is thought sluicing can be prosecuted until as late as November. The Little Rocky country was blessed with too much June rain this year and nearly all the sluice boxes in camp, together with what little gold had accumulated therein, were washed away. N. Thompson, et al., have a quartz location across the river from Townsend with an immense body of ore in sight, some of it assaying as high as \$125 to the ton. Blocks of quartz four feet square have been taken out, assaying over \$50 per ton. There are now less than 100 men in the Little Rockies. Of nine miners who returned to Maiden last week, all agreed that there is little gold to be taken out. But for the recent rains that washed out most of the sluice boxes, fair wages might have been secured; as it was about 75 cents per day to the man was the average. The miners are all leaving.

NEW MEXICO.

CERRILLOS DISTRICT.—*Santa Fe Leader*, July 20: This district contains several hundred prospects ranging in depth from ten to two hundred and twenty-five feet; many of them can be called mines, and have proved themselves to be valuable. The whole district has been prospected, and ore shows up everywhere. Without doubt the district holds within her well defined leads enough wealth to pay off the national debt. Concentrating works, smelters and stamp mills will soon show up the district to better advantage than we see it to-day. Cerrillos has a bright future.

THE GREAT AMERICAN has large quantities of ore ready for working, and \$100,000 worth more mined and lying on the dumps waiting till some company will take hold and put up works for treating it.

THE SILVER CITY Concentrating and Smelting Works.—G. A. Shufeldt has taken charge of these works which were put up about one year ago, but from one cause or another have never been started. Mr. Shufeldt has put in three Frue Vanning machines, which with two Rapids already in the mill, give it a concentrating capacity of 10 tons per day. Mill has 10 stamps, a crusher, Cornish Rolls, and is prepared to do a public sampling business in addition to concentration. Control assays will be made for parties desiring to ship their own ores, and thus protection will be furnished the shipper. He will know before his ore leaves the depot just what he ought to get out of it. The starting of this sam-

pler and ore buyer, with the approaching completion of the Flagler Reduction Works, are the best things that ever happened to Silver City and Grant county. Between them these two works can handle all the ore that the surrounding country can produce, and that means something very big. Mr. Shufeldt will either buy or sample ores in quantities from a burro load upwards. This is the chance that our prospectors, leasers and mine owners have so long waited for. There are many claims throughout Grant county that have abundance of \$40, \$30 and \$20 ore on them. It is estimated that if it does not cost more than \$7 to bring the ore into the works, that both the works and the mine owners can make money out of \$20 ore. Of course, the higher the ore runs above that the better it will pay.

OREGON.

FOUND AT LAST.—*Grant's Pass Times*, July 24: Some 30 odd years ago, an eccentric old man would bring into the mining camps along Rogue river from time to time, some very rich quartz which he would crush and extract considerable gold. Though frequently importuned, he would not disclose the whereabouts of his ledge and not much attention was paid to him. He was finally killed by the Indians, and the location of his lead has always been shrouded in mystery. During the famous Gold Hill quartz excitement, quite a number of persons hunted for the old man's ledge, but without success. Last Sunday, John Owens, while walking across a dry gulch just above the Hayes & Magruder placer claim, was suddenly precipitated into a hole, and on investigation it proved to be a narrow cut, the top of which had been covered with timbers and dirt, from appearances work had been done long years ago. Mr. Owens soon moved the debris, and followed the cut a distance of 30 feet when he came to a magnificent quartz ledge which had been cut in two; the lead is about five feet in width, the ore contains gold in considerable quantities which can be plainly seen with the naked eye. This is doubtless the murdered man's ledge, and it will prove a bonanza.

VARIOUS MINING ITEMS.—*Democratic Times*, July 24: Prospecting continues everywhere. About 50 men are at work on the quartz ledges in the Galice creek district. Placer and hydraulic mining is at an end for this season in Southern Oregon. Ex-Governor Chadwick has 100 tons of ore on the dump at the Yank ledge. Geo. W. Sturgeon of Pickett creek is putting a windmill in Rogue river. Success to him. The south tunnel on the Yank ledge has been completed by McNair & Co., and the northern will also be rushed to completion. There is considerable excitement in the vicinity of Woodville. Quite a number of promising quartz ledges are being prospected. Desselles & Connell, of Scotch gulch, Josephine county, have finished cleaning up and did very well. This is one of the very best claims in the State. Mark Colvig, of Rock Point precinct, has sent to the *Oregonian*, specimens of manganese and aluminum, both of which are valuable minerals, though how much so we are at this time unable to state. The parties who have undertaken to investigate the Yank ledge on Rogue river have been pushing matters energetically. A tunnel has been run into the ledge on both sides of the river and two shifts of eight men have been at work day and night for sometime. The ledge is 250 feet in width and the shafts are being run diagonally across it. The quality of the ore is considered satisfactory, and while there is no occasion for any excitement at present, there is a prospect that the Yank ledge may prove the great bonanza mine of Oregon and excel the Comstock in its best days.

PINE CREEK NOTES.—*Bedrock Democrat*, July 20: Wm. Harper will have his arastra in operation the coming week. The town of Cornucopia is being surveyed and lots are selling from \$50 to \$75 and upwards. W. O. Bitten, while passing the Allen & Co. mine the other day, picked up a piece of quartz and brought it into camp. He pounded it up in a mortar and realized \$5 from it. The Pine creek mines are the topic of conversation in every nook and corner of the Willamette valley and an exodus of people from that section may be looked for at once. Strangers are arriving daily in our city, securing mining outfits and going to the new mines. Three pounds of ore taken from the Forest Queen mine turned out \$50 in gold. The farmers of Pine valley and the miners working jointly will have a good wagon road completed from the valley to the mines in a few days. Every one that has been there predict they will turn out to be the new El Dorado. Persons contemplating visiting these mines should bear in mind the nearest route is via Baker City. Our merchants are offering every inducement to miners and prospectors wishing mining outfits. Stages leave this city daily for the mine. Persons arriving by train are not in any way delayed.

UTAH.

MINING MATTERS.—*Southern Utah Times*, July 25: North Star is booming. The outlook at the Rattler mine in the Carbonate Camp is not very bright just at present. Wages have been cut down at the Silver Horn mine, and when active operations are resumed, it will doubtless be upon a \$3 basis for underground work and \$2 50 on top. A regular Civil-Service retrenchment is going on in the ranks. On account of bad air, the underground men have been laid off. An air compressor should have been put in long ago.

SANDSTONE MINING NOTES.—The East Reef is situated about four miles southeast of the town. The crest of the Reef rises up to a height of from 75 to 100 feet above the surrounding country, and the cropings are distinctly marked running in a northerly and southerly direction for a distance of nearly three-quarters of a mile. The Vanderbilt mine has been attracting considerable attention here of late, on account of the rumors current of recent strikes of rich deposits of ore. The main working shaft is an incline sunk on the ledge to a depth of 160 feet. The ledge is four feet between the walls. The rich streak lies on the hanging, and varies in width from eight inches to two feet. A drift is run south, at the bottom of the shaft, for a distance of about twenty feet on the ore, at the end of which an uprise is being made and the ore stope out. There is a streak of fair grade ore on the foot wall, and the rich streak on the hanging wall assays between twenty and twenty-five ounces to the ton. This ore, while it would pay a company to save, is of no value to a person who must pay for having it worked.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

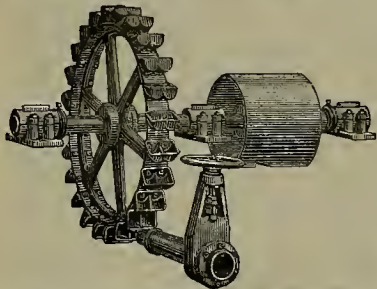
HALLIDIE'S

WIRE ROPE

TRAMWAYS.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

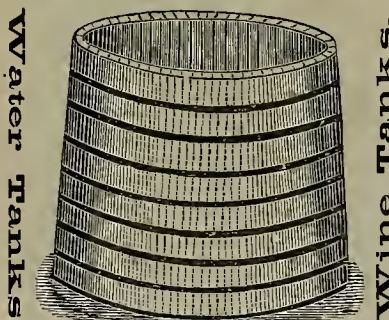
PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.
AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MECHANICS' MILLS.



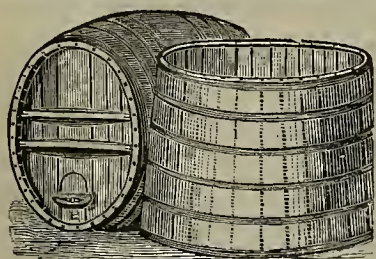
Our well-known TANKS are made by machinery,
from the best of materials, and shipped to all parts of
the country. Each piece numbered. No skill required
in setting up.

WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!
CALIFORNIA WINE COOPERAGE CO.

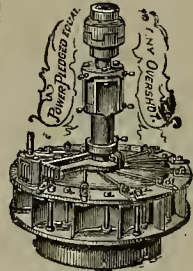


FULDA BROS., Proprietors,
30 to 40 Spear St., San Francisco.
ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

Dewey & Co., { 252 Market St. } Patent Ag'ts

JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"



With Important Improvements, making it the
MOST PERFECT TURBINE NOW IN USE,
Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics'
Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer
Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on
every order.
The most extensive and successful manufacturer of these plates in the
United States. Will fill orders for delivery in Rocky Mountain and Pacific
Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought
gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,
653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.
Extra Strong and Very Durable.
Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs
with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,
22 Cliff Street, New York.



TO CAPITALISTS.

FOR SALE—Half interest in 4,500 feet of valuable
SILVER MINING PROPERTY

In one of the best mineral locations in Arizona, having
wood and water on the ground. The mines are well de-
veloped, and thorough examination is solicited. Ore will
produce from fifty to nine hundred ounces per ton. The
interest will be sold at a sacrifice, as capital is required
to obtain machinery for hauling water. Address

GEORGE B. McCANN,
Bueno P. O., Arizona.

This paper is printed with Ink Manufactured
by Charles Eneu Johnson & Co., 500
South 10th St., Philadelphia. Branch Off-
ices—47 Rose St., New York, and 40 La Salle
St., Chicago. Agent for the Pacific Coast—
Joseph H. Dorey, 529 Commercial St. S. F.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

—1883—

For Best Hoisting Engine and

Boiler Combined.

W. H. OHMEN,

Machine and
Engine Works

22 Fremont Street,
SAN FRANCISCO.



Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

WM. D. JOHNSTON,
ASSAYER and ANALYTICAL CHEMIST.
113 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the
most suitable Process for Working Ores.
Special attention paid to Examinations
Mines; Plans and Reports furnished.
C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

METALLURGICAL WORKS,
STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. H. KUSTEL.
★ METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, - - CALIFORNIA.

JOHN TAYLOR & CO., Assayers' Materials, MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Cruc-
ibles, Scoriaires, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

THE HARMON SEMINARY,
Berkeley, Cal.
BOARDING and DAY SCHOOL FOR
YOUNG LADIES.

Pupils taken at any time.
For Catalogue or other information, address:
THE MISSES HARMON, Berkeley, Cal.
Or E. J. WICKSON, 414 Clay St., S. F.

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont Street, San Francisco.

Manufacturers of NEW and Dealers in SECOND-HAND

Boilers, Engines and Machinery of Every Description.

PORTABLE ENGINES AND BOILERS

On Skids.



Each engine is fitted with a governor, steam and water gauges, heater, fine brush, waste, blow-off cocks, brass whistle, smoke stack with spark arrester, oil cups, gauge cocks, combination check and stop valve, and pump.
Both boiler and engine are fitted in complete running order, and are sold either mounted on strong wheels with wide tires, or on skids.

STEAM PUMPS

OF ALL MAKES.

Mining Pumps.

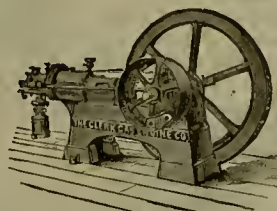
Quartz and Sawmill Machinery.

AGENTS FOR THE SALE OF

"Cummer" Automatic Engines,
Porter Mfg Co.'s Engines and Boilers,
Blaisdell & Co.'s Machinists' Tools,
Hot Polished Shafting,
Baker Rotary Pressure Blowers.

CLERK GAS ENGINES.

RELIABLE,
ECONOMICAL,
SAFE,
STEADY,
COMPACT.



NO BOILER,
NO ENGINEER,
NO COAL,
NO ASHES,
NO DANGER.

These Engines are eminently serviceable for use as motors for Printing offices, Workshops, Laundries, Factories where sewing and bag machines are operated, and in Hotels, Public Institutions, and Private Buildings where pumps, elevators, or electric lighting machines are in use; and generally in Cities and Towns (where gas is obtainable) for all mechanical purposes requiring small driving powers.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven Mfg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.
SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

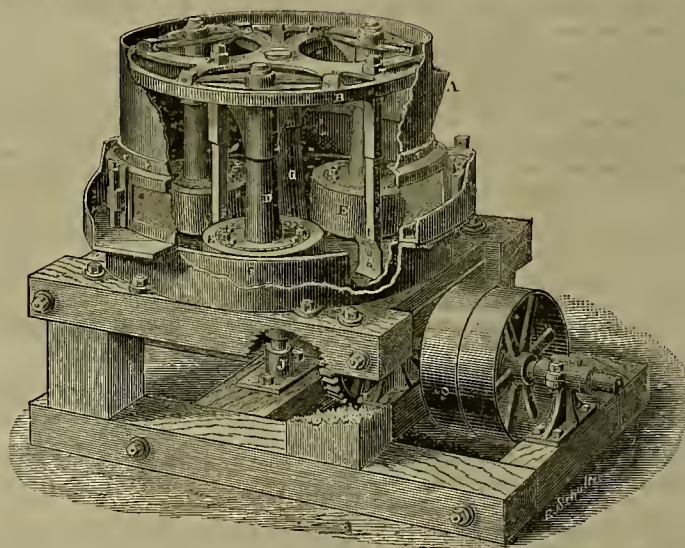
Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.



F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ill.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

A New Home Industry.

Manufacture of Materials from Graphite.

A short time since works were established in city by the Pacific Graphite Manufacturing Co., to make polish, axle grease, etc., from the graphite obtained from their mines in Sonora, Mexico. The mine has been known many years, but until the Sonora railroad was completed the product could not be brought to this city to advantage. The substance, as mined, runs from 80 to 95 per cent graphite, and is very pure and free from grit. The Ceylon mines, from which most of the plumbago previously brought to this country came, yield a graphite which is gritty and requires washing to free it from siliceous matter. That from the Sonora mine requires no washing at all. It is hauled from the mine to the railroad and thence transported to Guaymas, from which point it is brought to San Francisco by steamer. The deposit is immense and is easily mined.

The company now manufacture in this city stove polish, axle grease, skid grease, foundry facings and lubricants of all kinds. The stove polish they can sell in this market for \$1.50 to \$2 per gross less than the Eastern product. It is put up in handsome style, as is the axle grease. The latter is found very useful. There is a mineral oil mixed with very finely ground graphite. In using it there is no danger of hot axles, the lubrication being very perfectly accomplished. The skid grease, which is now used on the skid roads of saw-mills, has the advantage not only of cheapness over tallow, but will not melt and run off in the sun. It greases the skids perfectly and is lasting in its effects, not needing frequent renewal. The company intend shortly to commence the manufacture of plumbago crucibles here. With the articles made so far they are able to supply the home market, and hope to extend the trade in time.

The mineral is received at the factory in canvas sacks, containing 150 pounds each. The first process in making this very essential article of household use is to run the crude metal into a crusher, that in use in the new factory being capable of crushing ten tons of graphite a day. The lumps of mineral coming from the crusher are no larger than peas, and they are next dropped into an iron cylinder called a "tumbler," about six feet in diameter and three feet long. The "tumbler" is kept constantly in motion, and as fast as the particles of graphite are disintegrated they are blown by a revolving fan through an iron pipe about six inches in diameter and 50 feet in length into receiving bins in the basement of the factory. Plumbago to be used in lubricating oils must be ground very fine, and there is a separate bin in which it is deposited. Large wooden receptacles for the coarse grades of plumbago are ranged along the sides of the basement walls. On being taken from the bins the powdered mineral is conveyed to the hopper of a pressing machine, where it is first slightly moistened that there may be more perfect adhesion when pressed. A mold for 12 cakes of stove-polish runs back and forth under the hopper and the iron press, and the cakes after pressing are placed on an elevator and sent up so a drying-room in the third story, where they are deposited on smooth boards and left for two or three days, or until they have become perfectly dry. They are then wrapped and labeled by girls, the wrapping of twenty gross a day being no unusual task for a person skilled in this kind of work. The packages are next conveyed by means of a long chute to a room in which the boxing and shipping is done, and the polish is then ready for the market. The process of making pencils is similar as regards the crushing, blowing and pressing, but the molds are of a different pattern. A ton of stove-polish a day is the running capacity of the new factory, and the company is confident that it can place the manufactured article on the Pacific Coast market at prices that will cause the withdrawal of all Eastern manufacturers from the field. Owning and operating its own mines, it is also better able to compete with the factories of New York and Jersey city in their own territory. It is the intention of the company to make experiments in shipping crude material to the East, believing that it can be furnished cheaper from this coast than it can be procured elsewhere. The agents of the company are James O. Runtree & Sons, 16 Front street.

ADVICE to the aged: Use Muller's pearly spectacles, 135 Montgomery street, near Bush, opposite Occidental Hotel.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCA.	N. NO.	AMT.	LEVIED.	DELINQNT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alaska M. Co.	Nevada	13.	10.	July 23.	Sept. 1.	Sept. 24.	E. M. Hall.	327 Pine st
Alaska M. & M. Co.	Alaska	11.	40.	June 30.	Aug. 6.	Aug. 22.	T. J. Hay.	306 Pine st
Altman M. & M. Co.	California	2.	01.	June 15.	July 20.	Aug. 10.	J. M. Bunington.	309 California st
Blue Bluff G. M. Co.	California	9.	21.	July 10.	Aug. 21.	Sept. 12.	L. Stadfeld.	419 California st
Bullion M. Co.	Nevada	39.	25.	July 21.	Aug. 20.	Sept. 4.	J. M. Brazell.	338 Montgomery st
Follar M. Co.	Nevada	17.	50.	July 23.	Aug. 27.	Sept. 17.	C. E. Elliot.	309 Montgomery st
Galedonia M. Co.	Dakota	16.	15.	May 23.	July 10.	Aug. 5.	W. L. Oliver.	328 Montgomery st
Copper Mt. Con. M. Co.	California	2.	01.	June 17.	Aug. 13.	Sept. 17.	A. L. Perkins.	310 Pine st
Con. Reforma L. & S. M. Co.	Mexico	6.	40.	July 1.	July 31.	Aug. 17.	T. S. Gifford.	331 Montgomery st
Eintracht Gravel M. Co.	California	18.	05.	May 26.	July 14.	July 31.	H. Kunz.	209 Sansome st
Golden Gate M. & M. Co.	California	2.	25.	June 11.	July 14.	Aug. 1.	R. Hewston.	314 Montgomery st
Gold Canyon M. Co.	California	2.	23.	June 10.	July 18.	Aug. 4.	F. A. Berlin.	429 Montgomery st
Homeward Bound M. Co.	California	4.	25.	June 12.	June 20.	Aug. 11.	D. A. Smith.	209 Post st
Justice M. Co.	Nevada	42.	15.	July 13.	Aug. 17.	Sept. 5.	R. E. Kelley.	419 California st
Johnson Gravel M. Co.	California	1.	05.	July 1.	Aug. 5.	Aug. 25.	G. White.	318 Front st
Murphy M. Co.	California	9.	10.	June 24.	Aug. 7.	Aug. 31.	W. L. Bokkeles.	419 California st
Mayflower Gravel M. Co.	California	3.	40.	June 4.	July 20.	Aug. 11.	J. Morizio.	328 Montgomery st
Mono M. Co.	California	22.	50.	June 17.	July 22.	Aug. 11.	G. W. Sessions.	309 Montgomery st
North Star M. Co.	California	1.	20.	July 28.	Sept. 1.	Sept. 22.	D. A. Jennings.	401 California st
Pay Day M. Co.	Nevada	2.	02.	July 6.	July 14.	Aug. 10.	W. Van Bokkeles.	419 California st
Potosi M. Co.	Nevada	13.	50.	July 14.	Aug. 19.	Sept. 10.	C. E. Elliot.	309 Montgomery st
Savage M. Co.	Nevada	63.	50.	July 1.	Aug. 4.	Aug. 24.	E. B. Holmes.	309 Montgomery st
Sierra Nevada M. Co.	Nevada	62.	25.	June 9.	July 15.	Aug. 4.	E. L. Parker.	309 Montgomery st
Starlight M. Co.	California	2.	05.	June 28.	Aug. 1.	Aug. 21.	C. E. Hayes.	310 Clay st
Silver Hill M. Co.	California	2.	10.	July 1.	Aug. 4.	Aug. 24.	E. B. Holmes.	309 Montgomery st
Scorpion M. Co.	California	2.	25.	June 24.	Aug. 1.	Sept. 1.	H. D. Mitchell.	126 Kearny st
Summers Con. M. Co.	California	4.	05.	July 16.	Aug. 17.	Sept. 7.	F. E. Luty.	330 Pine st
Willow Creek M. Co.	Nevada	1.	1.00.	July 23.	Sept. 7.	Oct. 12.	R. E. Llon.	310 Pine st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Aurora M. Co.	Nevada	P. Conklin.	13 Post st.	Annual.	Aug 4
Derbes Blue Gravel M. Co.	California	T. Wetzel.	522 Montgomery st.	Annual.	Aug 4
Loreto M. & M. Co.	Mexico	H. G. Jones.	327 Pine st.	Annual.	Aug 4
Cherry Hill Con. M. Co.	California	F. E. Luty.	330 Pine st.	Annual.	Aug 6
McMillan M. Co.	Nevada	J. Morizio.	328 Montgomery st.	Annual.	Aug 6
Nevado M. Co.	Nevada	J. W. Pew.	310 Pine st.	Annual.	Aug 6
Occidental M. Co.	Nevada	A. K. Durbrow.	309 Montgomery st.	Annual.	Aug 10
Original Empire M. & M. Co.	California	D. A. Jennings.	401 California st.	Annual.	Aug 10
South Feather M. Co.	California	A. Halsey.	328 Montgomery st.	Annual.	Aug 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kossuth M. Co.	Nevada	C. K. Strickland.	328 Montgomery st.	96.	Mar 16
El Diablo M. Co.	Nevada	R. W. Heath.	313 Pine st.	20.	July 30
Nevado M. Co.	Nevada	J. W. Pew.	310 Pine st.	25.	Feb 13
Plymouth Con. G. M. Co.	California	W. Van Norden.	23 Nassau st.	50.	Apr 6
Silver King M. Co.	Arizona	J. Nash.	328 Montgomery st.	25.	July 15
Syndicate M. Co.	Nevada	J. Stadfeld Jr.	419 California st.	10.	May 5

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.		
	Rain.....	Temp.....	Weather..	Rain.....	Temp.....	Wind.....	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..
July 22-29																		
Thursday .....	.00	74	NW Cl.	.00	98	N Cl.	.00	85	SW Cl.	.00	66	W Cl.	.00	78	SW Cl.	.00	71	W Cl.
Friday .....	.00	67	N Cy.	.00	91	SE Cl.	.00	79	S Cl.	.00	67	W Cl.	.00	80	SW Cl.	.00	69	W Cl.
Saturday .....	.00	74	NW Sm.	.00	86	S Cl.	.00	76	SW Cl.	.00	62	SW Cy.	.00	74	SW Fr.	.00		
Sunday .....	.00	80	N Fr.	.00	80	S Cl.	.00	72	S Cy.	.00	65	SW Fy.	.00	77	SW Fr.	.00	71	W Cl.
Monday .....	.00	82	N Sm.	.00	84	SW Fr.	.00	76	SW Fr.	.00	64	W Cy.	.00	74	SW Fr.	.00	71	W Cl.
Tuesday .....	.00	83	SW Sm.	.00	89	S Cl.	.00	79	SE Cl.	.00	68	W Cl.	.00	79	W Cl.	.00	71	W Cl.
Wednesday .....	.00	79	NW Cl.	.00	84	S Cl.	.00	80	S Cl.	.00	68	SW Cl.	.00	83	W Cl.	.00		
Totals .....	.00			.00			.00			.00			.00			.00		

EXPLANATION.—Cl. for clear; Cy., cloudy; Fr., fair; Fy., foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 11.	WEEK ENDING July 16.	WEEK ENDING July 23.	WEEK ENDING July 30.
Alpha.	.85	.80	.85	1.70
Alta.	.35	.50	.35	.40
Andes.	.15	.30	.20	.20
Argenta.	.15	.30	.20	.20
Belcher.	.75	.80	.75	.90
Belding.				
Best & Belcher.	1.75	2.20	1.80	2.10
Bonanza.	.25	.30	.25	.25
Bonanza Con.	.25	.30	.25	.25
Belle Isle.				
Bodie Con.	1.35	1.50	1.35	1.40
Bouton.				
Belle Tunnel.	.50	.55	.40	.45
Bulwer.	1.30	1.85	1.50	1.65
California.	1.30	1.85	1.50	1.65
Challenge.				
Champion.	.85	1.00	.80	.85
Chollar.	.85	1.00	.80	.85
Confidence.				
Con. Imperial.	1.30	1.85	1.50	1.65
Con. Virginia.	1.30	1.85	1.50	1.65
Con. Pacific.	1.10	1.40	1.15	1.30
Crown Point.	1.10	1.40	1.15	1.30
Day.				
Eureka Con.	5.50	5.65	5.62	6.00
Eureka Tunnel.	.10	.20	.15	.20
Excelsior.	.10	.20	.15	.20
Grand Prize.				
Gould & Curry.	1.40	1.70	1.35	1.55
Goodshaw.				
Hale & Norcross.	6.87	8.12	6.37	7.25
Holmes.				
Independence.				
Julia.				
Justice.	.10	.15	.10	.10
Martin White.	.40	.40	.40	.40
Mono.	.50	.55	.40	.45
Mexican.	.60	1.00	.75	.85
Mt. Diablo.				
Northern Belle.	.70	1.00	.80	1.00
Nevado.	.70	1.00	.80	1.00
North Belle Isle.				
Occidental.	1.00	1.01	1.10	1.25
Ophir.	1.00	1.50	1.10	1.25
Overman.	.25	.30	.25	.30
Potosi.	.25	.30	.25	.30
Pinal Con.	2.55	3.40	2.10	2.70
Savage.	2.55	3.40	2.10	2.70
Seg. Belcher.				
Sierra Nevada.	.75	1.10	.80	1.25
Silver Hill.				
Silver King.	.10	.10	.10	.10
Scorpion.	.10	.10	.10	.10
Syndicate.	.30	.25	.30	.30
Tops.				
Union Con.	.75	.65	.80	.85
Utah.				
Yellow Jacket.	1.75	2.00	1.60	1.65

Sales at San Francisco Stock Exchange.

THURSDAY A. M., July 30.	150	Hale & Norcross.	6.31
200 A. & B. Belcher.	3.20	100 Mexican.	.09
500 B. & B. Belcher.	3.20	100 Mono.	.12
100 Bodie Con.	1.75	200 Mono.	1.20
100 Bullion.	1.00	500 Ophir.	1.20
70 Bullion.	1.00	500 Potosi.	.35
300 Con. Va. & Cal.	1.85	250 Savage.	1.30
300 Challenge.	1.35	1410 Sierra Nevada.	1.35
200 Gould & Curry.	1.30	150 Union.	.75

ADRESS all correspondence to the name of the paper to firm, as either of the publishers or editors connected with the office are quite likely to be absent at times.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JULY 21, 1885.

- 322,671.—EXPANDING HORSE SHOE—C. C. Allen, Salinas, Cal.
- 322,693.—MANUFACTURE OF SUPERPHOSPHATE—F. Dikken, S. F.
- 322,716.—ORE FEEDER—J. Hendy S. F.
- 322,825.—GANG PLOW—J. Ingham, San Jose, Cal.
- 322,829.—ICE MACHINE—A. R. Kenney, S. F.
- 322,549.—HEATING DRUM—J. P. Lydon, Marysville, Cal.
- 322,643.—SOFA BED—Geo. W. Robbins, Los Angeles, Cal.
- 322,753.—CANDLESTICK—J. C. Schlarbaum, San Jose, Cal.
- 322,756.—DERRICK—David Sharp, Lemoore, Cal.
- 322,559.—BUILDING BLOCKS, ETC., MADE OF PURIFIED ASHES AND LIME—E. L. Ransome, Oakland, Cal.
- 322,763.—PNEUMATIC DOOR CHECK—Geo. Vincent, Stockton, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MIXING AND AGITATING APPARATUS FOR PLANT WASHES.—Edward J. Delaney, San Jose, No. 321,089. Dated June 30, 1885. It consists of a reservoir within which the liquid is placed, a pump connected with the lower part of said reservoir, so as to draw the liquid therefrom, a pipe extending from the discharge opening of the pump, and having its opening vertically above the top of the reservoir so that the liquid may be discharged through this opening into the reservoir to mix and agitate the contents. In connection with this are secondary discharge pipes or nozzles, to which the spray apparatus may be attached, so that a portion of the liquid is being discharged or sprayed at all times upon the plants or trees to which it is to be applied.

SOFA BED.—William R. Shaber, of San Francisco, Cal. Dated July 7, 1885. No. 321,540. This sofa bed belongs to that class in which a hinged seat and folding back unite with a central section to form the length of the bed. The peculiarity of this bed is its central section and the connection between it and the back, so that when the back is dropped the central section is raised to the level of the extended seat and back, and when the back is raised the central section is dropped below the level, forming a chamber or receptacle the whole length of the sofa, in which the bed-clothes are stored away. The construction of the sofa bed is such as to make an attractive appearance and to render it easy to handle.

HYDRAULIC DIRT CONVEYER.—Albert Boschke of San Pedro, Los Angeles Co., Cal. Dated July 7, 1885. No. 321,573. This device consists of a hopper or receiver for the material. Around the neck of this hopper, and communicating with it, is a pipe of larger diameter, which leaves an annular space between the neck and pipe. A casing communicates with this space, and water under pressure or forced by a pump is admitted to the casing, and passing through the annular space, in a hollow cylindrical or cone shape stream meets with and carries along the material discharged through the neck of the hopper, until water and material become intermingled and blended, so that the whole mass moves easily and can be discharged at any suitable distance.

AUTOMATIC GRADE-DELINEATOR.—Bernard Faymonville, of San Francisco, Cal. No. 321,591. Dated July 7, 1885. This invention is for determining and recording the variation in the surface of a country so that the work may be plotted or laid out upon a map after it has been completed. The result is effected by means of a wheeled vehicle and attached mechanism, the essential parts of which are a vibrating weight or pendulum, a marking point, a traveling paper moving in front of the marking point, and gearing between the weight and marking point. The weight changing its position with relation to the vehicle, by reason of the character of the surface over which the latter measures, records its variations on the paper. Thus, when the vehicle ascends a hill, the suspended weight remaining plumb has changed its position relative to the vehicle, and this change is recorded on the paper. So in descending a hill. Thus the amount and extent of the declivity can be easily plotted out when the field notes are worked out in the office.

DRAFT REGULATOR.—William Hunter, San Francisco. No. 321,502. July 7, 1885. The invention is especially useful in fire-places and grates, and its object is to control the draft and direct the heat into the room, or to prevent it from too rapid exhaustion. The regulator consists of two plates, both being slotted, and one lying behind the other and adapted to be moved so that the openings in the two plates will co-

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, July 30, 1885.	
ANTIMONY—Per pound.	12 @
Ballet's.	12 @
Cookson's.	13 @
BORAX—Refined.	7 @ 7 1/2
IRON—Clemens.	25 @
Eglinton, ton.	23 @
American Soft, ton.	26 @
Oregon Pig, ton.	25 @
Clippers, Pig, No. 1 & 2.	25 @ 30
Clay Laid White.	26 @
Shells, No. 1.	25 @
Street—English, lb.	16 @ 25
Black Diamond, ordinary sizes.	13 @
Flow.	4 @ 5
Machinery.	6 @
Sanderson Bros.	13 @
COPPER.	
Brassier sizes.	1 @ 20
Fire-box sheets.	20 @
Bolt.	20 @
Yellow Metal.	12 @ 13
LEAD—Pig.	12 @ 34
Bar.	5 @
Pipe.	7 @
Sheet.	8 @
Shot, discount 10% on 500 bag.	1 85 @
Buck, 3/4 bag.	2 05

incide more or less. These plates are set at an incline in the chimney just above the fire-place. Where the openings coincide perfectly a full draft is obtained. As the fuel is consumed the draft openings may be shut off partially, in order to throw the heat out into the room. And they may finally be nearly closed, when the combustion has reached a point at which there is but little smoke. The use of this device is also advantageous in creating a circulation of air in the room by reason of the hot air from the plates rising in the apartment, and as it cools, falling and seeking the grate again.

CAR-BRAKE.—Frank Landgrane, assignor of one-half to Milton E. Willis, S. F. No. 321,057. Dated July 7, 1885. This is a safety brake for street cars, and it consists of a supplemental mechanism attached to the brake-shoe, and having a foot-lever by which it may be operated so as to apply the brake to the car wheels in case the chain or regular connections get out of order. It is more applicable to cars drawn by one horse, which have a brake attached at one end only. When this breaks there is no way to apply a brake, so that on down grades accidents occur. This invention is designed to supply a means for applying the brake in case of such an accident, and which at other times will not be in use.

MOVABLE GATE FOR IRRIGATING.—John A. Fry, Ukiahfield, Kern Co. No. 321,593. Dated July 7, 1885. This irrigating gate is specially used for drawing out water from ditches or other inclosures, so that it may be transferred to other portions of the land to be irrigated. Where irrigating ditches are made to pass through arable land, it is necessary to draw water from various points and lead it to those parts which are to be irrigated. This is done by simply making an opening in the side of the ditch, and unless a wooden sluice is put in this it will often wash out to such a depth as will damage the ditch, and it is almost impossible to stop the opening when desired. Mr. Fry's invention is a portable irrigating device consisting of a plank or frame having an opening cut through it, a vertically sliding gate fitted to move across the opening, a flexible apron secured below the opening and extending outwardly therefrom, and a flexible apron also extending inwardly.

ICE MACHINE.—Augustus R. Kenney, San Francisco, Cal. No. 322,829. July 21, 1885. This ice machine is of that class in which the freezing is done in water compartments separated by refrigerator cans containing the brine or other freezing agent and the evaporator coil. The whole machine embodies many essential points of novelty which contribute to the result of making a very perfect and complete ice machine. Perhaps the most important feature is the wedge shape of the refrigerator cans. As ice freezes outwardly in right lines, the cakes are frozen in a slightly inclined position which give them a tendency, when loosened, to tip over, thus freezing themselves completely. The refrigerator cans are closed tight, and have reciprocating agitators in them, while similar agitators operate in the fresh water compartments. The machine has a nicely balanced gate which can be readily operated, and there are means for making it form a perfectly water tight joint when closed.

ROTARY ROASTING FURNACE.—Albert Arents, of Alameda, Alameda Co., Cal., July 7, 1885. No. 321,780. This furnace seeks to overcome a disadvantage which seems obvious enough when pointed out, viz., the unequal temperature to which an extended body of ore or other material is subjected, by reason of the fact that the intensity of the temperature of heated gases coming from a fire place and passing through any space of more or less extent diminishes gradually as the gases pass on, thus resulting in the greatest intensity near the fire place and the smallest near the flue or exit. Mr. Arents' furnace overcomes this difficulty by the employment of a rotating roasting chamber, the diameter of which gradually decreases from the end nearest the fire place to the end nearest the flue, or, in other words, the chamber is the frustum of a cone revolving horizontally around its own axis, its base being placed towards the fire place, and its top or end of smallest diameter being placed towards the flue. This construction results in increasing the depth of thickness of the body of ore nearest the fire place, and decreasing it nearest the flue, for the reason that the crushed ore or pulp seeks its level. The whole mass gradually increases in thickness from the fire place end of the chamber to the flue end. The flame and heated gases passing through the chamber from its widest towards its smallest end, find more pulp or ore to heat where it is hottest and correspondingly less where it is coolest, and thus securing a more simultaneous and equal heating, roasting and finishing of the charge.

Missing Papers.

We mail and send our papers to subscribers as carefully and regularly as possible, but changes occurring sometimes in our mailing hands, by illness or otherwise, or changes in the Postoffice here or at the place of delivery, may cause irregularity in the receipt of the paper by the subscriber. We therefore request that *always*, when subscribers fail to receive their paper in due time that they notify the office by postal card or letter, and we will, if possible, remail all missing numbers.

Mining Share Market.

To say of the mining share market during the past week that it has been "stale, flat and unprofitable," would be the proper thing, because Shakespeare having originated this expression it has been constantly employed by the stock reporter ever since; wherefore it has the sanction of high authority and much usage. Dealing in mining shares being one of those things which a great many openly condemn but secretly practice, it is always safe to condemn it roundly, which we have never failed to do, calling it by all kinds of hard names; and this, not because of any good it would do, but simply from a sense of duty, mixed sometimes with a slight desire to gain popularity.

The number of shares sold during the week footed up hardly more than 50,000, and as the most of them sold for less than two dollars, and some as low as five cents per share, the commissions realized on these transactions aggregated but a pitiful sum, scarcely as much as would in bonanza times have fallen to the share of a single broker. With the improvement reported in some of the Comstock mines the stock dealer is taking new courage, being hopeful that there will occur more lively times, and possibly a genuine old-fashioned boom before many months are over.

Bullion Shipments.

Manhattan, July 24, \$19,834; Comstock mines, July 27, \$31,500.

A New Premium for Readers.

The publishers of this paper have had printed on fine paper and handsomely bound, a neat little volume, entitled "A Beautiful Poetic Review and Friendly Offering." It was written by Dr. J. R. Bradway, orator of Oakland Council, American Legion of Honor, and read in short sections by the author at different meetings, and eliciting much praise from his listeners. The work is embellished with fine lithographic portraits of several noted poets whose writings are mentioned in the work. We believe the book will prove a pleasant and attractive keepsake in every family; it can be so readily taken up and read as leisure moments occur. It will be mailed for 25 cents to subscribers (old or new), upon paying 12 months in advance for this paper.

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1. This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes *whereof* he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Elements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metals; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Anal; Assay; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.
Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulations, etc.; Lead; Assay of Lead; Volcanic Assays; "Barley" Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F.

These are much needed books for miners and other practical men, by an intelligent miner and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card costing one cent only will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. Look carefully at the label on your paper.

Gold Mines For Sale.

Two small gold mines for sale, in Kern county, California. Ore has paid by assays \$20 per ton. Worked to a depth of 60 feet. The vein is 15 inches wide. The mines are within seven miles of the Southern Pacific Railroad. The owner is not in a position to develop them without aid. The purchase price is very reasonable and there is a good opening for any one to take hold of the claims and work them. Address W. L., P. O. Box 2361, San Francisco.

W. E. CHAMBERLAIN, JR. T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.
Ladies admitted into all departments. Day and Evening Sessions during the entire year.
Call, or send for CIRCULAR to CHAMBERLAIN & ROBINSON, Prop'rs.

DEWEY & CO.'S SCIENTIFIC PRESS PATENT
AGENCY is the oldest established and most successful of the Pacific Coast. No 262 Market St., Elevator 12 Front St., S. F.

[Cut this out and save it.]

CRYSTAL SPRINGS RURAL HEALTH RETREAT, ST. HELENA, CAL.

This beautiful and popular Resort for Tourists and Invalids is situated on the side of Howell Mountain, 1,200 feet above tide level, 500 feet above and overlooking Napa Valley, and two and a half miles from St. Helena, in Napa County.

THE NATURAL ADVANTAGES

Of the Health Retreat surpass those of any other health resort. It is noted for its pure water, dry atmosphere, clear and balmy sunshine, even temperature, mild breezes, and the absence of high winds. Across the valley lies the Sonoma Mountain Range, breaking the sea breeze and shielding the Retreat from the chilling atmosphere of the coast, and presenting a safeguard against catarrh and lung diseases. The grandeur of its mountain ranges, with its shrubby canyons lying in beauty at their feet, the famous Mount St. Helena rearing its lofty head to the clouds, the gray plain lying beneath, reflecting the sunbeams like a grand mirror before the Retreat, all perfumed with a variety of wild flowers, lend an enchantment to this unsurpassed scene.

MALARIA IS A STRANGER AT THE RETREAT.

And in all this beautiful valley. In fact, the purity of the air on this hillside and in the upper valley, is a specific for malaria, and all diseases affecting the head, throat, and lungs; producing a healthy circulation through mucous passages generally.

COME TO THE RETREAT.

Most ailments can be cured by proper care and judicious treatment. All may be benefited. Are you a professional man, a Judge, Lawyer, Minister, or Doctor, suffering from mental exertion? Are you a business man, exhausted mentally and physically by too close application to business, and burdened with responsibility, troubled with constant thought of your ailments, dread of life or fear of death? Come to

CRYSTAL SPRINGS

And we will do you good. Remember that all these are but symptoms of disordered nerves, deranged stomach, liver, and other digestive organs that may be cured and leave you easy, and happy, and feeling younger for your stay with us. The treatment invigorates you, gives you a light heart, a quiet stomach, and a cheerful countenance. We employ no quick remedies, no patent nostrums. We treat all cases by the most recent knowledge of

HYGIENIC AND RATIONAL PRACTICE.

Disase is the injury of nature against the constant violation of her laws, and calls for hygienic regulation and wise observance of known physiologic law. Then all will be peace again. Especial attention is called to all persons suffering from

CHRONIC DISEASES.

It is a well known fact and recognized by all advanced pathologists of to-day that there is no specific for chronic ailments. They are only cured by hygienically removing the cause and giving nature time a proper conditions to heal itself. All surgical and mechanical assistance necessary in such cases is scientifically rendered. New facilities are constantly being added to make this the most advantageous, desirable, and efficient, as it is now the most natural and healthful

WINTER RESORT

In America; while a radical table is furnished for invalids and proper diet prescribed for each individual case, no one is confined to a starvation diet, and better and more ample variety is furnished at meals than is usual in any other probable cure, may do so before coming, by addressing RURAL HEALTH RETREAT.

The Managers have opened the Retreat under a new and experienced Director. They have secured the services of a thoroughly competent physician from New York; of nine years' experience in practice. Being a graduate from a three years' course of medicine and surgery in one of the New York Medical Colleges, it is his intention to keep abreast of the age in his profession. He is assisted by two lady attendants having a two years' course at one of the largest Hygienic and Surgical Sanitariums in the world, with five years' subsequent practice. Special inducements offered to all suffering with ailments peculiar to females. The Retreat is also open d as a

SUMMER RESORT

To all who desire to spend a few weeks or months in recreation and receive the benefit from rest and breathing the pure mountain air, whose easiness and purity is unsurpassed. For such a wholesome and liberal table is especially provided. While the Chief Object of this institution is to afford a Sanitarium for those in need of Hygienic and Surgical Treatment, ample means are afforded for recreation, and entertainment is provided for all boarders and pleasure seekers who love decency and good order. Winding and picturesque roads, walls of blasted rock terracing the hillside about the main building, cottages, and drive-ways, a fine campus, spacious woods, shady groves, arbored seats, swings, swinging rings, swinging chairs, rowing machines, machinery for developing the muscles and expanding the lungs, dumb-bell, and Indian club exercises are found here.

PLEASURE EXCURSIONS.

Are a factor of no small interest in coming to the Retreat. A Natural Cave, extending over 400 feet into the mountain, is within a few minutes' walk of the Retreat. A trip overland, twelve miles, through the pleasant and beautiful Napa Valley, of vines and flowers, to the Petrified Forest, can be made any day by a small party. Hotel accommodations or camp furnished. The summit of Round Tower Mountain, less than one-half mile from the Retreat, can be reached by a few minutes' walk, which, with its shady covering of Madroños, Live-oaks and Firs, furnishes an unlimited source of enjoyment and interest to the pleasure seeker and admirer of nature. Situated as we are, with the city and bay of San Francisco, with its Golden Gate and the old Pacific Ocean, but 60 miles south of us, and the famous Mount St. Helena towering high above all around, and looking down upon us from the north, this is just the place for

EASTERN TRAVELERS

To stop and regain their health, and at the same time view the curiosities and natural beauties of this portion of California, and escape the long, tedious, and sickly winter of the Eastern, Northern, and Middle States; for the winter season here is like the beautiful Spring time in the East. Geraniums, Verbenas, and Callas bloom all Winter in the open air.

LOOK AT IT

And think twice before you conclude to go to some other resort where they substitute for natural advantages "rare mineral water," but come and see for yourself where the water is pure as crystal.

EXPENSES.

Rooms, with board, Regular Treatment, \$15 to \$20 per week; without Treatment, from \$9 to \$15. Specially favorable terms for families and for the month. Some rooms in cottages can be furnished at reasonable rates. Office treatment and surgical operations extra.

TESTIMONIALS.

OAKLAND, CAL., February 22, 1884.

I have visited a number of the "Springs" and "Resorts" in California, and without hesitation can say that the "Health Retreat" is the most delightful of them all. The water is pure; the climate cannot be excelled; and the scenery is unequalled. Baths may be taken here under the direction of experienced practitioners and nurses—an advantage which I have found at no other place which I visited. At one place (Hot Springs) I found an intelligent superintendent who informed me that many invalids came to his place who, by the judicious use of baths, rendered their recovery almost impossible; but as they did not pretend to govern visitors in that respect, his advice would not be regarded if offered. At the "Health Retreat" it is not so. The feeblest may trust themselves with confidence in the hands of those who have charge of it. It is a quiet, pleasant, home-like place, where the sick are cared for and treated in harmony with nature's laws, and where the weary may find the most enjoyable rest.

ELD. J. H. WAGGONER,

Editor Signs of the Times, Oakland, Cal.

ST. HELENA, CAL., June 11, 1885.

Finding myself gradually failing, becoming emaciated, and with a bad cough, I was warned of consumption; I went to "Rural Health Retreat," weighing 130 pounds. Was happily surprised to find myself improving in one week. Now, at the time of writing, my cough is entirely gone; have free use of both my lungs; weigh 155 pounds, a gain of 25 pounds in four weeks. Words are feeble to express my regard for "Retreat," its physicians, and managers, who have the rare faculty of making you feel perfectly at home. I feel that the mercy of God attended their efforts, and to them I owe my speedy and remarkable restoration.

ELD. JOHN A. BURDEN, E. Portland, Oregon.

Persons sending notice previously will be met at the St. Helena depot by a carriage from Retreat. For further particulars and information, address

RURAL HEALTH RETREAT, St. Helena, Cal.

MISS BISBEE'S SCHOOL

FOR YOUNG LADIES,

1020 Oak Street, - - Oakland, Cal

WILL RE-OPEN

Wednesday, JULY 29, 1885.

THE HOME SCHOOL FOR YOUNG LADIES.

1825 Telegraph Ave., OAKLAND, CAL.

(Founded in 1872 by the late Miss H. N. FIELD.)

Gives thorough instruction in foundation studies. Admits special students. Prepares for the State University and for any of the Eastern Colleges. The Fourteenth Year will begin on Wednesday, July 29, 1885. Address MISS L. TRACY.

H. M. RAYNOR,
No. 25 Bond St.,
NEW YORK.

ESTABLISHED 1859

FOR ALL
Laboratory

Manufacturing Purposes.
Wholesale and Retail.

Native Platinum and Scrap purchased.



INGERSOLL ROCK DRILLS

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,
PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco.
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

Room 5, First Floor,
BOSTON, MASS.

PYROMETERS



GAUNTLET'S, ROBINSON'S, and STEINER'S
PRESSURE GAUGES
Hot-Well THERMOMETERS
ANEMOMETERS
SAFETY LAMPS
BAROMETERS
SALINOMETERS
Mining and Meteorological
Instruments of every description.

List and Description of our Ten Catalogues sent free on application.
JAMES W. QUEEN & CO.
924 Chestnut St. Philadelphia

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notices.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

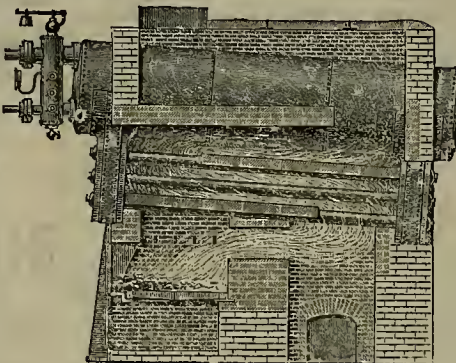
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

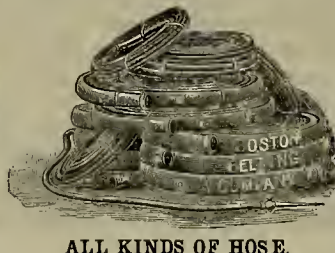
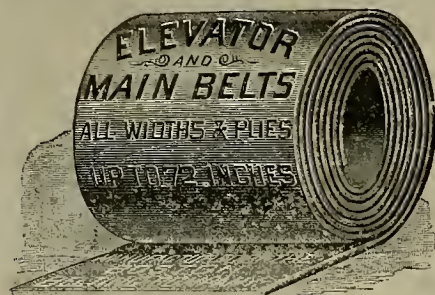
Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Box Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.



Send for Circular and Prices.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

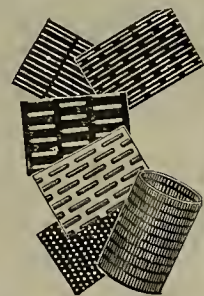
"HOYT'S" Pure Oak, Short Lap Leather Belt.

Wound with Flat Steel Spring Wire,

WARRANTED.

The BEST ROCK DRILL HOSE Made.

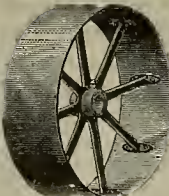
GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



Chicago Prices Beaten!
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.
J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chests, Cement and Slant Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Milling Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.
CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street - SAN FRANCISCO, CAL.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

JENKINS BROS., 71 John St., New York.

Iron and Machine Works.

THOMAS THOMPSON THORNTON THOMPSON
THOMPSON BROTHERS,
EUREKA FOUNDRY,
123 and 131 Beale St., between Mission and Howard, S. F.
MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,
WM. H. BIRCH,
Engineer and Machinist,
119 Beale Street, San Francisco.

— BUILDER OF —
Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines
Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bolts and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**
J. H. WEED. V. KINGWELL.

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT.
CIRCULAR

Saws.

SAW MILLS AND MACHINERY
of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Steware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of all kinds of Chemical Steware — FOR — Manufacturing Chemists. Also Chemical Brick for Glover Tower.

ASSESSMENT NOTICE.

Grosh Consolidated Mining Company.— Location of principal place of business, Room 35, Merchants' Exchange, San Francisco. Location of works, Storey County, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 13th day of July, 1885, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 35, Merchants' Exchange, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1885, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the 31st day of August, 1885, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

A. C. HAMMOND, Secretary.
OFFICE—Room 35, Merchants' Exchange, San Francisco, Cal.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

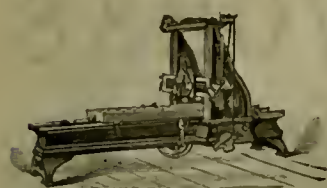
PORTLAND, OREGON.

PARKE & LACY.

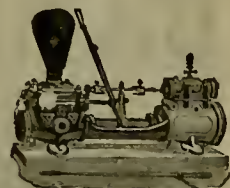
.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.



Putnam Planer.

Knowles Steam Pump
The Standard.

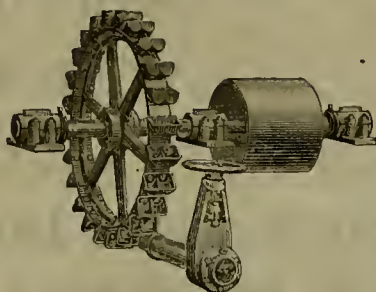
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery **ENGINES and BOILERS.**

SOLE AGENTS FOR

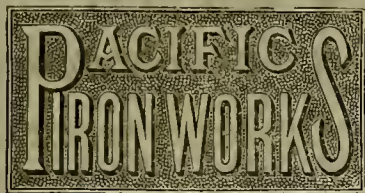
SEND FOR CIRCULARS.

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
 Putnam Machine Tools,
 National Bolt Cutters and Headers,
 New York Safety and Haskins Vertical Engines,
 Phoenix Engines and Boilers,
 Kendall & Roberts' Hoisting Engines,
 Knowles Steam Pumps for any service,
 Valley Machine Company's Bucket Plunger Pumps,
 Heald & Sisco's Centrifugal Pumps,
 Jessop & Son's English Cast Steel,
 Hazard Manufacturing Co.'s Wire Rope.

**PELTON**
HURDY-GURDY WATER WHEEL.

Wetherby, Rugg & Richardson's and
 H. B. Smith Machine Company's
 Woodworking Machinery,
 Novelty Iron Works' Shingle Machinery,
 Sturtevant Blowers and Exhausters,
 Waters' Governors,
 Hancock Inspirators,
 Harrington's Screw Hoisting Machines
 Leffel Double Turbine Water Wheel,
 Pelton's Hurdy-Gurdy Water Wheel,
 Babcock Fire Extinguishers and
 Chemical Engines.



1850. 1885.

RANKIN, BRAYTON & CO.,
 BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street.
 Chicago: 100 N. Clinton.
 New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
 embracing machinery of LATEST DESIGN and
 MOST IMPROVED construction. We offer our en-
 tire experience in this SPECIAL LINE of work, and
 are PREPARED to furnish from SAN FRANCISCO
 or CHICAGO, the MOST APPROVED
 character of MINING and REDUCTION MA-
 CHINERY, adapted to all grades of ores and su-
 perior to that of any other make, at the LOWEST
 POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-
 LIVER in COMPLETE RUNNING ORDER,
 in any locality, MILLS, CONCENTRATION
 WORKS, WATER JACKET SMELTING
 FURNACES, HOISTING WORKS, PUMP-
 ING MACHINERY, ETC., of any DE-
 SIRE CAPACITY.

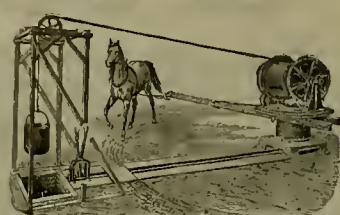
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
 ores of NEW and ORIGINAL DESIGNS, covered
 by LETTERS PATENT. No other Furnace CAN
 COMPARE with these for DURABILITY, and in
 CAPACITY for uninterrupted work. MORE
 THAN 150 of them are now RUNNING in various
 parts of THIS COUNTRY, as well as many in
 FOREIGN COUNTRIES, giving results NEVER
 BEFORE ATTAINED as regards CONTINUOUS
 running, ECONOMY of fuel, AMOUNT and QUAL-
 ITY of BULLION produced. These CLAIMS have
 been PROVEN by RESULTS in ANY NUM-
 BER of INSTANCES, and the GREAT SUPER-
 IORITY of this SYSTEM of smelting ores DE-
 MONSTRATED BEYOND QUESTION. COM-
 PLETE PLANTS furnished to order of any CA-
 PACITY, with ALL IMPROVEMENTS that ex-
 perience has DEMONSTRATED as VALUABLE
 in this class of work.

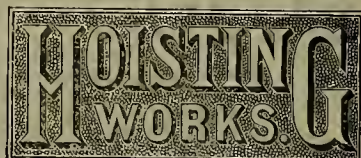


Beyond question the cheapest and
 most effective machine of the kind
 now in use adapted to all grades and
 classes of ores.

This machine has been THOROUGHLY TESTED
 for the past TWO YEARS, under a GREAT VA-
 RIETY of CONDITIONS, giving most EXTRA-
 ORDINARY results FAR IN ADVANCE of
 anything EVER BEFORE REALIZED. A re-
 cent COMPETITIVE TEST at the Carlisle Mine in
 Mexico, showed an ADVANTAGE OF OVER 30
 PER CENT in favor of THE DUNCAN. The
 amount SAVED OVER THE TRUE being suffi-
 cient to PAY THE ENTIRE COST of the ma-
 chines EVERY MONTH OF THE YEAR. One
 of its MOST VALUABLE features is as an AMAL-
 GAMATOR. It saves all the AMALGAM GOLD
 and SILVER that ESCAPES the BATTERIES,
 PANS or SETTLERS, making the machine worth
 MORE than ITS COST for THIS PURPOSE
 ALONE.

**Baker's Mining Horse Power.**

Possessing all the requirements of a first-class hoist,
 and affording means for the continuous operation of a
 Pump or Blower, without interfering with a hoisting ap-
 paratus. It is made entirely of iron, no piece weighs
 over 300 pounds. At the ordinary speed of a horse, a
 1,000-pound bucket of ore may be raised 120 feet per
 minute. The hoisting-drum is under the complete con-
 trol of the man of the shaft, and is capable of carrying
 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Geo. W. Prescott, President.
 Irving M. Scott, Gen'l Manager.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. Dickie, Manager.
 J. O'B. Gunn, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
 HORIZONTAL ENGINES,
 AUTOMATIC CUT-OFF ENGINES,
 COMPOUND CONDENSING ENGINES,
 SHAFTING,

BABY HOISTS,
 VENTILATING FANS,
 ROCK BREAKERS,
 SELF-FEEDERS,
 PULLEYS,

STAMPS,
 PANS,
 SETTLERS,
 RETORTS,
 ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
 LOGGING, PORTABLE, STATIONARY, MARINE
 AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes
 Steel Wagon, Ruggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.
 STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
 Beams, Angle, Channel, and T. Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
 Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
 and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

All Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.**CHILLED CAR WHEELS.**

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



WIRE FENCING

Of various designs for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrances Gates, and Ornamental Work.

Barbed Wire.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

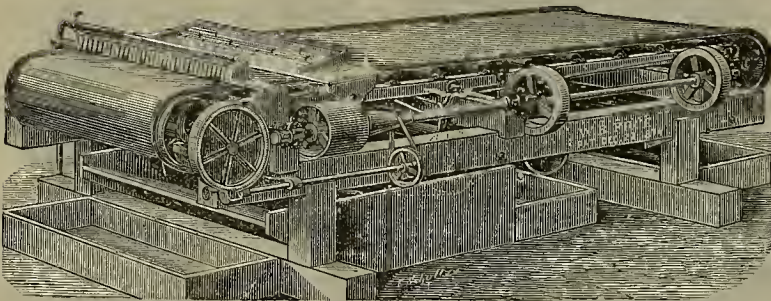
WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1876, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

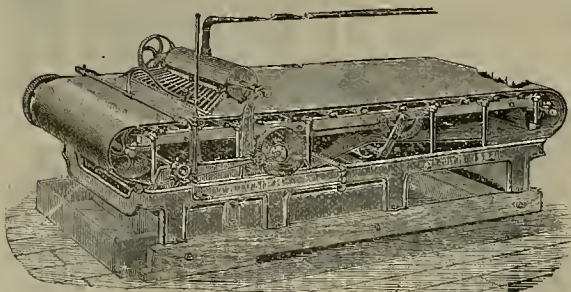
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

**PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.**

THE "TRIUMPH" TRIUMPHANT!

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, taunted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

"CLAYTON" IMPROVED

AIR COMPRESSORS

For CATALOGUES, ESTIMATES, Etc., Address,
Clayton Compressor Works,
Near Brooklyn Bridge, **BROOKLYN, N.Y.**

RUPTURE!

A New Invention! The "Perfection" Belt, with Universal Joint, Movement and Self-adjusting Spiral Springs. Worn with perfect comfort night and day. Given universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Inventor) 707 Market Street, cor. Third, San Francisco.

DEWEY & CO.'S

Scientific Press **Patent Agency.**

(ESTABLISHED 1860.)

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

L. PETERSON, INVENTORS. MODEL MAKER,
258 Market St., N. E. cor Front, up stairs, S. F. Experimental machinery and all kinds of models, tin, copper and brass.

The California Perforating Screen Company.

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

FLOUR AND OTHER MILLS.
Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco

THE HARMON SEMINARY,
Berkeley, Cal.
A BOARDING AND DAY SCHOOL FOR YOUNG LADIES.

Pupils taken at any time.
For Catalogue or other information, address:
THE MESSES HARMON, Berkeley, Cal.
Or E. J. WICKSON, 414 Clay St., S. F.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 8, 1885.

VOLUME LI.
Number 6.

Wrought-Iron Direct from the Ore.

The numerous direct processes which have been patented and brought before the iron masters of the world, differ materially from that now introduced by Mr. Wilson. He has succeeded in producing good blooms direct from the ore, and Mr. Willard P. Ward has, in a paper before the American Institute of Mining Engineers, pointed out theoretically the chief reasons of the success of his method. We condense from Mr. Ward's paper as follows:

In the Wilson process the conditions of the ordinary puddling operation are very closely approximated. Iron ore, reduced to a coarse sand, is mixed with the proper proportion of charcoal or coke dust, and the mixture fed into upright retorts placed in the chimney of the puddling-furnace. By exposure for twenty-four hours to the heat of the waste gases from the furnace, in the presence of solid carbon, a considerable portion of the oxygen of the ore is removed, but little or no metallic iron is formed. The ore is then drawn from the deoxidizer into the rear or second hearth of the puddling-furnace, situated below it, where it is exposed for twenty minutes to a much higher temperature than that of the deoxidizer. Here the presence of the solid carbon, mixed with the ore, prevents any oxidizing action, and the temperature of the mass is raised to a point at which the cinder begins to form.

Then the charge is carried forward by the workmen into the front hearth, in which the temperature of a puddling-furnace prevails. Here the cinder melts, and at the same time the solid carbon reacts on the oxygen remaining, combined with the ore, and forms metallic iron; but by this time the molten cinder is present to prevent undue oxidation of the metal formed, and solid carbon is still present in the mixture to play the same role, of reducing protoxide of iron from the cinder, as the carbon of the cast iron does in the ordinary puddling process. I have said that the cast-iron used as the material for puddling contains about three

per cent of carbon; but in this process sufficient carbon is added to effect the reduction of the ore to a metallic state, and leave enough in the mass to play the part of the carbon of the cast-iron when the metallic stage has been

reached, this sponge cooled down, in receptacles from which the air was excluded, to the temperature of the atmosphere, then charged into a puddling furnace and heated for working. In this way (and the same plan essentially has

"red-short." In the Siemens process pieces of ore of the size of beans or peas, mixed with lime or other fluxing material, form the charge, which is introduced into a rotating furnace, and when this charge has become heated to a

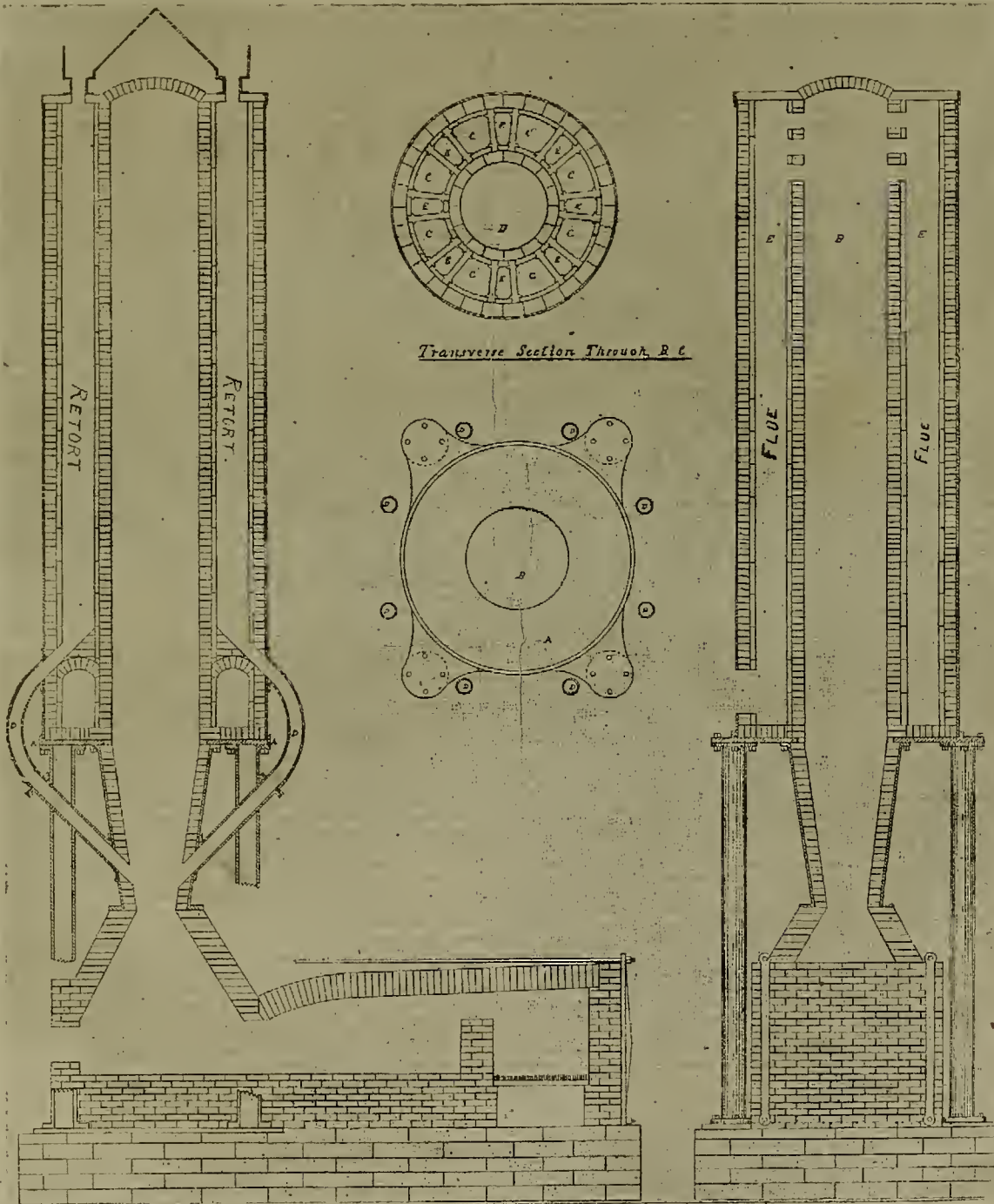
bright red heat small coal of uniform size is added in sufficient quantity to effect the reduction of the ore. The size of the pieces of the material employed prevents the intimate mixture of the particles of iron with the particles of carbon, and hence we would, on theoretical grounds, anticipate just what practice has proved, viz., that the reduction is incomplete, and the resulting metal being charged with oxides is red short. In practice, blooms made by this process have been so red short that they could not be hammered at all.

It would be impracticable in this process to employ ore and carbon in as fine particles as Wilson does, as a very large portion of the charge would be carried off by the draught, and a sticking of the material to the sides of the rotating furnace could scarcely be avoided. I do not imagine that a division of the materials into anything like the supposed size of molecules is necessary; we know that the graphitic carbon in the pig-iron employed in puddling is not so finely divided, but it is in much smaller particles than bean or pea size, and by approximating the size of the graphite particles in pig-iron, Wilson has succeeded in obtaining good results.

If we examine the utilization of the heat developed by the combustion of a given quantity of coal in this process, and compare it with the result of the combustion of an equivalent amount of fuel in a blast furnace, we shall soon see the theoretical economy of the process.

The coal is burned on the grate of the puddling-furnace to carbonic acid, and the flame is more fully utilized than in an ordinary puddling-furnace, for besides the ordinary hearth there is the rear hearth, where additional heat is taken up, and then the products of combustion are further utilized in heating the retorts in which the ore is partly reduced. After this the heat is still

Concluded on page 101.



WILSON'S FURNACE FOR MAKING WROUGHT IRON DIRECT FROM THE ORE.

reached. It is interesting to compare the Wilson with the numerous other direct processes, but there have been so many of them, and the data concerning them are so incomplete, that this is impossible. Two processes, however, the Blair and Siemens, have attracted sufficient attention and are sufficiently modern to deserve notice. In the Blair process a metallic iron sponge was made from the ore in a closed

been followed by other inventors) the metallic iron, in the finest possible state of subdivision, is subjected to the more or less oxidizing influences of the flame, without liquid slag to save it from oxidation, and with no carbon present to again reduce the iron oxides from the cinder after it is formed. The loss of metal is consequently very large, but oxides of iron being left in the metal the blooms are invariably

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Arizona.

Condition and Progress of Mining in Various Districts.

[Correspondence of MINING AND SCIENTIFIC PRESS.]

The writer returned a few days ago from an interesting trip of one hundred miles through a rich mineral region south of Prescott, and, although made in haste, a few items were gleaned. Almost immediately after leaving town, outcroppings of ore were noticeable on either side of the trail, which led over the Sierra Prieta mountains. In Groom Creek district, the first passed through, are a number of ledges carrying gold and silver, assaying \$50 to \$300 per ton, but little work is done on them. This region is well timbered with pines and oak, and well watered, as also is the Hassayampa district south of it. In this district is a greater number of mines that have been well prospected, and a few that have been worked to some extent. The ores are rich in both gold and silver, and assay all the way from \$20 to \$1,000. Rock producing \$100 to \$400 is common. This is also a rich placer mining district, and several hundred thousand dollars have been taken from the vast gravel beds along the Hassayampa creek. Like most of the small streams of this part of Arizona it furnishes an insufficient supply of water for mining during the summer months, and at present little is being done except to throw up piles of gravel to be washed when the water comes again. A great deal of the gravel is very rich, and in one mine we passed averages two and a half cents to the pan, or \$2.50 per cubic yard. Several miners make wages with rockers. Considering that these mines have been worked since 1863, it is surprising to note what slight impression has been made on the extensive gravel deposits.

Walnut Grove district, the next one south, which takes its name from a beautiful, green, tree-shaded vale locked in the close embrace of mountains and hills, contains many seams of rich gold quartz, but less has been done in developing this class of mines than in the other localities named. Several have been located which yield high assays, but nothing more than assessment work has been done on the major portion of them. The Montgomery group, consisting of the Lion, Tiger, Leopard and Badger mines, is near the upper end of Walnut Grove and about ten miles distant from Prescott. A tunnel 190 feet in length with side drifts has been run into this series of parallel ledges and a large amount of ore taken out. Assays have gone as high as \$300. One of the lodes is of low grade, \$25 to the ton, but its width is nearly 100 feet. A railroad now being constructed from the Atlantic and Pacific Railroad to Prescott, will, when continued southward to connect with the Southern Pacific, which is the intention, pass near these and other mines, when the advantages to be derived from cheaper transportation will permit of their being worked profitably.

At present they are difficult of access and only the ores of highest grade can be made to pay with the primitive methods necessarily employed. The gold ledges in this and adjacent districts usually contain free gold near the surface, but on sinking they run into sulphurets. Quartz from some of these ledges containing free gold is worked in arastras, but of course it is impossible to treat the sulphurets by the same crude process, and it is not probable that mills will be erected for that purpose in face of the difficulties now to be contended with, although many of these mines would be valuable properties under more favorable circumstances. In this district, as well as in the others, are gravel beds, or perhaps it would be more proper to say, a portion of the vast gravel deposit in the foothills of the Sierra Prieta and Weaver mountains. A little work is being done, but it is mainly in the way of preparation for the next rise of water in the streams. In the bed of Oak creek, a branch of the Hassayampa, water is plentiful at a depth of one to two feet, for the use of rockers, and wages can be made from the sand and gravel in the creek for a distance of more than a mile along its length. Men at work with half a head of water and a small string of sluices shortly before the stream stopped running averaged \$5 per day each. Water runs for eight months of the year, and why the creek bed has not been worked out long ago is a mystery. A painful of sand and gravel scraped up from the surface anywhere will show color, and occasionally nuggets weighing one to ten dollars are found at a depth of six inches to a foot. There is a large section of country hereabouts where any "dead broke" prospector can make more than a living with a rocker in the duldest season.

Lying west of Walnut Grove is Weaver district, the oldest in this part of Arizona, and its placers are the most widely known of any in the Territory. Of the wonderful deposit found on the top of Rich hill mention was made in a previous letter. In Weaver gulch, the head of which lies under the eastern base of this famous hill, and Antelope creek, on its western side, work is done every year during the short season when water runs in these small streams. A considerable quantity of gravel has been dug out of the banks, as on the Hassayampa, for washing when the head of water is sufficient. The land slopes off from the southern side of

the Weaver range in long mesas, and dirt taken from any part of them will give from a few colors to one or more cents to the pan. A number of Mexicans are at work with a dry-washer three miles below Rich hill, and are said to be making \$1.50 to \$2 per day each. Nearly all the work that has been done in the Weaver placers is in the bottom of the gulches, where the small supply of water was made to do as great a duty as possible; but so slight is the showing made that a stranger would never imagine the placers had been worked every year since 1863. If water could be supplied to all this gravel region, embracing an area of several hundred square miles, the annual output of gold should amount to many millions. There are also rich leads of ore in Weaver district. The Leviathan, the highest ledge in the district that has been prospected, is pierced by a tunnel 100 feet in length. It is calculated that it will average \$25 per ton, but has yielded ore which has gone twice as high when worked in arastras. The Bright and Marcus mines in this district have also been developed to a considerable extent. Quartz from the former is now being worked in an arastra. Sulphurets from this mine shipped to Pueblo for reduction have yielded \$275 per ton. These leads, like those in the other districts spoken of, run into sulphurets as they go downward. And nearly all of them, it may be remarked, are in a solid granite formation.

Eight miles further west in the Martinez district, is a promising group of mines, which, for lack of time, was not visited. To the south could be seen the dry, barren Vulture range of mountains in which, in Maricopa county, is the Vulture mine, which has been worked regularly for more than twenty years, and turned out several millions in gold bullion. The ore body is very wide, and, though for the most part of low grade, can be worked profitably. Water for the large stamp mill is pumped from the Hassayampa creek fifteen miles distant, the surrounding country being extremely dry. They have recently struck a body of \$12 ore sixty feet wide, and as they can work about 250 tons a day (twenty-four hours), at an expense of \$3 per ton, they should have a daily income of \$2,250 above running expenses.

The last mineral district visited was Copper Basin on the southern side of the Sierra Prieta mountains and ten miles from Prescott. In this basin is a vast deposit of copper, the extent or depth of which is not accurately known. Shallow prospect holes have been dug, and a few short tunnels run into the sides of the hills where it appears, but no extended development has been made in any one place. One of the most noticeable features is a horizontal shelf of conglomerate five or six feet in thickness, extending along the face of a ridge for a distance of about a mile and a half. Great masses of it have rolled down the hillside in places, and patches of blue and green are everywhere visible. This bed of a little creek below is also stained with green for a considerable distance. Where tunnels have been dug into the hill or shafts sunk, veins of copper are to be seen running through the rock in every direction. A few specimens were collected, consisting of azurite, red oxide and green carbonate, some of which was very rich. A great quantity of ore, including the coarse conglomerate spoken of, will yield twelve or twenty-five per cent in copper, and some will go as high as seventy-five per cent. In an excavation made beneath the horizontal out-cropping that marks the side of the mountain were found broken fragments of pottery, arrow-heads and other relics of a prehistoric race. The projecting roof was blackened with smoke, and bones found among the debris were dyed green by the copper with which everything is impregnated. Our stay in this interesting place was brief—arriving at dark and leaving early the following morning—and so little was seen that the writer is not prepared to say more. The ore body is an immense one, and being situated where water and timber are abundant and only ten miles from Prescott, which will soon be connected with one of the trans-continental railways by a branch line, should be one of the most valuable mining properties in the Territory. Gold is also found in the basin, and silver ore from a ledge now being prospected was shown which assays \$175.

Throughout the several districts spoken of are many mines which promise well, but upon which very little systematic work has been done, owing partly to their isolated situation. As a rule those that have been prospected best are the most promising; and should mills be erected on the ledges of largest size and highest grade, and custom reduction works put up in certain localities and more enterprise shown in the utilization of the water supply for the gravel diggings, the south central part of Yavapai county would soon become the largest gold producing region of equal area in any part of the Pacific Coast, and could also make a respectable showing in the yield of other metals. No one who knows the country will deny that gold exists in paying quantities in rock and earth and that it is not more difficult of extraction than elsewhere, and all will agree that so long as the present slipshod methods are employed by mining men the greater part of the golden treasure will remain where it is, awaiting the advent of a more enterprising class or generation. Lack of means has, of course, retarded the development of several claims, as well as poor facilities for freighting at a cost within the bounds of reason, but the same excuse will not answer for the condition of some others—lodes of high grade ore favor-

ably situated and rich gravel beds that can be supplied with heads of water during a large part of the year by judicious expenditures of money.

Besides the mines mentioned are many others in the several districts passed through, and in a few places arastras and mills have been built for working the ore, but as they were not seen and no authentic information of them ascertained, they are therefore omitted.

GEORGE W. STEWART.

Prescott, A. T., July 18, 1885.

Why Mines Do Not Sell.

EDITORS PRESS:—That there are many mines in this State is not to be disputed; but it is a fact equally certain that very few are ever sold. To read mining items in the newspapers one would conclude properties of this class are being constantly disposed of; but it is doubtful if half a dozen genuine bona fide sales are consummated on the whole coast in a year. A gentleman in San Francisco, who is always ready to undertake the sale of a mine that can stand an honest test, informed me not long since he had not in 20 years sold 3 mines in California or a dozen out of it. To put it briefly, there is no market for mines at home or abroad. It is not difficult to get at the true inwardness of this state of affairs. Mine owners seem to have no idea that the price of a commodity ought to bear some relation to its intrinsic value. If a mine is worth only \$50,000 to the purchaser, it will be found, without fail, that the owner will be asking six times that amount for it. On this basis properties have been sold on the Atlantic Coast and in Europe with the result of killing the industry almost entirely. Indeed, it is as much as a man's life is worth to even mention the word "mine" in the East at present. The whole business is associated in their minds there with chicanery and fraud, and even a solid man who has anything to do with a mine openly is looked upon with distrust and suspicion. Parties here who are indulging in golden dreams of foisting their properties on people abroad for three or four times their value are destined to be grievously disappointed. The unwritten law now insisted on in the purchase of a mine is that it shall have three times as much in sight as the price demanded, and that it shall be producing at such a rate as to return the principal to the buyer in three years. On this basis a sale may be sometimes effected in spite of the prejudice attending the transaction; but even then only as the result of a degree of energy, perseverance and diplomatic skill not often found in mine owners or their representatives. While the prices asked constitute the main reason of mines not selling, there are other causes, however, which co-operate in producing this result. Among these I may instance the difficulty of getting mine owners to listen to anything but cash payments. Now, a large mine never has been and never will be sold for cash in the ordinary acceptance of that term. When capitalists take hold of a mine they first organize a stock company, then they issue shares, floating the same on the market and turning over the proceeds of all sales made, less a fair commission, to the owner, till he receives the full amount agreed on. This is the method usually followed in London, the great center of all mining operations, and where the property is meritorious, always attended by the best of results. The smaller fry of mine owners I find just as exacting on the score of cash payments as their more important brethren.

Now, there are many people who would be only too glad to invest in a mine if they were first allowed to ascertain its value by working it, and not be compelled to purchase blindly. I know of a mine that has long been held at \$25,000. A company offered to put up a mill on it, work it for a year or eighteen months and then pay the price or forfeit the mill and value of all the ore taken out. The offer was refused, and the mine remains unsold. In another case a gentleman was willing to purchase a gravel claim if he was permitted to work it for thirty days; agreeing to turn over the entire product of the run to the owner, in case he did not find results sufficiently satisfactory to buy; refused again. Now, ordinary people can only draw one or two conclusions from this way of doing things—either that the miner is very simple or provincial, or that he has but little confidence in his property; in which event his endeavor to pass it off on anybody is equivalent to an attempt to swindle. Again, there are owners who are willing and even eager to dispose of a mine, and yet will not lay out a cent towards making a sale possible.

A prominent mine was recently offered in the Eastern States. The party to whom it was submitted was not satisfied with the page and a half scrawl which was all the authority, report and description the agent had to show from the owners. He demanded maps, drawings, a report by some reliable expert, the actual yield and expenses, as exhibited by the books—everything to be sworn to and acknowledged before a notary, when he said competent parties would be sent out to verify, and if representations were found to be correct, negotiations would be entered into. What more simple, honest or business-like? And yet the owners refused to listen to the proposition, because it would cost a few hundred dollars to

get up the maps, drawings and reports indicated. Now I am making no attempt to write down mine owners; they are, as a rule, a genial, hearty class of fellows, whom it is pleasant and satisfactory to know; but at the same time I want them to see they are standing in their own light, and that they must reform their methods, especially as regards prices and modes of payment, if they do not want to have their mines on their hands forever. EXPERIENCE.

Bullion at the Mints.

As depositors of bullion at the mints and assay offices are promptly paid in nearly every case the value of their bullion on the succeeding day, almost the entire gold product of the country, except native gold or bars from private refineries used in the arts, is directly or indirectly sent to the mints and assay offices, where an accurate record is made of its character and description, which, as well as the locality from whence derived, except as to bars from some of the large refineries, are in most cases apparent to the weigh clerks upon inspection or easily ascertained by inquiry of the depositor or knowledge of his business.

From these records monthly reports are forwarded to the office of director of the mint, which cannot overestimate or understate the value of such bullion without showing discrepancies readily discovered and corrected between these statements and the quarterly accounts rendered by the officers, which also give the value and the amount paid for such bullion. The erroneous designation of foreign bullion as domestic rarely happens, except where refined bullion received from private refineries consists of gold bars, which, although made up in part from foreign bullion, are recorded as domestic bullion. But the statements furnished by these refineries show the amount of such bullion, and this amount is deducted from the reported receipts of domestic gold at the mints and assay offices, or is offset against undeposited and unrefined gold production used in the arts, ornamentation, etc. Indeed, it might be claimed that some of the gold deposits reported as foreign bullion are domestic, and that an addition should be made to the estimated production on this account; for the amount of foreign gold bullion reported as deposited at the mints and assay offices annually exceeds, by several hundred thousand dollars, the imports of such foreign bullion entered at the custom house. But this excess probably arises from this receipt of bullion brought from Nova Scotia and Mexico across the border without being entered in the custom house returns.

The total deposits of gold and silver and purchasers of silver bullion during the year 1884 at the institutions under the charge of the mint director, exclusive of the redeposits, amounted to \$50,519,886 gold; silver, \$36,671,088. Of the gold \$266,877 was of United States coin; \$6,328,922 foreign coin; \$11,217,309 foreign bullion; \$1,899,577 jewelry, plate, etc., and \$30,807,200 was of domestic production.

The custom house returns report the export of \$115,963 of domestic gold bullion, exclusive of \$22,950,259 United States mint or assay office gold bars.

It might be proper to add to the deposits of domestic bullion this sum, \$115,963, and the value of the gold, some \$600,000, contained in the silver bullion exported, and also the amount of undeposited gold used in the arts and ornamentation, which, in the form of nuggets, native grains, etc., appears from responses to inquiries to have been for that year over \$700,000, and in the form of bars from private refineries at least \$200,000, for the excess of the production of one refinery on the Pacific Coast over its deposits at the mint and the export of its gold bars during that year was \$130,000. These amounts added to the gold deposits would increase the production of domestic gold not less than \$1,500,000. But of foreign gold bullion received at San Francisco from British Columbia and the northern States of Mexico, amounting to about \$1,100,000, only \$400,000 was deposited at the San Francisco mint as foreign bullion, and the remainder, as shown by the statement of private refineries, was refined before its deposit at the mint, and was included in the returns from that institution of refined gold of domestic production.

SCHOOL OF MINES WORK.—The Colorado School of Mines, acting under orders from Governor Eaton, has commenced a work which it is hoped will be a great benefit to the mining industry of the State. Four gentlemen have been appointed to examine and report during the season on special branches of the mining interests of Colorado. One goes to the district comprising Georgetown and Central City. One inspects the iron mines of the State, another the coal mines, and the fourth, Mr. M. C. Ihlenseng, is deputed to examine the San Juan country, with a special view to inquiring into its mineral resources, productions and method of the treatment and concentration of ores. A great effort will be made to ascertain why ore is not concentrated as successfully in this country as in Europe. While in Europe the excess of loss in concentration is 10 per cent, and the average loss between four and ten, in this country the most successful works have only been able to save 65 per cent of the whole.—*Denver Journal of Commerce*.

MECHANICAL PROGRESS.

Supplying a Demand.

Prejudice, says the *American Machinist*, has a good deal to do even with as enlightened a business as that of the machinist. Sometimes a manufacturer is, naturally enough, impressed with the idea that the best place to sell good tools and machines is where they are needed most, that is where they are using poor ones, but in the end finds that it needs more missionary work than he is prepared to engage in, and comes to the conclusion that it is easier and more profitable to sell to those who know the advantages of such things by experience.

Old tools and obsolete machinery stand in many places like old friends—not to be lightly put away in favor of something new. After all, the old engine turns over, which is just what the new one will do, or the old lathe runs with a belt just like the new one. These are arguments that cannot be opposed, and are sometimes conclusive.

More than one machinist, looking around for an opportunity to start in business in a moderate way, has come to the conclusion that his best opportunity would be where his work and tools would be a hundred per cent better than anything there, and found in the end that he had a hard job to get a chance to compete with old tools and methods with which every one was familiar. This is not mere fancy, as many have found out through an unpleasant experience. When a man is thoroughly satisfied that he can get along with poor work, done in twice the time that it ought to be done in, argument in favor of something better is wasted on him. It is more fruitful to talk to the man who is not satisfied. The demand for better things comes from those who are never entirely satisfied with what they have.

There are localities where the best classes of steam engine find no sale, as well as those where none others are used. And so it is sometimes with machine tools, and to some extent with the work done with them. "Yankee" tools, "gilt-edge" and "high-toned" are terms sometimes used to express ignorance of the qualities of design and workmanship. It is valuable work to reform opinion in such places, but it is not an easy thing to do.

In supplying foreign demands, prejudices has to be carefully studied. It is what those who buy think they want, and not what the manufacturer knows they ought to have that must be supplied. In the end, it is to be expected that everywhere the best will reach the head, but the end may be so far away as to make it useless to work for it, except in a spirit of pure benevolence, in favor of succeeding generations. The question of supply and demand is always the important one, only demand must generally come first. When the demand is for the best that is to be had, the manufacturer who supplies such, or the machinist who proposes to do good work, finds an opening, because he can supply the demand. When the reverse of this is true, the supply must be of another kind.

Deterioration of Iron.

For fourteen years Dr. Collett, State Geologist of Indiana, has been experimenting and studying the action of iron under various circumstances of use and duty. The results of his experiments and observations have much interest and importance to the machinist and engineer. He holds, in the light of his study, as above, that the best iron, when subjected to continuous strain, will undergo changes in its structure which will, after a time, render its use dangerous, and that these structural changes afford the explanation of many otherwise inexplicable accidents, particularly to railway bridges. He has lately undertaken a systematic investigation, which has resulted in the confirmation of his theory. For experiment he took from the Walsh dam, at Delphi, a number of bolts and spikes, which were, when the dam was constructed, of the best quality of malleable bar iron, as is shown by the hattering of the head when they were put into the structure. Of these bolts and spikes he found that 70 per cent of the whole number were as weak as cast-iron, while 90 per cent of those which were near the bottom of the dam were worthless; yet, of those which were rotten, the tips where inserted in immovable rocks were fibrous and strong. When broken they showed polished ends to the connecting fibers, indicating that the continued vibrations of many years had polished and rounded the points of fibrous structure. A similar effect is found in "the partings," or "horsebacks," in coal mines, which become polished and striated by the continuous quiver and motion of the crust of the earth. Dr. Collett says that all car axles, after a reasonable run, become crystallized two-thirds of the length from the hub and one-third from the outside extremity, rendering them worthless. On one Indiana railroad bridge he found that the bottom parts of the vertical strain pieces were crystallized for from two to four feet in length, and, as a precaution against what would invariably have caused a great catastrophe, they were replaced. The matter is one of great interest to railways, and the specimens which Dr. Collett has collected in his experiments are to be sent to the Stevens Institute of Technology, where an investigation of the subject has been in progress for years by a scientist connected with the institute.

GENERAL MACHINE WORKS.—The effort on this part of most machine shop proprietors in this country, for the past few years, has been to change from general work to specialties—to convert the machine shop into a manufacturing establishment. In many instances, it looks as if the plan had been too well carried out. Shops that are ready for jobs out of the line of regularly manufactured specialties are, we believe, as a rule, better provided at the present with work than those engaged on specialties. There will always be room for a fair number of good shops, well fitted for taking hold of jobs not in any special line of manufacture. A certain proportion—not a small proportion either—of machine work is general in its character. Jobs, large and small, are constantly wanted that will never require duplication, and these naturally find their way to shops that are well provided for doing them at reasonable cost without special appliances. Again, there is always being constructed a large amount of experimental machinery, in which important modifications will be made before it passes to the stage of manufacture. The general machine shop should be able to bring this machinery up to the point of manufacture, and then pass it along to those who will arrange for systematic manufacture. Good tools, judiciously selected for this kind of work, and above all, the best kind of shop management, is required for this. With these the general machine shop is not always the one that is left in the race for business. The ability to handle a variety of general work, so as to get it out well and cheaply, has come to be more of a specialty than the manufacture of any particular line of machinery. There is, in the future, fair prospects for the general machine shop ready to take hold of a job without any red-tape preparation.—*American Machinist*.

"LIMBERING" UP.—If it were more clearly understood that mere flexibility in machinery, as the term is often used, does not necessarily mean a correct case of motion, says the *Industrial World*, there would be a good deal gained in the interest of economy and of efficiency, although these two words mean very much the same thing. It is customary to speak of the "limbering" up of a machine by or during the first few days that it is run, but this word may have two very different meanings. One is that all the moving parts have become thoroughly oiled and polished, as they only can by actual working; they should be held in place loosely, all the building bolts and adjusting screws being left slack for this purpose. The other meaning, often very incorrect or injudicious in its application, implies that little or no exact workmanship need be used in the fitting or erection of machinery so long as things are left loose to "find their bearings," as the term is, the misfortune really being that most things, when left to themselves, are likely to move out of correct adjustment as well as to remain in it, the usual result of any actual working being to cause a loss of accuracy from the first.

IRON AND STEEL UNDER THE MICROSCOPE.—Eminent metallurgical chemists, experimenting with steel under a powerful microscope, have discovered the relative conditions of the iron and carbon particles in steel. The fine granular appearance of steel, so well known when closely examined under the microscope, is found to consist of a multitude of minute cells, the nucleus of each cell being formed of iron and carbon forming the outer skin. The investigators who have made this discovery expect to be able, in the course of further researches, to demonstrate the position that impurities such as phosphorus, sulphur and silicon hold in the structure of steel. This line of inquiry is likely to produce valuable results in showing exactly the structural changes that take place on steel under conditions approximate to what it has to endure in ordinary service. At present there is exceedingly little real knowledge respecting the changes that take place in the internal arrangement of metals under service.

THE AMERICAN EXHIBITION IN LONDON.—Mr. J. G. Speed, general commissioner of the American exhibition that will be opened in London on May 1, 1886, says: "The chief object of the exhibition is to give Englishmen who want to invest capital a chance to form an intelligent opinion of what the opportunities in this country are. It will be an exhibition of American products only. It is proposed that the railroads shall thus advertise their advantages, the States their products and the manufacturers their wares. Samples of everything that this country has for sale will be exhibited. It will be the first exhibition of the kind ever made."

SHEAR STEEL.—Shear steel is made by taking a high heat on blister steel and hammering it thoroughly. Double shear steel is made by cutting up shear steel, piling it, heating it, then hammering it again. The heat shear steel must be made from the best wrought iron. The shear steels are very useful on account of their toughness and the ease with which they can be welded to iron, and, when of good quality and well worked, they will hold a very fine edge.

ADHESIVE POWER OF NAILS AND SCREWS.—Spike nails in fir is from 460 to 730 pounds per inch in length, while the adhesive power of screws, 2 in. long, 0.22 in. in diameter at the exterior of the threads, twelve to the inch, driven into $\frac{1}{2}$ -in. boards, was 790 pounds in hard wood, and about one-half that amount in soft wood.

SCIENTIFIC PROGRESS.

FORMIC ACID.—This acid which is found in ants, from which it takes its name, is also contained in nettles (herba urticae), and in some pine needles, from which it is obtained by distillation with water. It is also a product of the oxidation of various organic substances, especially of sugar, starch, etc. In the animal system it is found in the sweat, blood and urine in very small quantities. It is also produced by the oxidation of methyl alcohol, by the decomposition of chloroform, iodoform, and bromoform with potassium hydrate, in the form of potash salt, and from hydrocyanic acid. It may also be synthetically prepared from carbon monoxide and potassium hydrate. Formic acid is generally obtained by the decomposition of oxalic acid in the presence of glycerine, the oxalic acid being split up into carbon dioxide and formic acid. Equal parts of oxalic acid, dried at 100 deg. C., and glycerine are heated to 110 deg. C. until the evolution of carbon dioxide ceases. The oily mass is then mixed with water and distilled. In this way a dilute acid is obtained. The pure acid is prepared by decomposing the lead salt with hydrosulphuric acid.

CHEMICAL ELEMENTS IN MARBLE.—The interesting discovery has been made by M. Dicuclafait that manganese, in the state of bicarbonate, exists in the waters of all seas and oceans, and the fact also appears that, in contact with oxygen, this bicarbonate becomes binoxide; it follows, therefore, that oxides of manganese must be produced in large quantity in the ocean, and sinking by its weight must accumulate on the ocean-bed. Thus is explained the existence of the large amount of binoxide of manganese concretions and manganese mud found in the sea-bed. It also accounts for the presence of manganese in the French and English chalks of the secondary period, and for the interesting fact recently made known, that the famous artistic marbles of Carrara, Paros and the Pyrenees are comparatively rich in manganese. There are two kinds of Carrara marble—the ordinary, which has a bluish tinge on fracture, and the statuary marble, so very pure and white—in both of which the well-known chemical reaction shows manganese. Parian marble, which has larger grains than Carrara, also shows manganese in even greater proportion than the latter; and the Pyrenean marbles, which resemble the Carrara in being of two qualities, contain manganese in similar degree.

HEAT, LIGHT AND VEGETATION.—THE TIME TO PLANT.—Dr. Hellriegel has found that it is very important to plant development that the time of seed forming and the season of greatest heat and light should be coincident. He has illustrated this by experiments in which he sowed barley under otherwise identical conditions, on April 21, May 28, June 28, August 2, and September 1; the first crop becoming ripe in 88 days, the second prematurely ripe in 87 days, (the maximum heat and light happening too early in the plant's growth), the third ripening imperfectly in 150 days, the fourth in 200, and the last in 240 days. From this it appears that the productiveness of a country depends not so much on its mean temperature as on the question whether its supply of heat is received at the right time, and in England the wheat harvest is known to be chiefly determined by the temperature during July and August. Under glass plants are subject to a great reduction of light, which, with other unfavorable conditions of hot-houses, Dr. Hellriegel has shown to diminish very seriously the fruitfulness of plants. There is little difference, however, in the influence of different colors of light.

UNIVERSITY EDUCATION.—England, with a population of 25,000,000, sends 5,000 students to her two universities; Scotland, with her 4,000,000, has 6,500 university students; Germany, with 48,000,000, sends 23,500 to her numerous universities; and New England, with a population of 4,100,000, has 4,000 students in her eighteen universities and colleges. According to the above figures, Scotland leads all the rest in the matter of the most general diffusion of university education among her people. She sends to the university one in every 675 of her population. Then England comes next with one in 1,025. Germany stands third, and educates one in every 2,042; while England educates only one in 5,000 of her population.

OIL IN STORMS AT SEA.—The Hydrographic Office of the Navy Department has for several months been engaged in collecting data to determine under what circumstances the use of oil is most efficacious in diminishing the danger of breaking seas during gales of wind. When sufficient data have been collected, it is proposed to issue a pamphlet giving such directions in regard to the use of oil as common experience of seamen may determine to be best. Such a publication will undoubtedly be of vast benefit in saving life and property at sea. It is to be hoped that no unnecessary delay will be permitted in placing before the world the information promised.

THE HUMMING OF TELEGRAPH WIRES.—The humming noise which frequently proceeds from telegraph wires has usually been ascribed to the vibration of the wires under the influence of the wind. The fact is brought out, however, in a recent issue of the *Popular Science News*,

that this humming noise is often very loud and intense on still nights when not a breath of air is stirring. This fact we have also observed. It would appear probable, therefore, that there is some other cause involved, which it might repay some interested electrician to search for.

MAGNETS OF HARD STEEL.—An electrical contemporary informs us that bars of file-tempered steel may be strongly magnetized by the following method, and great permanency secured: An old file, for example, is placed in a coil of moderate-sized wire, with one end resting against a block of iron; one of the wires from a dynamo is connected to one end of the coil wire; to the other end of the coil wire is attached a small block of iron, which rests against the free end of the file; the other wire from the dynamo is attached to a good-sized hammer, the face of which is past injury by the spark. It is clear that, when the block to which is attached the coil wire is struck by the hammer against the end of the file, it gives it a mechanical shock, while at the same instant the current passes through the coil, which, being instantaneous, will not injure it, even though very powerful. By this plan of combined mechanical and electrical shock, the molecules of the hard steel are jarred into position.

THE METAL GALLIUM.—It is stated of the new metal gallium, that with the exception of mercury, which only becomes solid at 37.9° Fah., there is no other element which liquefies at so low a temperature. It melts at 81.1° Fah., so that it liquefies when held in the hand. The metal is hard and resistant, even to a few degrees below the melting point. It can be cut, and possesses a slight malleability. When fused it adheres easily to glass, on which it forms a beautiful mirror, whiter than that produced by mercury. It oxidizes but very superficially when heated to redness in air, and does not become volatile. Unlike lead, it acquires only a very slight tarnish on exposure to moist air. Its specific gravity is a little under 6, that of aluminum being 2.6, that of zinc, 7.1, and that of lead 11.4. Unlike lead, again, gallium is a highly crystalline metal, its form being that of a square octahedron. In its chemical characteristics the rare element gallium shows the greatest analogy to the abundant element aluminum.

A WELL-MERITED COMPLIMENT.—The Franklin Institute, having been invited by the British Society for the Encouragement of Arts, Manufactures and Commerce, to nominate a suitable person to receive the "Albert Medal," has proposed the name of Mr. William Sellers, for his improvements in the construction of machine tools, which has been the model for machinists of all nations; and for his origination of the system of screw threads, which bears his name, and which received the approval of the Institute, and has been adopted by the Government of the United States.

COCAINE, the new local anesthetic that has suddenly achieved such an excellent reputation, has been known as such for a great many years, but for a long time was found to be too expensive for general use. The great progress now is the cheapening of the product. Its properties are due to a substance nearly identical with theine, the active principle in tea, and it is, indeed, obtained from one of the tea plants—the mate, of Paraguay. This is known botanically as *Erythroxylon coca*, cocaine, of course, being derived from the specific name.

GAS VS. COAL.—On the first of July it is said that every iron and steel mill in Pittsburgh and vicinity, with one exception, was using natural gas as a fuel. This will reduce the consumption of coal 38,250,000 bushels per annum, or one-seventh of the yearly output of the region tributary to Pittsburgh, and will throw out of employment thousands of firemen, coal-heavers and ash-haulers employed in the mills—truly an important revolution for which nature, rather than art or invention, is responsible.

REMARKABLE PHOTOGRAPHIC WORK.—Prof. Mach, of Prague, has obtained some remarkable photographs of a pistol hull in its flight under the illumination of an electric spark. He has also photographed the air streams which are seen over a Bunsen burner placed in sunshine, and has obtained pictures of waves of sound, these last being made visible by a method in which advantage is taken of the irregular refraction of light by the waves set in vibration by sound.

A NEW MODE OF OBTAINING OXYGEN.—Pure oxygen and the oxygen as it exists in the atmosphere have been proved to the satisfaction of M. L. Troost capable of passing through the sides of a heated tube of silver, but that only a mere trace of nitrogen found its way through the silver. It is suggested that pure oxygen may be obtained from the atmosphere by taking advantage of this permeability of silver to oxygen gas, but the metal must not be heated above 500° C.

SPONTANEOUS COMBUSTION FROM COAL DUST.—This conclusion has been reached by Mons. Fayol that the absorption of atmospheric oxygen by coal dust usually produces the rise in temperature to which spontaneous combustion is due. He finds that lignite is ignited at the low temperature of 300 degrees, anthracite at 575 degrees and other varieties of coal, in powdered form, at intermediate temperature.

MINING SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.
DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... 25 82.20 85.00
Half inch (1 square)..... 1.50 4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 8, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Wrought Iron Direct from the Ore, 97. Passing Events; Accepting the Situation; Improved Mining Outlook in Nevada, 100. The Imperfection of Mining Laws and their Amendment; Measurement of Water and Description of Weir Dam, 101.

ILLUSTRATIONS.—Wilson's Furnace for Making Wrought Iron Direct from the Ore, 97. Weir Dam for Measurement of Water, 101.

CORRESPONDENCE.—Arizona; Why Mines Do Not Sell, 98.

MECHANICAL PROGRESS.—Supplying a Demand; Deterioration of Iron; "Limbering" Up; Iron and Steel Under the Microscope; The American Exhibition in London; Shear Steel; Adhesive Power of Nails and Screws, 99.

SCIENTIFIC PROGRESS.—Fornic Acid; Chemical Elements in Marble; Heat, Light and Vegetation; University Education; Oil in Storms at Sea; The Humming of Telegraph Wires; Magnets of Hard Steel; The Metal Gallium; A Well-Merited Compliment; Gas vs. Coal; Remarkable Photographic Work; A New Mode of Obtaining Oxygen; Spontaneous Combustion from Coal Dust, 99.

ENGINEERING NOTES.—Steel vs. Iron Girders; The Mersey Railway; Cast-Iron Columns as Main Supports; The Ship Canal Across Ireland; The Longest Draw-Span Known, 103.

USEFUL INFORMATION.—Geography in 1738; Tanning Fibrous Material; Clothes Lines Wet and Dry; Testing Gold and Silver; The Metals in Ship Building; Rope from Asbestos; A Novel Method for Cutting Glass Tubes; A Steel Tempering Process; To Keep Silver Plated Articles Bright; Tempered Copper, 103.

GOOD HEALTH.—Mullein Leaves in Consumption; Working and Sleeping; Tea as a Beverage; Treatment of a Felon; Pure Food; Sinking at the Stomach; Chlorine and Germ Diseases, 103.

MISCELLANEOUS.—Bullion at the Mints, 98. Treatment of Dry and Base Silver Ores; Notices of Recent Patents, 102.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon and Utah, 104-05.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 103.

Business Announcements.

Gold Mine for Sale—H. Johnson, Sacramento.

See Advertising Columns.

Passing Events.

Locally considered the past has been an uneventful week other than the universally observed obsequies of General Grant have served to distinguish it. Never has the popular heart been so touched, or the emblems of sorrow so abounded in the city before. But this sorrow came so gently that it failed to take any frantic form—like the twilight it fell softly on the nation, and like the twilight traveled round the world. He glorified us and we have glorified him. We rest, for we shall never be called upon to perform another such service, as none will probably ever come to deserve it.

As minor events we note that Judge McFarland, of Sacramento, has granted the mandamus ordering Controller Dunn to draw his warrant in favor of debris dam contractors, notwithstanding the Supreme Court has decided the act authorizing the constitution of these days to be unconstitutional. Judge McFarland, however, takes the ground that the law was valid up till the time it was pronounced unconstitutional, therefore the claims that had accrued in the interview were also valid.

Col. Demby, minister to Peking, has arrived in the city and is to be duly enlightened on the Chinese question, the municipal authorities having taken steps to that end—the local papers are also helping on the good work after their way. During the week the Spring Valley Company let the water into their new reservoir in South San Francisco, nearly doubling the city supply. The question of securing better drainage in the south part of the city as a sanitary measure is claiming much consideration at the hands of our supervisors.

Accepting the Situation.

We judge from the tone of the Eastern press and from conversations had with parties recently returned from the other side of the continent that the mines of California are at a discount among business men, capitalists, bankers, and all other classes over there. To such extent is this the case that parties buying or taking any interest in California properties of this kind consider it politic to do so in a clandestine way, fearing it might hurt their credit were the fact to become generally known. We are assured that it is quite useless for any one to go East at the present time hoping to sell mines or enlist capital in any mining enterprise in this State, however strong the testimonials in favor of either. Parties arriving in any of the larger cities on the Atlantic seaboard are at once advised that nothing in that line is wanted, notices being sometimes conspicuously posted in the stores, offices and other places of business to that effect, the more timid people cautioning visitants against "talking mines" when customers are about.

Now, we suppose this is all right—these people, no doubt, have or think they have, good reasons for so letting our mines severely alone. Some of them have lost here a good deal of money. It is none of our business that they have lost even more heavily in speculations elsewhere. When men have lost money, no matter where or how, it is the dictate of prudence and business sense that they exercise greater caution in the future; and if this caution becomes extreme, amounting sometimes to timidity, so much the better for them and none the worse for us, because most of the money they lost in mining ventures here went into the pockets of reckless speculators, incompetents and swindlers, who in turn spent the greater part of it in fast living and other illegitimate ways, very little of it ever having been applied to the development and outfitting of the mines. We, therefore, find no fault with the course these Eastern people are taking in this regard; we approve of it, and hope they will not relax their vigilance, or abate one jot of this wholesome distrust of parties who come among them trying to sell mines or promote mining schemes in this State.

At the same time we know very well that we have here a great many good mines, some of which offer excellent opportunities for investment. Gold mining is in a very healthful condition with us at present, and its future is full of encouragement. The business here is bound to come up. It may not, and we hope it will not, come up with a clang and a burrah, but it is coming up surely, steadily and to stay. We would be the better of a little outside assistance, but we can get along without it, and rather than see investors abroad lose or even imperil their means we would forego any expected benefits contingent on their taking such risks.

So comparatively little noise has been made about mining in California of late that many no doubt suppose the business has declined in a corresponding degree. Such, however, is far from being the case, this industry having been growing steadily for several years past, as the increased product of bullion shows. We returned but a week or two since from a trip through the more central and important mining counties of the State, and not in an experience of thirty seven years in the mines have we seen them in a more satisfactory condition than at this time. We do not mean that as much gold is being taken out or that individual earnings are as large now as aforetime, but that the business is rewarding both capital and labor fairly, and at the same time with much greater certainty than in the flush days of mining. Though not so remunerative, it is by no means as hazardous now as then, nor is it attended with so much danger and discomfort.

In speaking of earnings, it will, too, surprise many to be told that they are not, on an average, so much less now than they were 20 or 30 years ago. Our annual production of bullion amounts now to, say, \$18,000,000. Estimating that there are at present 30,000 men at work in the mines of this State this gives \$600 annual earnings per man. In 1854 the bullion output of the State amounted to \$65,000,000, which, supposing there were 200,000 men employed in the mines that year, gave only \$325 as their individual earnings. But then these earnings

were made without the aid of capital, a good deal of which is now required in operating our mines. Considering how much they earn and how cheaply they can live, the California miners are in a position to lay up more money than any other class of laborers in the State. While a majority of our gold miners are self employers, many work on hire; but these always receive good wages, generally from \$2 to \$3 per day, their average wages being about \$2 and found.

Many good judges are of the opinion that bullion production has reached here its point of greatest depression, and that from this time on for many years to come it will undergo a slight but steady increase.

This opinion is based mainly on the expected rapid development of the quartz mines, of which we have so many that will pay for working in California. This branch of the business is, as before observed, both active and prosperous, new lodes being opened and mills put up everywhere throughout the mining regions of the State. Drift operations are also being extended wherever this class of mining is practicable, the partial cessation of hydraulic work in the more central districts having diverted attention to the old river channels, the principal sites of the drift deposits. From these channels a great deal of gold will hereafter be taken, since ten times as many men as are now at work might be employed there to advantage. With capital to open up these vast repositories of wealth, they might be made to yield ten or fifteen million dollars annually instead of only two or three millions as at present. When it is considered that our other branches of placer mining ought to turn out at least ten and our quartz mines fifteen million dollars every year, there is nothing extravagant in predicting for California a return to something like her old-time bullion production—say thirty million dollars per annum inside of the next ten years.

Improved Mining Outlook in Nevada.

As is well known, the bullion product of the State of Nevada has been gradually declining for the past seven or eight years; that is to say, ever since the exhaustion of the Consolidated Virginia and California bonanza on the Comstock range. This declension having been so marked and having continued for so long a time the opinion had begun to prevail that this State would never be restored or come anywhere near being restored to her former position as a bullion producer. And so, faith in the mineral resources of Nevada fell at last to a very low ebb. An interregnum had, it is true, occurred more than once before in the Comstock production, but none had been so notable or protracted as this. Meantime, the confidently expected and much hoped for developments elsewhere in the State were delayed and the prolific ore bodies in various mines that had been yielding liberally began to dwindle, and in some cases went out altogether. Treasure Hill, in White Pine, remained a perpetual disappointment, no second Eberhardt having to this day been unearthed there, though sought after persistently and with large expenditure of labor and money; and so of a score of other once encouraging localities scattered all over the State—localities that kept the promise to the ear, but broke it to the hope, and, to make matters worse, while such diligent and prolonged search after new ore deposits were so barren of fruition nearly all the more largely productive mines, as above stated, began to fail.

The output at Eureka year by year suffered contraction; Reese River, after a short-lived prosperity went under a cloud. The marvelous wealth of the Sheba vanished in a day, and the other Humboldt mines prematurely petered out; Pioche perished suddenly; the Northern Belle, after a short flirtation, bowed a sad lack of staying powers, and the bodies near by were carried off with a galloping consumption, yet discoveries of big things were all the while being announced, the most of them proving in the end as illusory as the mirage that dances over the Nevada deserts. Baffled in their efforts to find new bonanzas, or even remunerative ore bodies, the prospectors sought other and more promising fields of endeavor, and the mining population of Nevada decreased so rapidly that there was at one time a talk of disorganizing the State and relegating it to a territorial condition, though such procedure was probably never

seriously contemplated by a majority, or even any large number of the people.

But now comes the U. S. Surveyor General, of Nevada, with the information that her wealth of gold and silver is really very considerable—greater, perhaps, than she is just now being credited with, if not all that the pioneer prospector supposed it to be. The bullion yield of the State for the current year will, we are told, approximate \$10,000,000, being considerably larger than it was last year. The Surveyor-General also claims that it has been demonstrated that rich ore exists more than 3,000 feet below the surface of the earth, and that the Hale and Norcross mine is entitled to the credit of making the first bullion shipment from such a great depth. The daily ore product of the Comstock mines is 600 tons, keeping over 200 stamps on the Carson river constantly employed in crushing it. The ore is low grade, but returns a fair profit above expenses of mining and milling. By reason of this, extensive prospecting operations are being carried on in nearly every prominent mine on the lode, and there is every probability that valuable discoveries will be made in the near future.

It may be true as here stated, that some rich ore has been found in the Hale and Norcross mine at a depth of more than 3,000 feet. The importance of this fact depends, however, on how much of this ore has or is likely to be found and upon how rich it is. If it is of only medium grade, no matter how much there may be, it cannot, under the circumstances, be mined, brought to the surface and milled with profit; and so, on the other hand, no matter how rich it may be, if there shall prove to be but little of it, the find can be of no great consequence. If by reason of this find other companies on the Comstock have been encouraged to engage in extensive prospecting operations, as the Surveyor-General states, there is a chance that this Hale and Norcross revelation will result in more harm than good. Would it not be more prudent for these companies to wait a little, and before expending their money see what is likely to come of this embryonic bonanza? Possibly it may turn out to be of only Lilliputian dimensions, and may even fall still-born as have so many of these Comstock conceptions. In their action, however, these companies are but repeating the old error—rushing ahead and squandering their means, when by a little delay they might be able to determine whether the prospect would justify any further exploratory work being done or not.

Continuing his remarks on the improved condition and prospects of mining in the State, this official adds that Tuscarora is still contributing to the wealth of the country. Eureka, Austin and Candelaria have done fairly well during the past year, and will do better in the future. But there are hundreds of small mines scattered throughout the State which have caused the bullion yield to be greater than last year's product, and from these have come the mineral to more than make up the deficit of the hitherto big districts. Prospecting is being as keenly followed as ever, and there would be an immense "boom" in that line if the prospector could be placed on the same footing as the farmer. The greatest need of Nevada to-day is reduction works. What Colorado has done can, it is claimed, be discounted in Nevada, but private capital seemingly has so many attractions elsewhere that it is loath to take hold of any enterprise in the State. An enlightened public sentiment will, in the opinion of the Surveyor General, soon demand that the State itself shall maintain reduction works in connection with this State University. This would, he thinks, prove a profitable investment to all concerned, and make work for hundreds, homes for thousands, and business for all.

We very much doubt the policy of the State engaging in the business of ore reduction as here suggested. There were once put up near the site of this State University extensive and very complete reduction works but they failed, partly because the expense of carrying them on at that point was too great and partly through want of support. The Selby Smelting Company are now erecting reduction works at a point in this State convenient to the mines of Nevada. As these works are to be of large capacity and as perfect as any in the world, we think it would be better that the refractory Nevada ores be brought to these new works for treatment, since once on the cars the additional cost of bringing them on to that point would be but trifling.

In concluding this branch of his report the Surveyor-General expresses the belief that mining is but in its infancy in Nevada, and under proper systems that State will some day resume her former position as the richest mineral State in the Union.

Sympathizing in the above hopeful view, we await the time that the "Sagebrush" State shall be restored to something of her old-time prosperity and standing, leaving the while something of her old-time mistakes, errors and extravagance behind.

Wrought-Iron Direct From the Ore.

(Continued from page 97.)

further utilized by passing it under the boilers for this generation of steam, and the heat lost in the gases, when they finally escape, is very small. In a blast furnace the carbon is at first burned only to carbonic oxide, and the products of combustion issues mainly in this form from the top of the furnace. Then a portion of the heat resulting from the subsequent burning of these gases is pretty well utilized in making steam to supply the power required about the works, but the rest of the gas can only be utilized for heating the blast, and here there is an enormous waste, the amount of heat returned to the furnace by the heated blast being very small in proportion to the amount generated by the burning of that portion of carbonic oxide expended in heating it, and the gases escape from both the hot blast and the boilers at a high temperature.

In the direct process under consideration the fuel burned is more completely utilized than in the puddling process to which the cast-iron from the blast furnace is subjected to convert it into wrought-iron.

The economy claimed for this process over the blast furnace and puddling practice for the production of wrought-iron is that nearly all the fuel used in the puddling operation is saved, and that with about the same amount of fuel used in the blast furnace to produce a ton of pig-iron, a ton of wrought-iron blooms can be made. I had no opportunity of weighing the charges of ore and coal used, but I saw the process in actual operation at Rockaway, N. J. The iron produced was hammered up into good solid blooms, containing but little cinder. The muck-bar made from the blooms was fibrous in fracture, and showed every appearance of good iron. I am informed by the manager of the Sanderson Brothers' steel works, at Syracuse, N. Y., that they purchased blooms made by the Wilson process in 1881-82, that none of them showed red-shortness, and that they discontinued their use only on account of the injurious action of the titanium they contained on the melting-pots. These blooms were made from magnetic sands from the Long Island and Connecticut Coasts.

The annexed drawing shows the construction of the furnace employed. I quote from the published description.

"The upper part, or deoxidizer, is supported on a strong mantle plate, resting on four cast-iron columns.

"The retorts and flues are made entirely of fire-brick from special patterns. The outside is protected by a wrought-iron jacket made of No. 14 iron. The puddling-furnace is of the ordinary construction, except in the working-bottom, which is made longer to accommodate two charges of ore, and thus utilize more of the waste heat in reducing the ore to metallic iron.

"The operation of the furnace is as follows: The pulverized ore is mixed with 20 per cent of pulverized charcoal or coke, and is fed into an elevator which discharges into the hopper on the deoxidizer leading into the retorts marked C. These retorts are proportioned so that they will hold ore enough to run the puddling furnace 24 hours—the time required for perfect deoxidization. After the retorts are filled, a fire is started in the furnace, and the products of combustion pass up through the main flue, or well B, where they are deflected by the arch, and pass out through suitable openings, as indicated by arrows, into the down-takes marked E, and out through an annular flue, where they are passed under a boiler.

"It will be noticed that the ore is exposed to the waste heat on three sides of the retorts, and owing to the great surface so exposed, the ore is very thoroughly deoxidized, and reduced in the retorts before it is introduced into the puddling furnaces for final reduction. The curved cast-iron pipes marked D are provided with slides, and are for the purpose of introducing the deoxidized ore into the second bottom of the furnace. As before stated, the furnace is intended to accommodate two charges of ore, and as fast as it is balled up and taken out

of the working bottom, the charge remaining in the second bottom is worked up in the place occupied by the first charge and a new charge is introduced. As fast as the ore is drawn out from the retorts the elevator supplies a new lot, so that the retorts are always filled, thus making the process continuous."

The temperature of the charge in the deoxidizer is from 800° to 1,000° F.

The Imperfections of Our Mining Laws and Their Amendment.

As is well known, the laws governing the locating, holding and working of mines on our public domain are in many respects crude, impetitic and otherwise imperfect. Considering the circumstances under which these laws originated it could not well have been much different. Without experience in this branch of mining, with no codes at hand adapted to the anomalous conditions that existed, neither the miners themselves nor our legislators were competent to frame such laws and regulations as were adapted to meet the exigencies of the occasion. As a consequence, things were suffered to go for a time at first pretty much at haphazard, the methods of taking up and securing mining ground being left to be governed mainly by district laws and local usages, these being without uniformity and sometimes not very wise in their provisions. Even when laws came to be enacted by Congress and the local Legislatures, they were still marked by such

deficient and oracular, these being conditions favorable to the multiplication of suits and their protraction after being bought. Now, so it is, the lawyers constitute a majority in all legislative bodies, and it not being to their interest to unify and perfect the mining code, the prospect of this being accomplished at an early date is not encouraging.

Perhaps the best plan for effecting this would be that suggested by Dr. Raymond, that is, submit the business to the Institute of Mining Engineers, and let a proper mining code be framed by a committee of that body, to be afterwards presented to Congress for their consideration and adoption. No other set of men that could be named is so well qualified to properly discharge a duty of this kind as the members of the Institute, they being familiar not only with mining as a business, but also with the mines of the West, and well acquainted with the mining laws and usages of both this and all other countries.

Measurement of Water and Description of Weir Dam.

When a man has concluded to improve a water power, the first thing he should ascertain is the amount of head and fall he can secure. The next, and most important step, is to determine accurately the quantity of water that flows in the stream (provided there is a limited supply), as upon this will depend the amount of power, and consequently the amount of work the

he made of the depth of water over the top of stake E, as illustrated in the cut by the man with square and measure in his hand. Such measurement gives the true depth of water passing over the notch, since, if measured directly on the notch or the board, the curvature of the water in passing would reduce the depth, giving the improper measure. Although, where accuracy is not required, such a method will give a fair estimate of the quantity of water; in all cases it is best to make the measurement over the stake. The line D is a level from the bottom of notch B to the top of stake E; while the dotted line C represents the top of the water, and the distance between the lines or from the top of stake, gives the true depth or spill over the weir. The lines have, in the cut, the appearance of running over the top of the board; but this is owing to the fact that they pass behind it, and, for the purpose of illustration, the reader is supposed to look through the board and the post. The surface of the water below the board should not be nearer the notch B than ten inches, that the flow of water over the notch may not be impeded. Neither should the nature of the channel above the board be such as to force or hurry the water to the board, but it should be of ample width and depth to allow the water to approach the notch and board steadily and quietly. If the water passes the channel rapidly it will be forced over the notch, and a larger quantity will pass than if allowed to spill from a large body moving slowly.

When the depth of water over the stake E is known, the quantity of water passing can be easily calculated by reference to the Weir table appended. This table gives the number of cubic feet of water passing per minute over a weir for each inch in breadth, from one-sixteenth of an inch in depth to 25 inches in depth. The figures 1, 2, 3, etc., in the first and last perpendicular columns, are the inches depth of water over weir, while the first or top horizontal column represents fractional parts of an inch, from one-sixteenth to sixteen-hundredths.

The body of the table shows the cubic feet and decimal parts of a cubic foot that will pass each minute for each depth of weir from one-sixteenth to 25 inches, as before stated. But each result is for but one inch in width; so, of any particular number of inches breadth of weir the result obtained in the table must be multiplied by the number of inches of breadth the weir may be. For example, suppose the notch or weir be 20 inches wide, and the water at stake E, 5 1/2 inches deep; on the first or last column find the figure 5 1/2, follow the horizontal column until the perpendicular column is reached, containing 1 1/2 at the top. In the square where these two columns meet will be found 5.18 (five and eighteen hundredths) cubic feet. This is the quantity of water that will pass for each inch in width; but, since the supposed weir was 20 inches wide, this result must be multiplied by 20, which gives 103.6 (one hundred and three and six tenths) cubic feet per minute. In this manner the water passing any width of weir, of any depth from one-sixteenth of an inch to 25 inches, can be easily calculated.

Weir Table from one-sixteenth inch depth to twenty-five inches depth.

1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
1	1.14	1.43	1.73	2.02	2.31	2.60	2.89	3.18	3.47	3.76	4.05	4.34	4.63	4.92	5.21
2	2.28	2.86	3.44	4.02	4.59	5.17	5.75	6.32	6.90	7.47	8.05	8.62	9.19	9.77	10.34
3	3.42	4.28	5.14	6.00	6.86	7.72	8.58	9.44	10.30	11.16	12.02	12.88	13.74	14.60	15.46
4	4.56	5.71	6.86	8.01	9.16	10.31	11.46	12.61	13.76	14.91	16.06	17.21	18.36	19.51	20.66
5	5.70	7.06	8.42	9.78	11.14	12.50	13.86	15.22	16.58	17.94	19.30	20.66	22.02	23.38	24.74
6	6.84	8.39	9.94	11.49	13.04	14.59	16.14	17.69	19.24	20.79	22.34	23.89	25.44	26.99	28.54
7	7.98	9.73	11.48	13.23	14.98	16.73	18.48	20.23	21.98	23.73	25.48	27.23	28.98	30.73	32.48
8	9.12	11.07	13.02	14.97	16.92	18.87	20.82	22.77	24.72	26.67	28.62	30.57	32.52	34.47	36.42
9	10.26	12.41	14.56	16.71	18.86	20.91	22.96	25.01	27.06	29.11	31.16	33.21	35.26	37.31	39.36
10	11.40	13.75	16.10	18.35	20.50	22.65	24.80	26.95	29.10	31.25	33.40	35.55	37.70	39.85	42.00
11	12.54	15.09	17.44	19.69	21.94	24.19	26.44	28.69	30.94	33.19	35.44	37.69	39.94	42.19	44.44
12	13.68	16.43	18.78	21.03	23.29	25.54	27.79	30.04	32.29	34.54	36.79	39.04	41.29	43.54	45.79
13	14.82	17.77	20.12	22.37	24.63	26.88	29.13	31.38	33.63	35.88	38.13	40.38	42.63	44.88	47.13
14	15.96	19.11	21.46	23.71	25.97	28.22	30.47	32.72	34.97	37.22	39.47	41.72	43.97	46.22	48.47
15	17.10	20.45	22.80	25.05	27.31	29.56	31.81	34.06	36.31	38.56	40.81	43.06	45.31	47.56	49.81
16	18.24	21.79	24.14	26.39	28.65	30.90	33.15	35.40	37.65	39.90	42.15	44.40	46.65	48.90	51.15
17	19.38	23.13	25.48	27.73	29.99	32.24	34.49	36.74	38.99	41.24	43.49	45.74	47.99	50.24	52.49
18	20.52	24.47	26.82	29.07	31.33	33.58	35.83	38.08	40.33	42.58	44.83	47.08	49.33	51.58	53.83
19	21.66	25.81	28.16	30.41	32.67	34.87	37.17	39.42	41.67	43.92	46.17	48.42	50.67	52.92	55.17
20	22.80	27.15	29.50	31.75	33.91	36.11	38.41	40.66	42.91	45.16	47.41	49.66	51.91	54.16	56.41
21	23.94	28.49	30.84	33.09	35.25	37.45	39.75	41.90	44.15	46.40	48.65	50.90	53.15	55.40	57.65
22	25.08	29.83	32.18	34.43	36.59	38.79	41.09	43.34	45.59	47.84	50.09	52.34	54.59	56.84	59.09
23	26.22	31.17	33.52	35.77	37.93	40.13	42.43	44.68	46.93	49.18	51.43	53.68	55.93	58.18	60.43
24	27.36	32.51	34.86	37.11	39.27	41.47	43.77	46.02	48.27	50.52	52.77	55.02	57.27	59.52	61.77
25	28.50	33.85	36.20	38.45	40.61	42.81	45.11	47.36	49.61	51.86	54.11	56.36	58.61	60.86	63.11

Treatment of Dry and Base Silver Ores.

(Continued from last week.)

Summary.

From the above we find the following daily saving in a mill with two sets of Krom's rolls, as compared with 30 stamps:

Weir and tearand repairs.....	\$10 55
Interest and amortization.....	4 65
Fuel, two cords of wood, at \$6.....	12 00
Total.....	\$27 20

If no great accuracy can be claimed for this estimate, it is the best which can be given at present, and it is sufficiently correct to prove the economy of rolls beyond any doubt.

Mr. Krom and Mr. Clark claim a much greater saving in favor of rolls than that stated above. The future will demonstrate the correctness or fallacy of this view.

Even if we consider two sets of rolls equal in capacity to only 20 stamps, there still remains a considerable margin in favor of rolls.

The Chloridizing Roasting of the Ore.

The reverberatory furnace has universally been superseded by mechanical furnaces. Of these three types are in use:

- (1.) Revolving cylinder furnaces, which roast a charge.
- (2.) Inclined revolving cylinder furnaces, working continuously.
- (3.) Shap furnaces, which roast the ore as it falls through a beated chamber.

Mr. William Brueckner is the inventor of the first type. The first experimental Brueckner furnace was erected at San Francisco, Cal., in 1864. In the year 1867 it was introduced in the silver mills of Georgetown, Colo. The construction of this furnace has since then been more or less modified, the most marked change being that carried out by Mr. O. Hofmann, at the Silver King mill, Arizona, by providing the cylinder with a fire-place at each end.

The Stetefeldt furnace, the only successful representative of the third type, was introduced in 1869 at the Auburn mill, near Reno, Nev. It has been much improved in details of construction. Its imitations were in no instance improvements of the original, and had only a short-lived existence. The second type of furnaces, although they originate from the White furnace, an older patent than that of Stetefeldt, did not occupy a prominent place until after the Stetefeldt furnace had been largely introduced, and Mr. Howell had combined the White cylinder with the auxiliary fire-place for roasting the dust, one of the principal features of the Stetefeldt furnace. The first Howell furnace was built in 1872 at the Citizen's mill, Austin, Nev. Later on the construction of this type without the auxiliary fire-place found again a few advocates, and new names were invented—for instance, the "Oxland." That such furnaces are decidedly inferior, because they effect a very incomplete chlorination of the dust, is acknowledged by professional metallurgists.

I cannot notice here the great number of inventions which either are recorded only in the Patent Office or had a mere ephemeral existence, or, like the O'Hara furnace, never played an appreciable part in the production of silver bullion. These furnaces perform their operations more or less satisfactorily, much depending upon the skill of their management. All of them effect a great saving in the expense of roasting as compared with the reverberatory furnace. For mills of small capacity the Brueckner furnace is to be recommended. In mills of large capacity the other types work cheaper, especially as far as fuel is concerned. The Stetefeldt furnace excels on account of its durability and large capacity, and in that the power required to run it is merely nominal. It has been adopted in the best constructed and most successful mills of Nevada, Utah and Montana.

Two processes only are practiced for the extraction of silver from roasted ores, namely, amalgamation and lixiviation by hyposulphite solutions.

Amalgamation.

I have already stated that the use of the pan for amalgamation of roasted ores is characteristic of American silver mills, the barrel process becoming soon obsolete. The long time necessary to complete the amalgamation, and the greater delicacy required in the manipulation of the process, were the principal reasons which drove the barrel out of the field. The foundries, no doubt, had also a large share in the introduction of the pan, which was more profitable to their pockets. Regarding the construction of the pan it soon became evident that all complicated designs were of no merit, and the so-called "combination pan" was generally adopted. In the settler system comparatively little progress has been made, and it is here where most of the quicksilver is lost. The Boss system of elevating quicksilver or the bucket elevator is found in every well-appointed mill. The retorting of the amalgam is still done in the old way, a new system, introduced at the Lexington mill, Montana, namely, retorting with a current of air and suction, has not given such favorable results as were expected. In conducting the process of amalgamation itself no important change has taken place. The reduction of the silver chloride by granulated zinc, or rather zinc amalgam, although excellent in results, has found its way into a few mills only. For melting retorted bullion into bars the Lexington mill is the first one which has successfully introduced a reverberatory furnace for that purpose. At the Manhattan mill, Aus-

tin, Nev., reverberatory furnace melting had again been abandoned.

Lixiviation With Hyposulphite Solutions.

The lixiviation process with hyposulphite solutions is now entering into serious competition with amalgamation. It was first introduced in the United States in 1874, at Melrose, Cal., by the late Mr. G. Knestel. Subsequently lixiviation works were erected at Galena, Nev., at Monitor, Cal., and at the Martin White mill, Nev. All these establishments were on a small scale and their existence was of short duration. The first successful introduction, on a large scale, was at the Silver King mill, Arizona, by Mr. O. Hofmann, in 1880. The next mill with lixiviation plant was the Bertrand, built at Geddes, Nev., in 1882, followed by the Mount Cory mill, Nevada, in 1883. So much interest is manifested in the lixiviation process, and such radical improvements have recently been made in it by E. H. Russell, that a brief discussion of the subject will not be out of place. Those who wish more detailed information I will have to refer to a paper which is to appear in the transactions of the American Institute of Mining Engineers.

In the lixiviation of silver ores by means of a hyposulphite solution, two difficulties have heretofore been met with, which have rendered the process inapplicable in many cases: (1) The difficulty of producing bullion free from lead; (2) the necessity of a very perfect chloridizing roasting, since the hyposulphite solution acts only imperfectly upon metallic silver, and such of its combinations which have not been transformed into the chloride by the roasting process. In the amalgamation of roasted silver ores, bullion almost entirely free from lead is produced, if certain precautions are taken, even in case the ore contains a large percentage of lead minerals. If native silver occurs in the ore which is not entirely converted into chloride by roasting, this silver amalgamates readily. Silver compounds, too, which are not converted into chloride, are decomposed, to a certain extent, and the silver is amalgamated, especially if the roasted ore contains soluble copper salts. Hence a larger percentage of silver is, in many cases, extracted by amalgamation than that shown to be present as chloride, according to the customary chlorination tests. Mr. Russell's improvements in lixiviation consist:

1. In a practical and cheap method of precipitating the lead by itself from the hyposulphite solution.

2. In the application of a solution containing a double salt of sodic and cuprous hyposulphite, which reacts upon and dissolves silver compounds not soluble in sodium or calcium hyposulphite. He calls this solution the "extra-solution," to distinguish it from the ordinary sodium hyposulphite solution without copper.

Separation of Lead From a Hyposulphite Solution Containing Copper and Silver.

Mr. Russell discovered that lead can be completely precipitated from a hyposulphite solution by sodium carbonate as lead carbonate, while silver and copper remain in solution. In working on a large scale the commercial soda ash is used for this purpose. An extra series of precipitating tanks has to be provided. The lead carbonate settles quickly, and the clear solution is decanted into the silver precipitating tanks, where copper and silver are precipitated by sodium sulphide. The lead carbonate is collected and sold to smelting works.

The Treatment of the Ore by the Extra Solution.

If to a solution of sodium hyposulphite copper sulphate is added in the proportion of two of the former to one of the latter, the reagents completely decompose each other, a double salt of sodic and cuprous hyposulphite being formed. In case concentrated solutions have been used this double salt is precipitated as a canary-yellow powder. It is not easily soluble in water, but dissolves readily in a sodium hyposulphite solution of two per cent concentration. A solution of this double salt exerts a most energetic decomposing and dissolving action upon metallic silver, silver sulphide and combinations of silver with antimony and arsenic. If a charge of roasted ore is first treated with an ordinary hyposulphite solution to extract the silver chloride, and subsequently with extra solution, an additional amount of silver is extracted, which, by using the old method only, would have been lost in the tailings. Experiments carried out at the Ontario mill, Utah, show, with well chloridized ores, a difference of 4½ per cent in favor of Russell's process, and from 2 to 3 per cent more silver extracted than by amalgamation. But with ores of low chlorination the difference may arise above 30 per cent in favor of the extra solution. In applying the extra solution it is used for several charges in succession before the silver is precipitated from it, together with copper, by sodium sulphide.

Improved Process for Treating the Sulphides.

It cannot be denied that the handling of the sulphides is a weak point in the lixiviation process. In roasting such rich products a mechanical loss, and a loss in silver by volatilization cannot be avoided. The by-product of rich copper matte, obtained in melting the roasted sulphides, is also undesirable. The following process is designed to obviate existing difficulties. The sulphides are dissolved, without previous drying, in sulphuric acid, with addition of niter. After complete decomposition has

taken place the silver is precipitated from the solution by metallic copper. From the copper solution copper sulphate is obtained by evaporation and crystallization. A great saving in niter can be effected if the nitric oxide escaping in this process is, according to well-known chemical reactions, reconverted into nitric and nitrous acid, which are absorbed by sulphuric acid. This nitrated acid is then used for oxidizing fresh charges of sulphides.

Amalgamation and Lixiviation by Russell's Process Compared.

Without entering into detailed calculations, I will only point out the principal items which are in favor of lixiviation, as compared with amalgamation.

1. In amalgamation the fineness to which ore has to be crushed is determined by the capacity of the settler to work off coarse sands without material loss of quicksilver. It is not practicable to use a coarser screen than No. 30, if the crushing is done by stamps. This is almost equivalent to sifting through a No. 40 revolving screen, if the crushing is done by rolls. In lixiviation pulverizing as coarse as possible is desirable. The limit of coarseness is determined by the roasting process. It depends upon the character of the ore, and principally upon the manner in which the silver-bearing minerals are disseminated in the gangue.

2. The original cost of the lixiviation plant is much lower than that of pans and settlers. A farther saving is effected by a reduction in size of the engines and boilers, the power required for pumping solutions, etc., being merely nominal.

3. In amalgamation the pans and settlers consume not less than 1½ horse-power per 24 hours for each ton of ore.

4. In large mills the quantity of quicksilver in rotation represents a capital of from \$30,000 to \$40,000, while the stock of chemicals required for lixiviation does not cost more than one-tenth of this amount.

5. With Russell's improvements the percentage of silver extracted is much higher than by amalgamation.

6. Lixiviation by Russell's process requires a less careful chloridizing roasting. That in some cases salt may be entirely dispensed with is indicated by experiments made at the Ontario mill.

7. The value of the lost quicksilver, and cost in wear and tear of the pans and settlers, amounts to more than that of the chemicals consumed in the lixiviation process.

8. The lixiviation process permits the extraction of copper and lead as valuable by-products.

9. The sulphides from the lixiviation process can be much easier converted into fine bars than the bullion obtained in amalgamation.

10. Amalgamation is invariably injurious to the laborer's health.

In view of these advantages, coupled with a reduction of the cost in crushing by using rolls in place of stamps, we stand before a revolution in the reduction of silver ores, to which this process can be applied, rarely equalled in the history of metallurgy. It is fair to presume that in lixiviation mills of large capacity, with rolls, the cost of producing silver will be lessened nearly one-half, as compared with the present system of stamps and amalgamation, and in some cases the saving will be even greater.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

THRASHING CYLINDER.—Edward C. Souney, Sacramento. No. 322,135. These improvements consist in peculiarly arranged double bars, in novel reversible and single teeth, and the means for seating and securing together the teeth bars and heads. The object of the invention is generally to provide a practical and serviceable thrashing cylinder of great strength of parts, and adapted to be readily repaired by the easy removal of worn or broken teeth and the substitution of new ones.

STACKING MACHINE.—Byron Jackson, S. F. No. 322,106. Dated July 14, 1885. This is a machine for stacking grain. The stacker lifts the net out of the wagon and dumps the load. When unloaded the net returns to its place in the wagon, properly spread in the bed, by the action of the weight. The lifting capacity is one ton, all that the strongest pair of horses can pull. The grain is dumped on the center of the stack, making it easy for the stack builder to keep the stack in shape. The net has neither wood end-rail, latch or trip-rope, but is simply hooked at the four corners to the lifting frame.

DERRICK.—David Sharp, of Leemoore, Cal. No. 322,756. Dated July 21, 1885. The object of this invention is to supply farmers and others needing hoisting apparatus with a derrick which is simple in construction, economical, and is, above all, readily handled. It belongs to that class of derricks having a mast mounted on a wheeled frame and adapted to be raised for operation and lowered for transportation. It has a wheeled main frame, on one end of which are standards in which is mounted at an elevation a roller which may have a vertical adjustment when desired. A smaller frame is mounted on the main frame and has a sliding movement thereon by reason

of rollers on which it travels. Pivoted by a cross shaft in this sliding frame is the mast, which in being raised and lowered rests on the roller. Tackle is attached to the sliding frame to move it. As the frame moves towards the roller the mast rises to a position from which it can readily be pulled by its guys to a vertical. To lower the mast it is allowed to drop to the roller and then the sliding frame is moved back, so that the mast moves to a slight angle with the horizontal and there rests. There is also a peculiar connection between the outer end of the boom and the top of the mast for moving the former to any desired position.

BELT-WINDER FOR THRASHING ENGINES.—Perry Olmsted, Dixon. No. 321,521. Dated July 7, 1885. This invention relates to a new and useful belt-winder attached to the side of a thrashing machine, the object of which is to receive and wind up the main driving-belt after its use is discontinued. This belt is usually very heavy. It is usually rolled up by hand, the operator removing it from both pulleys and rolling it upon the ground before putting it away. In some cases a small windlass is used. Mr. Olmsted's plan provides for a simple and ready adjustment of the belt on the windlass, said windlass being secured to the side of the thrasher.

BRAKE BLOCK HOLDER.—Duskin Hedrick, Greenville, Cal. No. 322,099. Dated July 14, 1885. This invention relates to that class of brake block holders in which clamping jaws are employed to receive the block to the bar; and the invention consists of peculiarly pivoted jaws on the brake bar adapted to clamp the block, the sides of which are properly shouldered to receive said jaws, a screw mounted on and connecting the rear ends of the jaws and a nut or screw adapted to force the rear ends of the jaws in opposite directions, whereby their forward ends are forced together to clamp the block. This block can be readily removed and replaced when desired.

MANUFACTURE OF SUPERPHOSPHATE.—Frank Dikken, of San Francisco, Cal., assignor of one-half interest to Edgar J. Duhbs, of Alameda, Cal. No. 322,698. Dated July 21, 1885. This invention is for an improvement in the manufacture of superphosphate or soluble phosphate of lime. Heretofore this manufacture has been accomplished by means of the sulphuric acid of commerce. But in the process of Mr. Dikken the necessary sulphuric acid is obtained from the acid sulphate of soda. His process consists in dissolving acid sulphate of soda in water and adding to the solution a certain quantity of pulverized bone or other phosphate of lime, and then driving off the water from the solution by means of heat.

ORE FEEDER.—Joshua Hendy, of San Francisco, Cal. No. 322,716. July 21, 1885. This machine belongs to that class in which the drop of the stamp stem causes the automatic feed of the ore to the mortar. A large hopper receives and discharges the ore upon a rotating disk or table, which is mounted under its throat at an inclination. The disk or table is rotated through power transmitting devices by the action of the falling stamp. Means are provided for obviating the irregular wear of parts of the power transmitting mechanism, so that the delicacy of the feed movement will be unimpaired. Novel means are also used for returning the lever with which the collar or other device on the stamp stem comes in contact, to its point of action after each stroke of the stamp. The machine is so constructed as to control the movement of the feed table and the amount of ore fed very accurately, and to permit of the adjustment and regulation of parts to the best advantage.

EXPANDING HORSESHOE.—Charles C. Allen, of Salinas, Cal., assignor of one-half interest to N. A. Dorn, of same place. No. 322,671. July 21, 1885. This horseshoe is of that class which are pointed at the toe and adapted to expand, in order to prevent contraction of the hoof. The shoe is a two-part one. The forward ends of the two parts are pivoted to a plate on the upper side of the shoe, which is let in flush. This plate prevents sand from working up under the hoof. It also strengthens the toe joint. Under the shoe is a toe calk, to which the forward ends of the parts of the shoe are also pivoted. The presence of both toe calk and sand plate provides for a strong and durable joint. A perfect shoe is thus made, adapted to expand and to prevent the entrance of sand.

PNEUMATIC DOOR CHECK.—Geo. Vincent, of Stockton, Cal., assignor of one-half interest to George W. Hainee, of same place. No. 322,763. Dated July 21, 1885. This is a door check of that class in which the compression of air prevents the door from slamming. It consists of a cylinder having its rear end open and pivoted to a bracket on the door casing. A piston works within the cylinder, and its rod extends out through a peculiar air-tight packing in the front end and is secured to a bracket on the door. There is a cup-leather on the front side of the cylinder, forming air-tight joints. The check is applied to doors having a closing spring, and as the door closes the piston moves forward, encountering the resistance of the air in front, which escapes slowly through a very small aperture. As the door is opened the piston in moving back offers no resistance, as the rear end of the cylinder is open,

ENGINEERING NOTES.

Steel Versus Iron Girders.

C. L. Strobel, C. E., a widely known engineer, draws the following conclusions in a paper read before the Engineers' Society of Western Pennsylvania, entitled "Experiments on Steel and Iron Riveted Girders, and Remarks on the Tests Made by the Dutch Government."

1. Each of the steel girders showed a large increase in strength over the iron girder; the soft steel girder proved 22 per cent stronger, and the hard steel girders 66 per cent stronger than the iron girder.

2. The greater strength of the soft steel over the iron in the specimens was fully attained, and exceeded, in the girders.

3. The hard steel girders did not show so large percentage of greater strength over the iron girder as did this material in the specimens. This may be accounted as the result of punched holes which gave way by the fracture of the tension flange, whereas the girder with reamed holes gave way in the compression flange and probably would have stood more before fracture had taken place in tension flange. The latter girder did not appear to bear truly upon its supports, and it was probably this which caused it to fall in top flange when it did.

4. Punching rivet holes without reaming did not produce any result other than an apparent loss of strength, as compared with reamed holes.

5. The strength of steel girders strained in the manner of these girders appeared about the same for the two flanges, if made alike in section.

THE MERSEY RAILWAY.—The whole length of the tunnel under the river Mersey, which is 1,300 yards from quay to quay, is now reached in, and the greater part of the land approaches are finished, so that the laying of the permanent way will shortly commence. The total length of the line will be four and a half miles, independent of some extensions now being proposed. It runs from the London and North-western and Great Western joint lines at Birkenhead to the Central Station at Liverpool, the course being chiefly under the public streets in the land portion. The underground parts of the stations at Greenlane, Traimere, and Hamilton Square, Birkenhead, with that at James street, Liverpool, are in a forward state. The hydraulic machinery for lifting train loads of passengers, the machinery for mechanical ventilation, and the locomotives and carriages are in course of manufacture. It is expected that this railway will cost half the mileage rate of the Metropolitan Railway, and that the main line of three miles will be opened about June next.

CAST-IRON COLUMNS AS MAIN SUPPORTS.—The employment of cast-iron columns as main supports has been greatly restricted at Berlin by a regulation issued recently from the architects' department of the police authorities of that city, causing great consternation among builders. The cause of the new order is said to have been a discovery in connection with a fire last winter in the Alte-Jacobstrasse, when it was found that the cast-iron columns had been cracked by the effect of the cold water jet playing upon them so that the upper stories of the house were as near collapsing as they could possibly be. The Berlin police authorities insist upon it that where partition walls rest upon columns the latter are either to be bricked in or covered with a patent plastering in such a manner that an air space remains between the iron and the brick or plastering. In many cases a brick pier or granite pillars are prescribed.

THE SHIP CANAL ACROSS IRELAND.—The official surveys, plans, and sections of the Anglo-American Ship Canal from Kingston harbor to Galway bay, have been completed by the surveying and engineering staff, and submitted to a conference of some of the most eminent engineers of this and foreign countries. The plans and sections fill two ponderous volumes four feet square, and seem to be elaborately prepared. The undertaking is said to be powerfully supported, as obviating the chief hazards of trans-Atlantic navigation between England and America, besides the enormous advantages it will confer upon Ireland, several stations along its line forming entrepôts for direct trade with America on one hand, and England on the other.

THE LONGEST DRAW-SPAN KNOWN.—The Passaic Rolling Mill and Bridge Works, of Paterson, are building what will be, when finished, the longest draw-span in the world. It is to be 430 feet long, will weigh about 500 tons and consist of iron and steel in the proportion of three to two. The machinery for latching, lifting the ends and turning the draw is all to be worked from the center of the span, and is fitted to be operated by either hand or power. The turn-table is rim-bearing, turning on 50 wheels 18 inches in diameter.

THE NEW FORTH BRIDGE, between North and South Queensferry, Scotland, approaches completion. It is a cantilever structure, 8,091 feet long, 150 feet high, and will cost \$8,000,000. It has been nearly eight years in building. Two thousand men are now employed upon it.

USEFUL INFORMATION.

GEOGRAPHY IN 1738.—Some one recently furnished the *Morning Call* with the following description of America, as given in an old geography: Looking at an old geography printed in 1738, I read that "California, the largest island in America, lies along the coast of New Mexico, southward. The Spaniards have there several harbours, and upon the coast there is a Pearl Fishery. The natives are of a much less savage nature than one would imagine; their wealth consists of cattle, which serve them for most of the conveniences of life; of the call's skin they make pales."

"America, called the West Indies, is about twice as large as Europe, and Nature itself made the division of it, by the Isthmus of Panama, into North and South America. North America is divided into four Capital parts, New Spain, New Mexico, Florida and Canada; New Spain, lying under the Torrid Zone, and of which the Spaniards made themselves masters in 1521, after a cruel massacre of some millions of the Natives."

"New Mexico lies north of Spain, east of the island of California, and joins Quivira Anau and the unknown lands toward the North Pole."

"Florida, divided by the river Mississippi, was called Jaquaza before the Spaniards discovered it. Mexico is the capital city of all America."

"St. Fe, a fine city built of stone by the Spaniards, where live about 680 of them, who are masters of 50,000 slaves, all Natives; Cibola or Granada-Nouvelle, a place of commerce; Finqueze, a college of Jesuits, and Acoma, a small but well-peopled place."

TANNING FIBROUS MATERIAL.—A Belgian inventor, M. Piron, has invented a method of rendering cellulose tissues, such as linen and cotton cloth, impervious and very durable without injuring their flexibility, and without much increasing their weight. By examining the bandages of the Egyptian mummies he inferred that the best preservatives would be found in the vegetable kingdom, and he has given preference to the green tar of birch bark, which furnishes the perfums of Russian leather. The tar forms, with alcohol, a solution of great fluidity, but when once dried it becomes resinous and resists the solvent power of alcohol. It can be combined with the most brilliant colors. These qualities enable it to penetrate the capillary vessels of tissues, covering them with a varnish of great elasticity, which resists the corrosive action of acids, sea-water and changes of temperature. The density is very small, so that the tissues are made impervious with a slight increase of weight. The prepared stuffs can be folded without scaling. The aromatic odor drives away insects. Microscopic vegetation cannot grow, because neither air nor water can penetrate into the interior of the fibers. The invention can be applied to all vegetable tissues, such as sail-cloths, cordage, awnings, curtains, etc.

CLOTHES LINES WET AND DRY.—Some one writes to a contemporary under the head of "Facts Whittled Down" as follows, on the subject of clothes lines: I would state that I have often noticed their tightening when thoroughly wet, as well as the same line becoming too slack when again dry, and I have wondered what the action could be that produced this change. Sometimes I have thought it might be a felting process, as in wool, causing contraction. In fact, the decision of all is, no doubt, that the line expands and contracts as it becomes wet or dry, and the subject left there; but the question is, what makes it expand and contract? My theory is this: A clothes line has about three turns of twist per inch; when it becomes wet the fiber swells, and a wet rope is larger than a dry one; hence, it must be shorter with the same amount of twist, bringing the twist nearer to a right angle.

TESTING GOLD AND SILVER.—For testing gold, make a liquid consisting of nitric acid one ounce, water two drams and muriatic acid one-half scruple. Mix the ingredients well and keep the solution in a bottle with a glass stopper. With a glass rod which has been dipped in the mixture touch the metal and watch the action. If no effect is produced on the metal, it is either gold or gold-plated. If the gold is very low, or less than nine karat, the acid will boil green, and base metal is at once detected by the mark left by this acid. To test silver, apply a drop of a solution of nitric acid, three ounces, water one ounce and bichromate of potash one-half ounce, and wipe off the drop immediately with a sponge and water. If a blood-red mark results, the metal is silver or the article silver-plated.

THE METALS IN SHIP-BUILDING.—Some idea of the large amount of iron and copper, etc., which enters into the construction of a ship may be formed by reading the following paragraph: The old war ship *Niagara*, recently broken up at the Charleston Navy Yard, yields 171,226 pounds of copper, 61,369 pounds of composition, 486 pounds of wrought iron, 646,000 pounds cast-iron, and 18,000 pounds lead.

ROPE FROM ASBESTOS.—The manufacture of rope from asbestos is likely to become an industry of considerable importance in England, the strength of the article being estimated at about one-fourth that of ordinary hemp rope of the same diameter. Ropes of this material of one

and a half inches in diameter is stated to have a breaking strength of one ton, and 20 feet of it are calculated to represent a weight of 134 pounds. Some of the purposes as enumerated, to which this kind of rope is especially adapted, are theaters, fire brigades and means of escape from dwellings and public buildings, its advantages being that it will not break and drop its burden if the flame bear upon it. It is made like ordinary rope, and is spun from Italian asbestos thread.

A NOVEL METHOD FOR CUTTING GLASS TUBES.—Electricity has now been applied for cutting glass tubes—an operation of some difficulty when the diameter is large. The *Journal of the Society of Arts* says: An iron wire $\frac{1}{16}$ in. in diameter is wound round the tube at the place required to be cut, and the ends are connected by means of copper conductors of the same diameter with the poles of a powerful battery or other generator of electricity. This iron becomes heated when the current flows, and is only necessary to cool it suddenly with a few drops of cold water in order to produce a clear cut. Glass tubes four inches in diameter are now cut in this way.

A STEEL TEMPERING PROCESS practiced by M. P. Gabriol is said to give very desirable and satisfactory results. Cyanide of potassium is dissolved and red heated in a metallic or earthen crucible, and the pieces of steel are then immersed in the liquid until they are red and afterward plunged into cold water. It is asserted that this method of tempering does not distort or bend a straight piece, and proves very serviceable in dealing with escapement springs.

TO KEEP SILVER PLATED ARTICLES BRIGHT.—This can be done by dipping the articles occasionally in a solution of hyposulphide of soda. Large articles, like pitchers and salvers, should be wiped off with a rag dipped in the solution and dried with a soft towel. By rubbing with a piece of chamois leather they will be as bright as new.

THE moss crop of Florida, says the *Pensacola Commercial*, is worth more than the cotton crop, and can be put on the market at less expense. The demand exceeds the supply, and there is not a county in which this product is not going to waste.

JAPANESE industries are mostly conducted in small workshops, with possibly the aid of a primitive water-wheel; fan-making and the manufacture of porcelain, paper, pigments and lacquers, constituting a large portion of the whole.

TEMPERED COPPER.—A tomahawk of tempered copper was recently found by a farmer near Sanborn, Dakota. This is a very rare relic. The method of tempering copper tools is said to be a lost art.

CARPETS, after the dust has been beaten out, may be brightened by scattering upon them cornmeal mixed with salt, and then sweeping it off. Mix salt and meal in equal proportions.

GOOD HEALTH.

Mullein Leaves in Consumption.

There are many of our readers, doubtless, who will remember how much in their early days they were impressed by their mothers and grandmothers in regard to the medicinal value of the mullein leaf, so common in the poor pastures of their New England homes. All such will read with interest the following:

Mullein Leaves in Consumption.

Dr. Quinlan, of Dublin, read before the International Medical Congress at Copenhagen last year an interesting paper on the medicinal qualities of the mullein. It has attracted widespread attention, and among the more recent articles confirmatory of Dr. Quinlan's statements is one by Dr. Wilfert, of Cincinnati, which appears in the last number of the *Lancet and Clinic* of that city. From the results obtained in 127 cases of pulmonary consumption treated by Dr. Quinlan with mullein alone, he draws the following conclusions, which are condensed from his original article, viz:

1. In the earlier and pre-tubercular stage of pulmonary consumption, mullein has a weight-increasing and curative power greater than that of cod liver oil, and equal to that of Russian koumiss.

2. In cases where tubercles are well established or cavities exist, the mullein has great power in relieving cough—a great boon to consumptives, whose weak stomachs too frequently cannot tolerate the usual cough remedies.

3. Phthisical diarrhoea is completely obviated by this mullein.

4. Mullein has no power or effect on the night sweats of consumption, which should be combated by atropia sulphate.

The method of using the mullein, which originated among the Irish peasantry, and was adopted by Dr. Quinlan just as he found it, is as follows: Three ounces of the fresh green leaves, or about 10 times that much of the dried, are boiled in a pint of fresh cow's milk. After boiling a moment the infusion is allowed to stand and "steep" for 10 minutes, when it is strained, sweetened and drunk while warm. This quantity is taken twice or three times a day. It is generally much relished by the pa-

tients, who regard it as a pleasant article of diet, rather than as a medicine. The smoke of the mullein leaves inhaled into the respiratory passages relieves irritation and spasmodic cough.

Dr. Wilfert states that he has followed Dr. Quinlan's method in 20 cases of undoubted pulmonary phthisis, all of them more or less advanced, and all improved during the administration of mullein, no other drugs being used. These results are certainly very encouraging and should be followed up.

WORKING AND SLEEPING.—Some men are blessed with a working constitution. They may not be of stalwart frame, nor even enjoy robust health; but they can work day after day, continuously, and endure without flagging fatigue of body and strain of mind. Such men are usually good sleepers, and in this way nature recreates them. Lord Brougham was one of this class, being equally good as a worker and a sleeper. His power of sustained mental labor was something wonderful. In the early days of the *Edinburgh Review*, when he was one of the most frequent contributors, it was a common feat for him to read a book one day, and to write an elaborate article on it the next. Many a time he worked 12 hours on a stretch at his desk, and often he included this night as well as the day in his stint. The greatest feat of his life seems almost impossible, but intimate friends vouched for its absolute truth. He had one week several important cases in court, for which he had not made full preparation. He was busy in the court room by day during the week, and spent the nights in preparing his arguments. On Friday afternoon the cases ended. He hurried to his country seat, ate a hearty dinner and slept through the entire days and nights of Saturday and Sunday, and awoke on Monday morning, thoroughly rested, ready for another week's hard work. He suffered, however, the penalty of such irregular habits. They so disordered his nervous system that he was an uncomfortable companion, even to his best friends, while those who were not intimate with him found him a tyrant.

TEA AS A BEVERAGE.—Wong Ching Foo in the *Cook* says: "Use a china or porcelain pot. If you do use metal let it be tin, new, bright and clean; never use it when the tin is worn out and the iron exposed. If you do you are playing chemist, and forming a tannate or tea-ate of iron. Use black tea. Green tea when good is kept at home. What goes abroad is bad, very bad, and horrible. Besides containing the 203 adulterations the Chinese philanthropist puts up for the outside barbarian, it is always pervaded by copper dust from the dirty curing pans of the growers. Infuse your tea. Don't boil it! Place one teaspoonful of tea in the pot and pour over it one and a half cups of boiling water—that is, water really boiling. If your tea is poor use more. It is cheaper, though, to buy good tea at the outset. Put your pot on the back part of the stove, carefully covered, so that it shall not lose its heat and the tea its bouquet. Let the tea remain there five minutes. Then drink it. Drink your tea plain. Don't add milk nor sugar. Tea brokers and tea tasters never do; epicures never do; the Chinese never do. Milk contains fibrin, albumen or some other such stuff and tea a delicate amount of tannin. Mixing the two makes the liquid turbid. This turbidity, if I remember this cyclopaedia aright, is tannate of fibrin or leather. People who put milk in tea are therefore drinking boots and shoes in mild disguise."

TREATMENT OF A FELON.—A correspondent of the *Michigan Farmer* says: "I wish to tell those who may suffer from that terrible scourge, felons, of a painless remedy that will effect a perfect cure in 24 hours, as I have had occasion to prove within the last 3 days. A lady came here who had been suffering over 2 weeks with a felon on the end of her middle finger. I saturated a piece of wild turnip, the size of a bean, with spirits of turpentine and applied it to the affected part. It relieved the pain at once. In 12 hours there was a hole in the bone, and the felon was destroyed. I removed the turnip and applied healing salve, and the finger is well."

PURE FOOD.—M. Pasteur recently recommended a member of the Academy of Sciences to experiment with young animals in order to ascertain if they can be nourished upon the absolutely pure food which many people regard as an ideal diet—that is, food wholly free from microbes. He believed that such a diet would not sustain life, and that the presence of common microbes in the digestive organs was necessary to the proper functional action of those organs.

SINKING AT THE STOMACH.—Individuals sometimes complain of a very unpleasant sensation at the pit of the stomach, as if "the bottom had dropped out." The feeling is commonly due to the improper use of the breathing apparatus. The abdominal and dorsal muscles have become relaxed, and the diaphragm has been forced to do more than its share of work. The remedy is fresh air and exercise.

CHLORINE AND GERM DISEASES.—Workers in bleacheries where chlorine is largely used are singularly exempt from all germ diseases, but suffer from special ailments induced by inhaling that gas.

FOR NOSE BLEEDING try bathing the face and neck in cold water.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GENERAL MINING ITEMS.—*Sentinel*, Aug. 1: The mill at the Amador Queen mine is crushing when water can be obtained. The prospects of this mine would appear to be most flattering. The St. Julian mine continues to look well, though the mill is tied up at present for lack of water. Reports from the McKinney mine at Middle Bar, continue favorable, the rich rock being found in yet larger quantities. There is a rumor that the Tellurium mine of Pine Grove will soon be started up by Capt. Roberts, of Sacramento. Rich rock is now being taken from the Crockett mine, near the West Point bridge. The derrick in use at the Lambing gravel mine for hoisting the top dirt is one of large dimensions. Length of boom 114 feet, 46 feet wide. The derrick car is 44 feet long by 16 wide.

Calaveras.

ABOUT ANGEL'S CAMP.—*Mountain Echo*, July 29: Owing to lack of water, the North End has suspended operations for the present. W. Evans, of this town crushed in an arastra four tons of ore taken from this mine, recently, from which he realized \$58, an aggregate of \$17 per ton. Steam power is soon to be erected at the Lane mine, which is now run by water-power. A portion of the machinery has already arrived. This arrangement will enable the company to keep the mill running steadily, as when the water supply is short steam can be used. It is the impression that there will be a big mining boom in Carson before long. Twenty more stamps are soon to be put in the Brechtel mine, making in all thirty. The cleanup there the other day was quite satisfactory. The mine is paying well. The Colier mine, situated five miles east of Murphys, on the north side of the Stanislaus river, has been bonded by Messrs. Geo. Seitz and C. H. Ross for one year. There is a tunnel 200 feet long on the premises, and 55 feet from the mouth of this tunnel they are sinking a winze which is 18 feet at present, and it is their intention to sink it to a depth of 208 feet where they will tap it by another tunnel at the base of the hill. Three assays have been taken from the rock, and it gives the following returns: No. 1—\$1,941, No. 2—\$444, No. 3—\$325 50 per ton. The facilities are all excellent for working, and some very rich specimens are being exhibited.

Colusa.

SULPHUR CREEK.—*Lower Lake Bulletin*, Aug. 1: The gold mines at Sulphur Creek are doing a flourishing business. The old Manzanita and Cherry mines have been purchased by a San Francisco company, and are yielding remuneratively. The rich but rebellious ores of Sulphur Creek, with which nothing could be done, are yielding well, handled by the Wiswell Pulverizer and Amalgamator. The machine is considered a great success.

Inyo.

CERRO GORDO.—*Independent*, August 1: Business is likely soon to undergo a revival at this place. It is well known that there is plenty of good ore in the old camp, and the legal troubles that hindered the working of the mines are nearly all ended now. It is an open secret that a large number of men will be put to work in some of the mines, perhaps a larger number than at any former time. In addition to this, recent experiments have proven that the vast quantities of low grade ores, formerly regarded as worthless, can now all be worked at a good profit. This fact alone insures prosperity for Cerro Gordo, and for the country as well. A few more months will prove, what some never doubted, that the railroad was the most valuable aid to the development of mining resources ever brought to the country, and with the development of mines the promotion of every other interest.

Kern.

THE BIG BLUE MINE.—*Californian*, July 29: It would appear that work has already begun at Kernville, an English company having undertaken to work the Big Blue mine at that place. It is to be hoped that this mine can be made to pay, as formerly, when it made business lively and a good market for farmers in that part of the country.

Mariposa.

ABOUT COULTERVILLE.—*Gazette*, Aug. 1: The company working the Hasloe mine have got the water out of the mine and have commenced sinking the main shaft. Their new mill is completed and ready for crushing or grinding ore as it comes from the mine. They have a strong force of miners at work. If the new mill proves a success you may listen for big results from that mine. The Bandierita people are working a considerable force in the mine. There is a considerable amount of prospecting going on, and quite a number of promising veins have been discovered recently. The Mt. Gaines mines are being pumped out and put in condition for working.

Mono.

BODIE MINES.—*Free Press*, August 1: Con. Pacific, during past week have completed winze station, and Winze No. 1 has been sunk six feet.

MONO.—The joint cross-cut on the 400-foot level extended during the week 14 feet. Five miners and one engineer employed.

THE BODIE CON.—On the 700-foot level east crosscut extended 18 feet during week. South drift on same level extended 14 feet. Upraise from the 300-foot level is up 55 feet, a gain of seven feet. The east drift from north drift, between 300 and 400-foot levels, is in seven feet. Men employed, 23.

THE STANDARD CON.—During week north drift, 410-foot level, advanced 15 feet. East drift, same level, eight feet. Drift on 400-foot level, 18 feet. Upraise on 400-foot level, 13 feet. Drift on same, 12 feet. Drift on 560-foot level, 19 feet. Crosscut on 400-foot level advanced seven feet. Number of men employed: Miners, 43; stationmen, 2; timbermen, 1; carmen, 6—at \$4 per day; laborers, 41—at \$3 75 per day; engineers, 2; shiftboss, 2; carpenter, 1; blacksmith, 1; pumpman, 1. Mine looking well. Ore shipped to mill 501 tons. The Bodie Tunnel Company has built two dams above the mill, and now has plenty of water for milling purposes—quite a saving over previous methods.

ABOUT BENTON.—West of the Laura, James Goyen has located a ledge, and is opening it up by tunnel. In several places it shows a nice slab of good ore. Still west, W. R. Ritchie has started in on a ledge with good prospects, and further down the hill Wm. Beckman and John Krenshaw have been working a very promising location, carrying occasional bunches of rich lead and black ores. Several parties came down from Bodie last week, and went out to Clover Patch to work assessments on several of the claims out there.

Nevada.

QUARTZ MINES IN EUREKA TOWNSHIP.—Near Moore's Flat, Mr. Buck has been opening up a vein of rich rock, and parties versed in such matters pronounce it a valuable mine. In the near future there will no doubt be a mill on the ground. Hathaway & Davis are also prospecting in that vicinity and meeting with encouragement. Copper and partner are taking out some rich rock, keeping up expenses of development by running a small hand mortar. Next in order is the Santa Anita mine which has a mill on it, but is not running at present. The owners intend to resume operations soon. Close by is the Spanish mine which has two Huntington mills. Here is found a peculiar formation, but it pays well. In this vicinity is the "Old Grizzly" mine, formerly owned by an Eastern company, but badly managed. The machinery was taken off and the mine abandoned. After lying idle many years, parties from San Francisco are about to reopen it and do what should have been done in the first place, sink on the pay chute and give it a fair trial.

WILL BRING IN WATER.—*Transcript*, August 4: There is a probability that the project of bringing water power to the Empire and other mines in the district will be revived, as some of the obstacles to the right of way for a pipe-line have been removed.

GOLD SLIDE DRIFT MINE.—Messrs. Way and Williams, who are about to prospect the Gold Slide gravel claim near the Central House, have their buildings and wagon roads completed, and will start the tunnel next Monday.

A SHORT-SIGHTED POLICY.—A few years since the Republic mine, also in this neighborhood, was sold by Mr. Snapp to Messrs. Meek, Dyer, Hinckley & Co., wealthy residents of Alameda county, who put up a first-class twenty stamp mill upon it, run by water power. After three or four short runs (the rock paying about three dollars per ton on an average), they became completely discouraged and shut down. Almost the entire hill is one mass of easily worked quartz containing free gold. The claim has splendid water power and every facility for mining and milling rock at a few cents per ton. After paying out \$75,000 for mine, mill and improvements, then testing a few hundred tons of rock which did not come up to their over-sanguine expectations, these gentlemen abandoned the mine entertaining very hard feelings toward the man who sold it to them, all of which was hasty and ill-advised. This is not the way business is done on fine farms in Alameda county nor in sugar refineries or other industrial establishments there. The property no doubt is a fairly good one, and properly managed would pay a profit. Adjoining the Republic mine is the National, out of which rock was taken over twenty years ago, that milled \$11 a ton. Both the Republic and the National are lying idle, covered by U. S. patents.

WASHINGTON TOWNSHIP.—Accounts from this section of the county continue to be of the most favorable kind, the mines that are being worked paying well, and those in course of development showing the most encouraging prospects. Although operations are being conducted in a quiet way, the district has a bright future before it. An expert sent up to Washington not long since to examine the quartz mines there, though very reticent while on the spot, is understood to have entertained a high opinion of such of them as he examined, and so reported to those in whose interests he was acting. We think a good deal of money will be invested there on California account the coming autumn.

Napa.

WORKING THE SILVER MINES.—*Register*, Aug. 1: A good deal of prospecting and mining for silver ore is now in progress about Mt. St. Helena and in the vicinity of Calistoga. There are over one hundred claims located in that vicinity, and the Grigsby & Johnson mine has 600 tons of ore that will go \$100 to the ton on its dump.

Placer.

ABOUT FOREST HILLS.—*Argus*, Aug. 1: The Washington Company, have bonded a claim from A. Clark, lying between the Washington shaft and the Grinnell claims, and this week commenced a tunnel, running in from the Breece & Wheeler tunnel, at a point about 1,700 feet from its mouth, through which they expect to work the channel. The Mayflower Mining Company is negotiating for the purchase of more mining ground, lying immediately south of their present claim. The Excelsior Mining Company has bought some additional ground from the railroad company, and propose to put on a force of men as soon as they can get the water out of their old works. Breece & Wheeler are taking out rich gravel from their drift mine at Bath.

Siskiyou.

MINING JOTS.—*Union*, Aug. 1: All of the hydraulic claims on the Klamath are running on full time, and are said to be paying well. The Jackson & Crary mine is under full headway and paying unusually well. At the Black Bear mine there are some 25 or 30 men at work, and several new drifts are being run. At Doggett & Morrow's claim everything is in working order and the claim yielding liberally. At the Kittlewood, below the mouth of Scott river, good pay is being obtained, although bedrock has not yet been reached. At the Empire mine there have occurred two rock slides on the pump, which have been cleared out, and the claim is paying well. The Allen boys, of Quartz valley, have just crushed 36 tons of rock and will clean up this week. Forty tons of rock taken from their mine last month averaged \$35.25 per ton, and it is expected the average yield of this crushing will not fall short of the former. At the Klamath mine, on Salmon, a large quantity of good rock is finding its way to the dump, and the mill will be started as soon as water can be obtained. The quartz from this mine is low grade, and while the mill can be run by steam power, the company owning a good engine, it has been found unprofitable in the past, wood having to be hauled a considerable distance.

HAPPY CAMP.—Owing to the mild winter and consequent small deposit of snow in the mountains, water is scarce and mining is suspended in the majority of the hydraulic claims here.

GOLD ON COFFEE CREEK.—Sam Borden, of Trinity Center, tells us that Rumlert & Co., who are drifting on the east fork of Coffee creek, are taking out much coarse gold, and recently secured a piece which weighed \$280. It was round and smooth, about the size of a forefinger, and shaped like a rolling-pin. They expect to find plenty more large pieces.

San Bernardino.

CALICO DISTRICT.—*Print*, Aug. 2: Notwithstanding the cry of dull times, mining throughout Calico District is being vigorously pushed, and though we have no new strikes to report, yet we have no failures, nor are there likely to be any for years to come. Because the mines here occurred in porphyry there was a prejudice against them at first, it being feared they would not prove permanent. But experience having demonstrated that there are no good grounds for this fear, our district is coming to be regarded with more favor by capitalists, and it will not be long before we will begin to enjoy more fully the benefit of this change. Calico has shown itself to be second to no mining locality yet discovered on this coast. Our daily output of bullion is immense for the number of stamps employed, and new mills are in contemplation, some of which will be erected at an early day. Many new mines are now under bond to responsible parties, upon which the work of development will soon begin. Upon every hand is seen the cheering signs of material prosperity and advancement.

Sierra.

YOUNG AMERICA.—*Tribune*, Aug. 1: Work is being vigorously pushed on this mine. At the mill the battery frame is in position and mortars set, and H. Schussler, chief engineer of the Spring Valley Water Works, has been investigating the machinery preparatory to its starting up. At the annual meeting of the company the following officers were elected: President and treasurer, A. C. Busch; secretary, J. P. Deidesheimer, Jr.; superintendent, Oliver Saunderaus; manager and agent, Philip Deidesheimer; trustees, A. C. Busch, Wat. Hughes, C. A. Herringlake, J. Saunderaus and M. H. Mead. The Young America continues to improve under vigorous exploration, and is destined to take rank among the great mines of this State, as it has the resources and the benefit of a first-class management.

STRIKE AT ALLEGHANY.—A perfect mass of gold has been struck in the Osceola mine at Alleghany, and over \$1,000 taken out in one day. In the face of the tunnel the ledge is perfectly yellow with gold and the strike is looked upon as being a big thing. From a ten days' run with their quartz crusher, Gardner & Co., at Poker Flat, cleaned up \$1,700. The Derbec drift mine is looking splendid, and good-sized nuggets are being found almost daily. The rumor that it was soon to be closed down was unfounded. Some men who were employed in the tunnel were discharged, which gave cause for the rumor. The upper part of the mine, where most of the work is being done, never looked better than now. The mill at Butcher Ranch is about ready to run, everything being nearly completed. The rock in the mine continues to improve as the shaft goes down. A party of capitalists have been looking at the Phoenix mine up at Sierra Buttes, and, it is said, entertain a very favorable opinion of the same. It is undoubtedly a very valuable property. Mr. Forbes is putting up another of his quartz crushers, to be used within a few miles of Downieville. The longer Mr. Gardner uses the one at Poker Flat, the better he is satisfied with it, not only as a prospector, but as a permanent mill.

THE BALD MT. EXTENSION COMPANY is putting a couple of pumps in their shaft at the old Galloway Ranch. They have, for the past five summers, been using a pair of pumps left in the shaft when work on it was abandoned owing to inability to cope with the 65 inches of water that was coming in. When the company needed water for air and for washing, it put these pumps at work and raised it. These pumps have continued to raise the water required each summer, working at the bottom under from 130 to 250 feet of water. Last week, from some cause, probably the wearing out of one of the packing rings, one barrel ceased to work and only half a head of water has been raised since. The new pumps will be at work in a few days.

Shasta.

MINING ITEMS.—*Democrat*, July 29: Reid & Co.'s quartz mill on Star gulch will be running in a few days. The new shaft of the McDonald mine at Deadwood is down 125 feet. The Huntington mill near Oso will be moved to Redding in a few days and put up as a custom mill. It works ten tons per day and has sulphur concentrators attached. Spellman and Whitton's claim on Squaw creek, shows a five-foot vein with much free gold in sight. On the Central mine, old Diggings district, the length of the tunnel is 130 feet and taps the ledge at a depth of 150 feet. The Niagara Mill and Mining Company has advertised for proposals for running a bed-rock tunnel 100 feet long. The company will furnish timbers, cars and track. Bids will be received at the office of the company at French gulch up to August 5, 1885. Hon. Reuben Clark, who purchased the Harrison mine, will ship his engine and part of his quartz mill machinery here this week, and the rest of the machinery will follow in a few days after. Mr. Clark will endeavor to have the mill running not later than the middle of September. A number of new gold quartz finds are reported to have been made during the week. A young German found some very rich croppings on Rock creek near the river; Jackson, a few days ago found, near Churntown in old Diggings, a two and a half foot vein, the croppings of which are rich in sulphurets and free gold. It compares exactly with the rich ore from the Sinaloa mine, one and a half miles west of Quartz Hill. A young prospector Saturday struck a four foot vein nearly on the east side, opposite Copley. Some of the rock shown us is as fine specimens of free-gold as we have seen in the county. The mines of Shasta county continue to look favorable. Experts, capitalists, assayers and prospectors all seem to be pleased with the outlook. The indications are good for a boom, as those who are interested themselves are prepared to work the mines to advantage. All that was needed to open out these rich mines was luck, energy and capital.

The mines around Quartz hill and the old Diggings country on the east side of the Sacramento are looking splendid. Workmen on the Central are in with the tunnel 220 feet and tapped the ledge when in 150 feet. Reid & Co. will have a five-stamp steam mill in operation in a few days. The Texas mine is looking fine and keeps two arastras running. The Mammouth, one of the oldest and best paying mines in that vicinity will soon be started up again and the large mine at Quartz hill recently sold by Tom Harrison to Hon. R. Clark is paying big.

Tuolumne.

WASHING THE DUMP.—*Independent*, Aug. 1: A strike of several hundred dollars has been made in washing off the "dump" of the Anna mine in Wet Gulch, on the Stanislaus river. It is an old quartz claim, from which has been taken \$30,000 in early days, and is by no means worked out yet, as the owners have proved for the last twenty months' working on it.

VARIOUS MINES.—The Green is running night and day and doing well. The App, at Quartz Mountain, is being steadily operated, paying satisfactory dividends. A good 12 day run has just been made on the Lampher. The Jumper at Quartz Mountain recently bonded by the Fitzgerald Bros. to Edward Fisher, of San Francisco, is rapidly being put in working order, with a promising future.

Trinity.

VERMONT MINE.—*Journal*, Aug. 1: From this mine they are now taking out excellent rock; the ledge is from three to four feet in width. A quantity of the ore was sacked and taken to the Washington Mill on French Gulch, but owing to the scarcity of water, the mill is not now running and the rock will not be crushed until fall. The Vermont is splendidly located near the summit of the dividing ridge between Deadwood and French Gulch, and as development progresses will doubtless prove one among the best mines of that section.

NEVADA.

Washoe District.

COMSTOCK MINES.—*Enterprise*, Aug. 1: More and better work is being done in the mines of the Comstock at present than has been done for the last three or four years, and more men and mills are employed. Good prospecting work is going ahead in all the leading mines, and a small army of men are engaged in taking out low-grade ore in the old rich bonanza sections of both the south and north ends. There is a sort of lull, as it were, just at present in actual ore development in the deep workings of the middle mines. (Hollar has to wait and so does Savage, until the other half of the big hydraulic pump can be placed in working position before their lowest level merits can be further investigated with safety, and until crosscutting east from the Hale and Norcross deep winze, or west toward it from the Combination shaft, can be done at a proper depth, the actual merits of the rich ore vein developed on and below the 3,000 level cannot be known and developed. The present promise at that point is most certainly very great for another old-time bonanza. It is true that the rapid decrease of the volume of water in the Carson river during the past week or two has already interfered with milling operations and necessarily will further retard and suspend ore reduction, throwing many miners and mill operatives out of work for several months, or until rains and snow shall again increase the river's source of supply; yet this is merely a temporary disadvantage, usual at this season of the year. The ore remains stored in the mines, ready for production and reduction when called for. Virginia City is better off to-day than it has been for a long time past. More men are employed in the mines than there were three years ago. The long-continued depression has weeded out superfluous business establishments and driven away a large class of idle miners, gamblers, small politicians and parasites generally, who were wont to give an air of liveliness to the streets, but who were really a heavy burden upon the town. The business men who remain are doing well, and the miners have their wages for themselves, not now being compelled to support unemployed comrades as of old. The development on the lower levels of the middle mines has renewed faith in the existence of ore bodies at great depths, and so given Virginia a new lease of life. The down-grade movement was arrested when the long-neglected upper levels of the mines were reopened. So far from the city being a "deserted mining camp," it is now about as prosperous as are most of the interior towns of this State. The uncovering of another bonanza—an event which is always possible—would cause a resumption of exploration on the deep levels all along the old lode, and the Comstock would be itself again. But bonanza or no bonanza, Virginia will not die in our day. There are great bodies of low-grade ore that will keep the miners and the mills busy for years to come. And such vast prizes have been won in the lottery of Virginia's hills that the hopeful prospector will continue to dig and try his luck indefinitely.

CONSOLIDATED CALIFORNIA AND VIRGINIA.—On the 1,700 level the northwest drift from the upraise on the ninth floor has been extended and has connected with the 1,600 level. From the 1,750 level they have extracted 925 tons of ore, and shipped to the Morgan mill 730 tons and 144 pounds. The average assay value of ore milled during the week, as per samples taken from the batteries, was \$25.29 per ton. Ore extracted under the Jones contract, 420 tons, and shipped to the Eureka mill, under this contract, 522 tons and 555 pounds. The average assay value of ore milled during the week, as per samples taken from the batteries, was \$16.67 per ton.

BEST AND BELCHER.—On the 1,000 level west crosscut No. 1 has been extended 50 feet; total length, 318 feet.

UNION CON.—On the 500 level the drift running north has been extended 70 feet.

MEXICAN.—On the 500 level a west cross-cut was started, and has been advanced 46 feet.

OPHIR.—On the 500 level the upraise has been continued upward 27 feet.

SIERRA NEVADA.—On the 520 level the north lateral drift has been extended 46 feet; total length, 937 feet.

GOULD AND CURRY.—On the 1,000 level west crosscut No. 1 has been extended 54 feet; total length, 66 feet.

Jefferson District.

THE MILLS.—Belmont *Courier*, July 25: The Harrison mill at Jefferson is still running and the bullion produced is very fine. John B. Truman has a force of men engaged removing the machinery and the building of the Jefferson S. M. Co.'s mill to Park Canyon, where it will be put in position and started up on ore from the Giant mine, on which work will soon be vigorously pushed.

ARGENTIFEROUS GALENA.—Gallatin & Folsom have shipped a carload of ore from Steamboat to Salt Lake for reduction. The ore is from the old Shannon mine, near Steamboat, and is galena, assaying \$55 in silver and carrying 67 per cent of lead. It is the intention to ship a carload every week to either Salt Lake, Denver or San Francisco. These mines were worked as early as 1861.

Mineral Hill District.

AN ORE MARKET.—Cor. *Eureka Sentinel*, July 31: The statement that parties from Utah were on the Base Range for the purpose of purchasing iron and lead ores for the Salt Lake smelters, was hailed with special satisfaction by mine owners throughout this vicinity, where we have such large quantities of lead ores. The owners of this class of mines look upon any new arrangement which will give them encouragement to work their mines with the prospect of getting a fair deal with marked approval. Sixty-two per cent of the assay value, and nothing for lead under 20 per cent, has obviously had a tendency to retard developments in mining property throughout Eureka county, and it is safe to assume that where one "outside" mine is working to-day there would be half a dozen if the owners thought they would receive a fair margin for their ores. It cannot, of course, be said that ores can be reduced as cheaply here as in Colorado, where tenounce ore pays a profit; but it is very unreasonable to suppose that any furnace company claiming to work their own ores up to 90 per cent of the assay value, cannot afford to pay over 62 per cent of the assay value for certain ores after charging full rates for reduction. The mine owners know this as well as furnace managers, and will, of course, welcome and encourage any innovation on the old established schedule tending to give them better rates for their ores. The mill at Mineral Hill is running along about as usual and turning out the usual amount of bullion, and the mines are looking well.

Oseola District.

BOTH PLACER AND QUARTZ.—*Eureka Sentinel*, August 3: Active work is being done in Oseola in several of the gold quartz mines. The camp has a population of upwards of 300, and aside from Taylor it is the liveliest settlement in those parts. The gold quartz mill runs about two weeks out of every six or eight, or whenever sufficient ore collects to keep it employed for a time sufficient to justify its starting up. The gravel mining company have all their appliances working satisfactorily, and it is believed by many that the result at the next clean-up will exceed the expectations of the most sanguine of the shareholders, and yet they are working the gravel some 18 feet and upwards from bedrock. But one six-inch nozzle is now employed on the banks, but inasmuch as the water pressure is sufficiently great to send boulders as large as a man's body into the air the work it accomplishes is enough to keep 20 men employed. The water now at the command of the company, some of which is brought from a high mountain 17 miles distant, is more than sufficient in quantity as well as pressure for another nozzle of the same size, and it is very probable such addition will be made at an early day.

Tuscarora District.

BLUE JACKET.—*Times-Review*, July 30: Superintendent Milford has made a perfect success in treating the Blue Jacket ores by free-milling process, obtaining bullion over 800 fine, and working the ores to 88 per cent of fire assay. He is now engaged in changing the mill to wet crushing, as it will save largely in expense of reduction, and complete necessary experiments preparatory to the erection of a 60-stamp mill.

Walker Lake District.

BIG STRIKE IN LA PLATA.—*Bulletin*, Aug. 1: The gold ledge lately discovered here by Brady, the prospector, is probably a very big thing. The rock is free gold quartz, and the ledge from ten to twenty feet wide on the surface, the average assay of which is over \$700. Several valuable gold discoveries have been made recently in the same district, and in others in this neighborhood, but this is the greatest up to the present time. La Plata is situated in the Lake District, about nine miles Southeast of Hawthorne, from which place it is easily accessible. This is a large district, full of mineral, and comparatively unknown. It has only been of late that gold was found to be the prevailing metal. The few prospectors who worked that section having confined themselves to looking for silver. Lake district will, doubtless, soon contain several lively mining camps, as the excitement over this last discovery is very great, and much prospecting will soon be done there.

AT KINKEAD.—Most of the miners here are now idle, and all will be laid off in a few days, until the well is sunk to a better supply of water. The well is to be sunk 180 feet further, which will make a total depth of 370 feet. The work will require twelve or fifteen days. It will be bored, and the borers are to arrive from San Francisco in a day or two. They charge \$1.50 a foot. A concentrator will soon be built here, which will work all kinds of base ores. It is confidentially believed that there will be enough water to run the mill and concentrator to their full capacity. Custom rock will be worked when the water supply is increased, and prospectors will be greatly benefited. The price will be \$7 per ton. L. McNeil, the foreman, is a thorough millman, of extensive practical experience and uniform success, and there is no doubt about the satisfactory result of the working of the mill. The mines near Kinkead are all looking well and most of the owners expect to make money fast as soon as they can get their rock worked. There are now about forty men chopping wood for the railroad contract.

CORVILLE CROPPINGS.—The North Star mine is taking out \$600 ore. The Silver Brick mine is taking out a better quality of ore. The Mount Cory mine is working eight hour shifts.

GOING ON AGAIN.—On Sunday forty men went to work in the Holmes. A combination of wages, silver depression and lack of water caused the stop-

page of work, and the men of Candelaria, knowing that the company was not making money under all the disadvantages and realizing that should they leave they could find no other place where they could do better, appointed a committee to visit the managers and offered to take reduced wages. Their wise conduct in this emergency has doubtless saved the camp from desertion, and their ability to look at both sides of the question in a fair spirit shows that when the managers of the mine evince a disposition to deal liberally with their employees the men will not be behind hand in making concessions. The company is vigorously pushing work on the water supply, and as soon as this is finished the force of miners will be increased to the former strength, or perhaps, even more, and no uneasiness need be felt about the future of Candelaria, which will, in a few months, resume its station at the head of the live mining camps of Nevada.

ARIZONA.

WALLAPAI.—*Tribune*, Aug. 1: Returns from the Selby smelting works have been received concerning the ore shipped from the Avis Supai mine, situated on Cataract creek. About ten tons of ore was sent as a venture, which netted over all expenses, \$67.50 per ton. This clearly demonstrates the fact that this mine is of such character that great possibilities may be expected of it and the locality in general, as there are several mines close by to the original. The placer mining is an important industry in Yuma county. A large number of people are employed and considerable gold dust is being received at Yuma. The McCrackin lode at Signal is attracting considerable notice from the outside world, and the prospects are that a large mill will be put up on the Signal mine in a short time, which event will cause things to boom in and around that place.

ABOUT PRESCOTT.—*Miner*, Aug. 1: Fred, Maroney came in to-day from Copper creek in western Yavapai, bringing with him ore from a mine which he owns, that assays into the hundreds. The ledge he reports eight feet from wall to wall, all carrying this high grade ore. At Antelope, Stanton keeps a large force of men at work placing, with excellent results. On the Hasyampa quartz a force of men are washing out gold, and find from \$3 to \$5 per day to the man. The Hartford Copper Company, with Mr. Isaac Stoddard as general manager, has made contracts for opening up some of their claims near Copper Mountain, with a view to starting their smelter. Rudy and Martin, near Skull Valley, have put in sluice boxes and commenced hauling rich gravel from the placers recently discovered by Mr. Rudy. "Old Gizzy" is expected daily from the East, when he will put men at work on placer diggings in the valley of Walnut Grove. The old Vulture, under its new management, is said to be prospering.

COLORADO.

DOLORES COUNTY.—*Tribune-Republican*, August 1: The Maggie and Sunlight lodes at Mount Wilson expect to keep 15 jacks busy this season packing ore. The small force at the Puzzle extension is doing good work and has run 100 feet of tunnel since the 25th of last month. The Chestnut lessees are in about 300 feet with their tunnel, and have several inches of high grade mineral. A low grade shipment was made last week. The Grand View smelter is receiving the large quantities of ore recently purchased from the Sheridan, Mendota and other San Miguel mines. The date when the smelter will blow in for its long run is not far distant. The tunnel cut the Premier vein at a considerable depth, and shows 3 to 4 feet of quartz ore very similar to the high grade from the upper workings, which made something of a sensation last fall. The Grand Luke Company have decided to run a tunnel to tap the Forest vein at a considerable depth. It is to be 248 feet long and will cut the vein 172 feet below the surface. The next property on which they propose to commence work is the Dawn of Day. Work on the Hidden Wealth is progressing with encouraging results and is showing a very nice streak of heavy galena ore, and considerable copper ore is also being saved. So far the value in silver is not high, averaging 10 to 12 ounces per ton, the lead ore carries 60 per cent of lead and copper ore, 10 to 15 per cent of that metal. A very slight improvement in value will raise it to a paying grade, as the ore can be placed on the dump at a cost of \$2 per ton. Receipts of ore continue at the Pasadena smelter in large quantities from both local mines and the divide. The thirty-ninth carload of bullion has been sent to the railroad, and the fortieth is now on hand. The castings for the new furnace are being turned out as fast as possible, and work upon it will be commenced at an early date. When completed, it is not proposed to have an idle moment at the smelter, as whenever it is necessary to blow out one of the stacks, the other will be immediately blown in, if not already in operation. Samuel Jones, Jr., the metallurgist, is now absent in Telluride and other points north arranging for the delivery of certain ores from there. All improvements at the coke ovens have been completed, and six splendid ovens are now ready for business. The warehouse for the reception of ores is finished and the wagon road to the coal banks will be completed soon.

SAN JUAN COUNTY.—*Animas Forks Pioneer*, July 30: The Dora mine started up with its full force again Monday. The shaft has been timbered up and a boarding-house built, and the accommodations for the men are much better. The San Juan Chief mine has commenced shipping ore. There are only three men at work at the mine at present, but more will be put on soon. Dr. Stevens will experiment some on the ore this summer, shipping it to different mills and find out the best mode of treatment.

EXTENSIVE PLACERS.—One of the prominent Colorado mining enterprises, attracting attention at the present time both at home and abroad, is the Sovereign, situated in Park county, just over the Mosquito range from Leadville. This property, embracing hundreds of acres of placer ground and innumerable lodes, is now being developed under the commendable energy of Mr. R. M. Whipple. The territory of the company includes nearly all of the old Montgomery mining district, which in former years produced large quantities of gold from mere surface workings along the various lodes, and by primitive sluicing of the extensive auriferous gravel banks,

IDABO.

BETTER TIMES IN GALENA.—*Wood River Times*, Aug. 1: The town of Galena is at last looking up, and indications point to a permanent improvement in that thrifty town. The Senate company has had 30 men at work for some time, and will "blow in" its smelting furnace this year. If the furnace runs successfully, it will be kept going permanently, as there is a vast quantity of ore in sight in the various leading claims thereabout. Now that Sawtooth, Vienna and Galena are getting well started, the upper country will boom.

LOST RIVER AND ANTELOPE CREEK districts are alive with prospectors, and the developments there being exceedingly promising. Mr. Biddy has retained two teams, and expects to keep them busily employed hauling ore. The Cliff furnace was blown in last Wednesday, with good prospects for an all summer and fall campaign; and the managers intend, if the outlook continues as favorable as at present, to double their smelting capacity this fall.

KETCHUM is at present the liveliest town on Wood river. The Philadelphia Mining and Smelting Company is operating two stacks, and keeping a small army of men and teams at work, and money is getting into circulation and causing times to improve all around. A great deal of dead work is being done and much prospecting. New finds are being made, some of which are very valuable. J. H. Moyle, superintendent of the Warm Springs Mining Company, on Warm Springs Creek, is working twenty men in the different mines under his supervision and the concentrator. Regular shipments of concentrated ore are made to the Philadelphia smelter at Ketchum. All the properties of this company are looking well, and indications point to a yield of ore for the season better than ever before.

LITTLE SMOKY MINES.—All the mining properties on Little Smoky that are being worked upon are steadily improving, generally, but some are developing rapidly into large and valuable ore-producers. The Carrie Leonard is the best opened mine in that section at the present time. There is plenty of ore in sight. There are now some twenty-six tons of \$300 ore on the dump ready for shipment, and many tons of \$75 and \$100 ore easy of access for shipment. The Isabella mine is looking well, and ore is being taken out. The King of the West presented a fine appearance, and a good lot of high-grade ore is being extracted. Superintendent McIlhenny will commence shipping ore to Hailey as soon as the new Camas wagon-road is extended up the Little Smoky to the mine, which will be early next week. The Silver Star mine will commence shipping ore to the smelter early next week. As the season advances and the many hundreds of prospects in the Little Smoky section are developed, it will not be expecting too much for a large output of fine ore from that section this season.

MONTANA.

BURLINGTON.—There are at this place about 150 inhabitants; three saloons, two hotels and five lodging houses. There are at least 100 men at work in the mines, and with the prospect of that number being materially increased in the near future. There is evidently a mining boom at the Independence Mining District. The place that is receiving the greatest benefits from this revival in mining, is the town of Burlington. Much work is being done in the district. Messrs. Rodda & Co. are working four men at present, and are taking out considerable ore from the 120-foot level of the Fredonice mine. The stopes and drifts on this level are looking well and producing rich ore. Arrangements are being made to sink a new shaft in the middle claim of the mine. The shaft will be sunk on the ledge and pay rock will be taken from the shaft. Considerable work is being done on the Blue Bird mine, about forty men being employed. The mine looks well all through, and steps are being taken to sink the main shaft below the 300-foot level. The company are shipping their ore to the Lexington and Silver Bow mills. The Burlington mine, owned by the Colorado Smelting Company, is worked almost exclusively on the leasing plan. Messrs. Reynolds & Co. are prosecuting work on the 50-foot level, and are extracting large quantities of ore from that point, that will assay about 40 ounces in silver. The pumping and hoisting machinery just put up is working admirably, and steps will be immediately taken to resume the sinking of the main shaft. The shaft is now down 65 feet, and the ledge at that point looks well. Messrs. Reynolds & Co. are now taking out about 10 or 12 tons a day, and this quantity will be materially increased when the work of timbering and otherwise repairing the shaft is completed. Messrs. Masters & Co. are working three men, and are taking out a large quantity of ore daily, from the 50-foot level. The ore assays about 40 ounces. The Little Darling mine is worked under the direction of C. H. McSherry & Co., with a force of fifteen men. Considerable good ore is being extracted from the mine. The Narrow Gauge mine, owned by August Mills & Co., is worked on lease by Messrs. Olsen & Co., who are working a force of five men. Considerable ore that will assay 45 ounces in silver is being extracted. The general appearance of the Narrow Gauge is very flattering, and work is being prosecuted with vigor.

MINES AND MINING ABOUT BUTTE CITY.—*Miner*, July 25: There was never a time in the history of Silver Bow county, when the mining outlook is more promising than at present. Good reports are continually coming in, not only from the large mines of Butte City, but also from the smaller mining properties situated in the hills, valleys and mountains adjacent to the city. It is doubtful if a more prosperous mining camp than this ever had an existence. This is shown by the rapid and steady growth of Butte City, which has, during the past four years, surprised the mining world by the rapid strides it has made in the way of prosperity and population. The output of this camp is something wonderful, while the outlook is conceded by men of all classes to be full of hope and promise. During the past week in some of the leading mines of Butte, developments have been made that have exceeded the most sanguine expectations of the respective managers and owners of the mines, and that have insured to our people an indefinite period of prosperity. Like all other mining camps we have had, and will doubtless continue to have, our reverses and setbacks. These, however, will not arise from a scarcity of ore in the district or a lack of enterprise on the part of our mining men, but as long as the

mines of this camp are worked in the same legitimate plan in which they are at present conducted, and wild-cat schemes, stock-jobbing and the thousand-and-one different modes of mining known to and practiced by the mining sharps of the East and West are excluded and condemned by the owners and managers of our mines, so long will Silver Bow county enjoy prosperity, and be admired by all persons engaged in producing the precious metals. The state of Nevada is to-day under a cloud, from which it will not emerge for years, on account of the mismanagement of some of the mines within its borders. Mining in many parts, indeed, in nearly every part of Nevada, is worked upon and conducted on the principle of gambling, and so many people who wish to follow the business of mining in a legitimate manner have been robbed by the mining sharps of Nevada, that it is now as difficult to dispose of a really good mine in Nevada to a foreign or home company as it is for a Butte City rounder to scare any of the pencil pushers of the *Miner*. Shall the mines of this district be conducted in such a questionable manner that a person seeking a field in which to invest his capital would not touch Butte with the proverbial forty-foot pole? We hope not.

NEW MEXICO.

LAKE VALLEY MINES.—*Rio Grande Republican*, Aug. 1: Within a few weeks work will be resumed at these mines. The arrangements for the erection of new works have all been completed, and it only remains to let contracts for putting up the buildings and the proper machinery. The old mill, which cost \$505,000, will be partly utilized but greatly added to. It has been proven that the ore is not free milling and for this reason the plant first put in operation is useless. The new mill will subject the ore to the leaching process. Thousands of tons of ore, now on the dumps, was mined while searching for the rich pockets that made these mines so famous, and it is estimated that it will run from 12 to 22 ounces; all ore of a higher grade was shipped East.

MINING ITEMS.—*Socorro Bulletin*, Aug. 1: The Bonaparte tunnel is in 35 feet, on a full breast of pay mineral, the ore is being sacked for shipment. The Juanita mine is working 40 men, and the force will be increased shortly. It ships about 10 carloads of ore weekly. F. Wilson is operating in the Iron Mountain district on the old Boss mine, and will continue throughout the season. Col. E. L. Mann is deepening shaft No. 1 of the Silver Gance, in the Limiar district. It has attained a depth of 170 feet, and the work is being performed in line, in which copper and galena appear sporadically. The development of the Lion mine is still going forward, Col. Eaton having let a contract recently, and when it expires he will let out another, until the property makes a satisfactory showing. A new mining company is formed for the exploitation of several mining properties in this county. The claims which the new corporation are to develop are situated in the Pueblo district, and produce rich argentiferous copper and galena-bearing silver. Capital properly expended, there is every reason to believe, will place a number of these properties upon a producing and paying basis. Thirty-six men are now employed by the Merritt Mining and Milling company. This number will be materially increased as soon as stoping is inaugurated, which will occur in a few days.

OREGON.

MINING NEWS.—*Sentinel*, Aug. 1: Klippel & Co.'s windmill on Applegate is approaching completion. Work on the Sterling Mining Co.'s reservoir is progressing steadily. John Owens, of Gold Hill, stumbled on a fine quartz ledge in that vicinity a few days since, and it is said to have been the property of a miner murdered many years ago. There is considerable excitement at Woodville, some promising quartz ledges having been discovered. A shaft 40 feet deep has been sunk on Lind, Kinney & Co.'s claim, with flattering results. The subscribers to the stock for a quartz mill in this place have formed a temporary organization and appointed a committee to select grounds for the proposed mill and obtain motive power. The certainty that we are to have a new test quartz mill at Jacksonville has given an impetus to quartz prospecting and the result is some very important developments. The parties working on the Yank ledge sent up Victor Fernbaugh, reputed to be a very capable expert, to examine the mine, who expressed himself well pleased with it. On Thursday's freight 900 pounds of ore was shipped to San Francisco for mill test. There is no occasion for any excitement, but indications are that the mine will be worked, and that means prosperity for this county.

UTAH.

ALTA ITEMS.—*Salt Lake Tribune*, Aug. 4: The Frederick and Crown Prince mine is working from 25 to 30 men. The tunnel is in about 1,600 feet, and the work is vigorously prosecuted day and night by the best miners in the district, using the Ingersoll rock drill air compressor. The property promises to be a very valuable one, and everything connected with it is being done in superior style. The wall for their new building is very strong, and when completed it will be the safest in the district from the dread snow-slide. In connection with the mine, there is 1,000 feet of switch built lately from the Alta tramway in order to move conveniently to ship freight to and from the mine, which is a great accommodation to the company. There are a few men working the Toledo on lease. The managers of the Vallejo are pushing their great mine ahead day and night, and frequent shipments of ores have been made. The Flagstaff has been inactive for years, but it is said Professor Vincent has left London for Utah with sufficient capital to resume work upon it.

COPPER PRODUCT.—The Arizona Company, at Clifton, produced in May, with two furnaces in blast, 579,583 pounds; and in June, with three furnaces, 759,187 pounds. The Detroit Company, at Clifton, produced 560,000 pounds of copper for the two months of May and June, with but one furnace in blast.

THE NEW EMMA has been in operation for years under the superintendency of George Cullins and his foreman, John Stilwell, who are pushing the mine forward with all possible speed, day and night. There are now 25 men working in the mine. That force will soon be increased. There is a shaft in the tunnel about 1,800 feet from its mouth; now 200 feet deep, and in the lower level 240 feet deep,

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

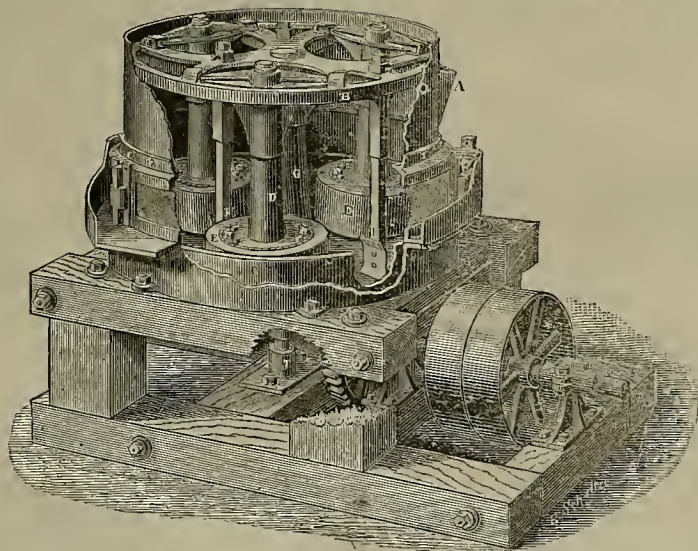
J. A. Fay & Co.'s Woodworking Machinery.
 Frank & Co.'s Woodworking Machinery.
 New Haven M'fg Co.'s Machinists' Tools.
 Bement & Son's Machinists' Tools.
 Bickford's Power Drills.
 Blake's Improved Steam Pumps.
 Perry's Centrifugal Pumps.
 Perin Band Saw Blades.
 Sturtevant Blowers and Exhausts.
 Shimer Matcher Heads.
 Brainard Milling Machines.
 Turbine Water Wheels.
 Bradley Cushioned Hammers.
 Massey's Steam Hammers.
 Schlenker's Bolt Cutters.
 Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
 Atlas Engine Works Engines and Boilers.
 Payne's Vertical and Horizontal Engines.
 Otto Silent Gas Engines.
 Clapp & Jones' Steam Fire Engines.
 Pickering Engine Governors.
 Judson Engine Governors.
 Tanite Co.'s Emery Wheels and Machinery.
 Nathan and Dreyfus Oilers.
 Korting Injectors and Ejectors.
 Disston's Circular Saws.
 New York Belting and Packing Company's Rubber Goods.
 Lane and Bodley Saw mills.
 H. W. Johns' Asbestos Packing. Paint. etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

F. A. HUNTINGTON'S
CENTRIFUGAL ROLLER QUARTZ MILL.

Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and
HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St. San Francisco, Cal.
 E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL,

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING
ENGINES
—AND—
MACHINERY,
CORNISH
PUMPS.



WE KEEP IN STORE, DENVER:

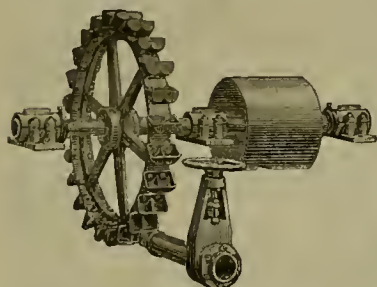
Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

HOISTING
ENGINES,
HALLIDIE'S
WIRE ROPE
TRAMWAYS.

GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

Smith's Patent Belt Fasteners.



Are positively unequalled for fastening Leather, Rubber, or Cotton Belting. THE ONLY FASTENER that will run under tighteners, on patent rolls in flour mills, and Electric Light machines. Easier to apply than Lacing and far more Economical.

Patented Sept. 20, 1881; Aug. 15, 1882; June 16, 1884.

PRICE LIST.

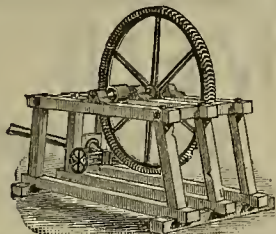
No. 1—For large drive belts, per box of 100.....\$2 00
No. 2—For Cotton drive belts, per box of 100..... 1 75
No. 3—For Rubber drive belts, per box of 100..... 1 50
No. 4—For single Leather belts, per box..... 1 25
Combination Punch with guides and nippers..... 1 25
Reamers for taking fasteners out..... 35
TRY THEM! They will save you loss of TIME, TEMPER and MONEY. Manufactured by

H. D. EDWARDS & CO.,

Nos. 16, 18 and 20 Woodward Ave., DETROIT, MICH.

Manufacturers of Oak Leather Belting, Agents for J. B. Hoyt & Co., N. Y. Belting and Packing Co., Eureka Fire Hose Co., Cotton Belting Mill Supplies. FOR SALE BY Dunham, Carrigan & Co., San Francisco, Cal.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

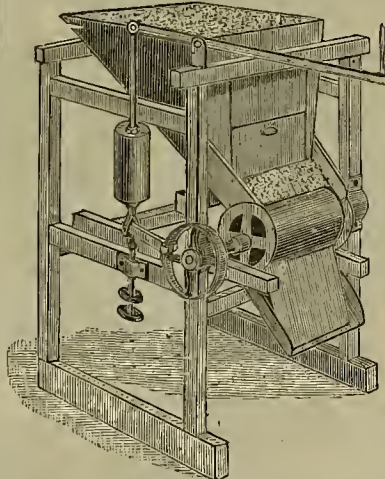
EDWARD A RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco

THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required. In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.
Sole Manufacturers,
327 First Street, SAN FRANCISCO, CAL.



The California Perforating Screen Company.

All kinds of Quartz Screens, slot and round holes; zinc, copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

PATENT

LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

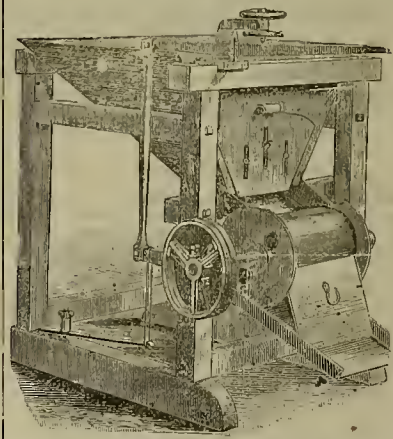
Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 5) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ore.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco.

TO CAPITALISTS.

FOR SALE—Half interest in 4,500 feet of valuable

SILVER MINING PROPERTY

In one of the best mineral locations in Arizona, having wood and water on the ground. The mines are well developed, and thorough examination is solicited. Ore will produce from fifty to nine hundred ounces per ton. The interest will be sold at a sacrifice, as capital is required to obtain machinery for handling water. Address

GEORGE B. McCANN,

Bueno P. O., Arizona.

L. PETERSON,

INVENTORS. MODEL MAKER,

253 Market St., S. E. cor Front, up-stairs, S. F. Experimental machinery and all kinds of models, tin, copper and brass.

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoriaires, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for

GOLD, SILVER and LEAD ORES
AND SULPHURETS.

MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leideedoff Street,

Between California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. RUSTEL.

H. KUSTEL.

METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leideedoff Street, - - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on.

Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO,

CALIFORNIA.

THE HARMON SEMINARY,

Berkeley, Cal.

A BOARDING AND DAY SCHOOL FOR YOUNG LADIES.

Pupils taken at any time.

For Catalogue or other information, address:

THE MESSES HARMON, Berkeley, Cal.

Or E. J. WICKSON, 414 Clay St., S. F.

A Suggestion for Our New Chinese Minister.

Now that the newly-appointed minister to China has arrived in San Francisco, we unite with others in tendering him such advice as we think may prove useful to him. We advise, then, that he declare, when he reaches the court to which he is accredited, that he is opposed to any further emigration of the Chinese to this country. This he should do both as a matter of policy and duty; of duty, because it would be right, as we do not want them here, and of policy, because the authorities of that country do not want them to leave, and this for many good reasons. It is, of course, well known that it has from time immemorial been the aim and desire of the Emperor of China to retain all his subjects at home, death being formerly the penalty meted out to any one going abroad. Now, that Government has never released that rule except as circumstances have compelled them to do so. They would, were they able, be glad to enforce it at this time and would, no doubt, regard with special favor any foreign minister who would second their desire in this regard. We think Col. Denby would do well to duly weigh this suggestion, as it would insure to him great advantages were he to act on it when he reaches Peking.

How Not to Mine Silver.

A correspondent in the silver mining region writes us: "The silver-producing section has for 20 years past been the field of operations for a class of Eastern adventurers, who, by their wily schemes, have done much to prejudice the East against silver. One of their many jobs is worked out as follows: They purchase some worked-out mine for a nominal sum and start a small mill, and place the stock in the New York market. Sales start at a low figure, and under the incentive of small dividends (paid out of their pockets), and larger ones as soon as the mammoth reduction works are completed, the stock reaches a large price, and the swindlers unload; then comes the collapse, and a host of swindled people are ready to believe anything had about silver. Again, some well-meaning capitalists form a syndicate for mining in a legitimate manner, and send some young college graduate out to superintend operations, who don't know a drift from a cross-cut, and whose only recommendations are a portion of the alphabet appended to his name. This gentleman generally erects a mill the first thing, not particularly because the mine justifies it, but 'everyone needs a mill, you know.' 'Plenty of ore in sight, must have the mill ready when we begin extracting it,' and so on to the end of the chapter, and about the only extracting this young gentleman does is from the pockets of the stockholders. He soon works out his bonanza, and leaves a large monument of his folly behind. When men have lost money in silver mining either through avarice or inexperience, they are apt to be slightly prejudiced, and to do all in their power to misrepresent legitimate mining to the general public."—*American Machinist.*

Mining Share Market.

From the lowest depths of last week the Mining Share Market has since reached a lower depth, nor has the bottom probably yet been reached. It really looks as if ore developments on the Comstock affected stocks in the inverse ratio of the importance of such developments; that is, if the latter are even one-half as valuable as represented by the Virginia City papers, which record the discovery of bonanzas almost daily. But this being the day of small things on the Comstock, these reported discoveries must be viewed accordingly.

Bullion Shipments.

Standard Con. July 29, \$10,911; Grand Prize, Aug. 4, \$16,000.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCA.	N. NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Argentina M Co.	Nevada.	13.	10.	July 29.	Sept 1.	Sept 22.	E. M. Hall.	327 Pine st	
Alaska M and M Co.	Alaska.	11.	40.	June 30.	Aug 6.	Aug 22.	T. J. Hay.	306 Pine st	
Aultman M. & M. Co.	California.	2.	01.	June 15.	July 20.	Aug 10.	J. M. Buffington.	309 California st	
Blue Bluff G M Co.	California.	9.	21.	July 10.	Aug 21.	Sept 12.	L. S. Stadfeld.	419 California st	
Bullion M Co.	Nevada.	39.	23.	July 21.	Aug 20.	Sept 4.	J. M. Brazell.	328 Montgomery st	
Chollar M Co.	Nevada.	17.	59.	July 23.	Aug 27.	Sept 17.	C. E. Elliot.	309 Montgomery st	
Copper Mt Con Co.	California.	2.	01.	June 17.	Aug 13.	Sept 17.	A. L. Perkins.	309 Montgomery st	
Con Reforma L & S Co.	Mexico.	6.	40.	July 1.	July 31.	Aug 17.	T. S. Gifford.	331 Montgomery st	
Entracht Gravel M Co.	California.	18.	05.	May 26.	July 14.	July 31.	H. Kunz.	209 Sansome st	
Holmes M Co.	Nevada.	9.	100.	Aug 3.	Sept 7.	Sept 27.	C. T. Bridge.	224 California st	
Hale & Norcross M Co.	Nevada.	36.	53.	Aug 4.	Sept 7.	Sept 23.	J. F. Lightner.	309 Montgomery st	
Homeward Bound M Co.	California.	4.	15.	June 12.	June 20.	Aug 11.	D. A. Smith.	209 Post st	
Justice M Co.	Nevada.	42.	05.	July 13.	Aug 17.	Sept 5.	R. E. Kelley.	419 California st	
Johnson Gravel M Co.	California.	1.	05.	July 1.	Aug 5.	Aug 25.	G. White.	318 Front st	
Murchie M Co.	California.	9.	13.	June 24.	Aug 7.	Aug 31.	W. L. Oliver.	328 Montgomery st	
Mayflower Gravel M Co.	California.	30.	40.	June 4.	July 20.	Aug 11.	J. Morizio.	328 Montgomery st	
Mono M Co.	California.	22.	50.	June 17.	July 22.	Aug 11.	G. W. Sessions.	309 Montgomery st	
North Star M Co.	California.	1.	02.	July 28.	Sept 1.	Sept 22.	D. A. Jennings.	401 California st	
Pay Day M Co.	Nevada.	3.	02.	June 6.	July 14.	Aug 10.	W. Van Bokkels.	419 California st	
Pearl M Co.	California.	2.	30.	July 31.	Sept 2.	Sept 29.	A. Waterman.	309 Montgomery st	
Potosi M Co.	Nevada.	19.	50.	July 14.	Aug 19.	Sept 10.	C. E. Elliot.	309 Montgomery st	
Savage M Co.	Nevada.	63.	50.	July 1.	Aug 4.	Aug 24.	E. B. Holmes.	309 Montgomery st	
Starlight M Co.	California.	2.	05.	June 28.	Aug 1.	Aug 21.	C. E. Hayes.	310 Clay st	
Silver Hill M Co.	Nevada.	22.	05.	July 1.	Aug 4.	Aug 24.	E. B. Holmes.	309 Montgomery st	
Scorpion M Co.	California.	2.	05.	June 24.	Aug 1.	Sept 1.	H. D. Mitchell.	126 Kearny st	
Summers Con M Co.	California.	4.	05.	July 18.	Aug 17.	Sept 7.	F. E. Luty.	330 Pine st	
Willow Creek M Co.	Nevada.	1.	1.	100.	July 25.	Sept 7.	Oct 12.	R. E. Lillon.	310 Pine st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alta S M Co.	Nevada.	W. H. Watson.	302 Montgomery st.	Annual.	Aug 20
Central Pacific M Co.	Nevada.	F. E. Luty.	330 Pine st.	Annual.	Aug 15
Conadonia M Co.	Nevada.	R. G. Gray.	California st.	Annual.	Aug 15
Golconda M Co.	California.	J. M. Buffington.	309 California st.	Annual.	Aug 24
Independence M Co.	California.	J. W. Pew.	310 Pine st.	Annual.	Aug 17
Martin White M Co.	Nevada.	J. J. Scoville.	309 Montgomery st.	Annual.	Aug 20
Nevado M Co.	Nevada.	J. K. Durbro.	308 Montgomery st.	Annual.	Aug 10
Occidental M Co.	Nevada.	A. K. Durbro.	308 Montgomery st.	Annual.	Aug 10
South Feather M Co.	California.	A. Halsey.	328 Montgomery st.	Annual.	Aug 10

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alta S. M. Co.	Nevada	W. H. Watson.	302 Montgomery st.	Annual.	Aug 20
Con. Pacific M. Co.	Nevada	F. E. Luty.	310 Pine st.	Annual.	Aug 15
Caledonia S. M. Co.	Nevada	A. S. Groth.	414 California st.	Annual.	Aug 19
Golconda M. Co.	California	J. M. Buffington.	309 California st.	Annual.	Aug 17
Independence M. Co.	California	J. W. Pew.	310 Pine st.	Annual.	Aug 17
Martin White M. Co.	Nevada	J. J. Scoville.	309 Montgomery st.	Annual.	Aug 20
Navajo M. Co.	Nevada	J. W. Pew.	310 Pine st.	Annual.	Aug 11
Occidental M. Co.	Nevada	A. K. Durbin.	309 Montgomery st.	Annual.	Aug 10
Southern Feather M. Co.	California	A. Halsey.	328 Montgomery st.	Annual.	Aug 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kossuth M. Co.	Nevada	C. K. Sturtevant.	328 Montgomery st.	06.	Mar 16
Mt. Diablo M. Co.	Nevada	R. W. Huth.	318 Pine st.	20.	July 30
Navajo M. Co.	Nevada	J. W. Pew.	310 Pine st.	25.	Feb 13
Plymouth Con. G. M. Co.	Arizona	J. Nash.	328 Montgomery st.	25.	July 15
Silver King M. Co.	Arizona	J. Nash.	328 Montgomery st.	25.	July 15
Syndicate M. Co.	Nevada	J. Stadfeld Jr.	419 California st.	10.	May 5

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.		Red Bluff.		Sacramento.		S. Francisco.		Los Angeles.		San Diego.	
	Rain.	Wind.	Rain.	Wind.	Rain.	Wind.	Rain.	Wind.	Rain.	Wind.	Rain.	Wind.
July 29-Aug. 5												
Thursday	.62	S. Cy.	.00	84 S.	.00	80 S.	.00	68 W.	.00	87 W.	.00	76 W.
Friday	.00	72 NW.	.00	92 N.	.00	81 NW.	.00	68 W.	.00	92 W.	.00	76 W.
Saturday	.00	80 NW.	.00	98 E.	.00	86 NW.	.00	66 SW.	.00	91 W.	.00	77 S.
Sunday	.00	76 NW.	.00	100 E.	.00	92 NW.	.00	77 W.	.00	86 W.	.00	78 S.
Monday	.00	73 W.	.00	95 S.	.00	92 NW.	.00	68 SW.	.00	92 W.	.00	76 W.
Tuesday	.00	78 NW.	.00	102 SW.	.00	90 NW.	.00	63 SW.	.00	83 W.	.00	78 W.
Wednesday	.00	71 NW.	.00	100 E.	.00	85 SE.	.00	68 W.	.00	88 W.	.00	78 S.
Totals	.00		.00		.00		.00		.00		.00	

EXPLANATION.—Cl. for clear; Cy., cloudy; Fr., fair; Fy., foggy; — indicates too small to measure. Temperature wind and weather at 1200 M. (Pacific Standard time, with amount of rainfall in the preceding 24 hours.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

A BIG CEDAR TREE.—If any of our readers are not inclined to believe the following story, they can say that the *Oregonian*, of Portland, invented it: "Over at Yaquina bay there is a fallen cedar tree eight feet through, which must have lain there a long time, by the fact that two trees have grown over it, one six feet in circumference having two roots that reach down into the ground, one on each side of the log, the other five feet through that has three roots running into the earth. The fallen log is perfectly sound as when first it fell."

THE reports received at the State Bureau of Labor Statistics show that outside of San Francisco the city of Sacramento heads the list in the variety and extent of its manufacturing establishments.

Mining and Scientific Press.

THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

Established in 1860, this paper has been eminently successful as a popular and useful mining and mechanical journal. Relative to precious metals especially, it is the leading mining paper of the world.

It is largely patronized by the leading Miners, Mine Owners, Superintendents, Engineers, Metallurgists, Chemists, Manufacturers, Mechanics, Scientific, Professional and Industrial "Men of Progress" on the Pacific Coast, and many leading Mining Men throughout the mining fields of the world.

It is by far the best advertising medium in the Pacific States and Territories for Mining, Mechanical, Engineering, Building and Manufacturing Tools and Implements Goods, Supplies, etc.

Being thoroughly able and reliable in its editorial and business management, and long established in the most progressive industrial portion of the Union, at present, its power as an advertising medium is unsurpassed.

Subscription, \$3 a year. Advertising rates, moderate. Send for samples and further information.

DEWEY & CO., Publishers,
252 Market Street, San Francisco.

To Young Men and Young Women.

All student boys and girls should prepare themselves for usefulness in business if they wish to "step up higher." We have for sale to such, on easy and favorable terms, a scholarship in one of the best business colleges in the U. S. Address this office.

BOYS AND GIRLS may be had—particularly boys—for service at wages, for indenture, or for legal adoption, by applying with recommendations to E. T. Dooley, Supt. Boys and Girls' Aid Society, 68 Clementina St., San Francisco.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING JULY 28, 1885.

- 323,299.—ROTARY HARROW—Cureton & Kaino, Cuffey's Cove, Cal.
- 323,300.—PORTABLE HOUSE—Wm. Elford, Oakland, Cal.
- 323,134.—SPEED REGISTER—B. Faymonville, S. F.
- 323,308.—DOOR OPENER—Julius Finck, S. F.
- 323,044.—CLOTHES PROP—A. La Jennesse, Oakland, Cal.
- 323,050.—FOLDING BABY CARRIAGE—M. Luxemburg, S. F.
- 323,183.—DRENCHING BIT—Jas. F. Marvin, Fort Apache, A. T.
- 322,955.—MINE DRAINING MACHINERY—Joseph Moore, S. F.
- 322,956.—GOVERNOR FOR STEAM ENGINES—Joseph Moore, S. F.
- 322,957.—HYDRAULIC RAM ELEVATOR—Joseph Moore, S. F.
- 323,065.—CUT-OFF VALVE FOR ENGINES—H. J. Oliver, S. F.
- 322,970.—ASPHALTIC TILING AND PAVING—Rice, Steiger & Thurber, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

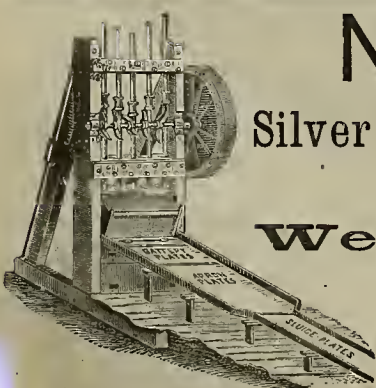
NAME OF COMPANY.	WEEK ENDING July 16.	WEEK ENDING July 23.	WEEK ENDING July 30.	WEEK ENDING Aug. 6.
Albion	.80	.85	1.70	.90
Alta	.35	.40	.40	.35
Andes	.30	.30	.20	.25
Argenta	.05	.05	.05	.05
Belcher	.75	.75	.90	.90
Bell	1.80	2.10	2.70	2.00
Best & Belcher	1.80	2.10	2.70	2.00
Bullion	.25	.25	.15	.15
Bonanza King	.10	.10	.10	.10
Bodie	1.35	1.45	1.40	1.80
Bodie Con.	1.35	1.45	1.40	1.80
Benton	.10	.10	.10	.10
Bodie Tunnel	.40	.55	.45	.50
Bulwer	.40	.55	.45	.50
Challenge	1.50	1.85	1.60	1.90
Champion	.10	.10	.10	.10
Chollar	1.30	1.60	1.20	1.35
Columbia	1.00	1.10	1.00	1.25
Confidence	.10	.15	.10	.15
Con. Virginia	1.50	1.85	1.60	2.15
Crown Point	1.15	1.30	1.30	1.10
Crowns	1.15	1.30	1.30	1.10
Eureka	.50	.60	.50	.50
Eureka Tunnel	.15	.20	.15	.20
Exchequer	.15	.20	.15	.20
Grand Prize	1.35	1.55	1.40	1.65
Gold & Curry	1.35	1.55	1.40	1.65
Hale & Norcross	6.37	7.25	6.50	7.25
Holmes	4.50	5.00	4.50	5.00
Independence	.10	.10	.10	.10
Julia	.10	.10	.10	.10
Justice	.10	.10	.10	.10
Martin White	.40	.50	1.25	1.30
Mono	.40	.50	1.25	1.30
Mexican	.75	.85	.80	.90
Mt. Diablo	2.25	2.45	2.00	2.85
Northern Belle	.80	1.00	.95	1.05
Navajo	.80	1.00	.95	1.05
North Belle	.10	.10	.10	.10
Occidental	1.10	1.25	1.15	1.30
Ophir	1.10	1.25	1.15	1.30
Overman	.25	.30	.25	.30
Potosi	.60	.70	.20	.45
Pinal Con.	.20	.20	.20	.20
Sage	2.10	2.70	2.05	2.35
Seg. Belcher	.80	1.25	1.20	1.50
Sierra Nevada	.80	1.25	1.20	1.50
Silver Hill	.80	1.25	1.20	1.50
Silver King	.80	1.25	1.20	1.50
Scorpion	.25	.30	.25	.30
Syndicate	.25	.30	.25	.30
Tioga	.80	.85	.75	.95
Union Con.	.80	.85	.75	.95
Utah	1.45	1.75	1.55	1.75
Yellow Jacket	1.60	1.65	1.75	1.60

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug. 6.	100 Mexican	.90c
50 Albion	400 Mono	1.20
50 B. & Belcher	200 Navajo	.85c
200 Bodie Con.	100 Ophir	1.35
300 Belle Isle	30 Silver King	.65c
200 Bodie	100 Sage	.25c
300 Con. Va. & Cal.	150 Sierra Nevada	1.50
200 Gould & Curry	250 Union	.85c
100 Hale & Norcross	150 Utah	1.15

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!
We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

CHICAGO PLATING COMPANY, 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St, San Francisco, Cal.



INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco.
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

Room 5, First Floor,
BOSTON, MASS.

PYROMETERS

GAUNTLET'S, HOBSON'S, and STEIN'S

PRESSURE GAUGES

Hot-Well THERMOMETERS

ANEMOMETERS

SAFETY LAMPS

BAROMETERS

SALINOMETERS

Mining and Meteorological

Instruments of every description.

List and Description of our Ten Catalogues sent free on application.

JAMES W. QUEEN & CO.

924 Chestnut St. Philadelphia

San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, White Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

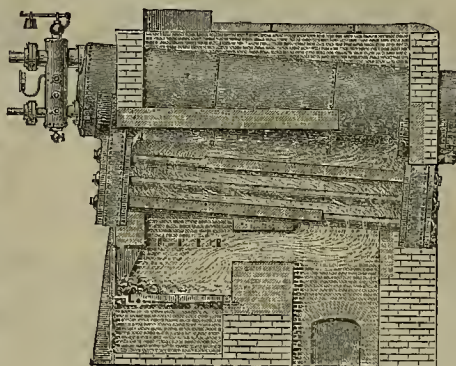
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Borax Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly, (Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sir: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours, (Signed) W. S. TOWNSEND.



Send for Circular and Prices.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made.



Chicago Prices Beaten!

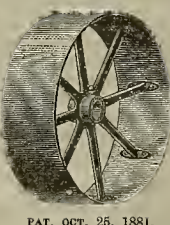
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stair Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington

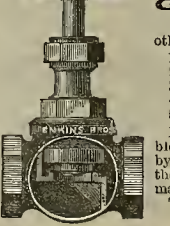
Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and

Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street - - - SAN FRANCISCO, CAL.



JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

Iron and Machine Works.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Shotting Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF

Steam Engines, Flour Mill,

Mining, Saw Mill and

Dredging Machines

Brodie Rock Crushers,

Steam Power, Hydraulic,

Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Henriksen's Patent Automatic

Safety Catches for Elevators. All kinds of machinery

made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

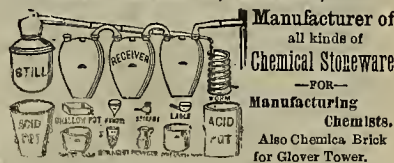
Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



ASSESSMENT NOTICE.

Grosh Consolidated Mining Company.—

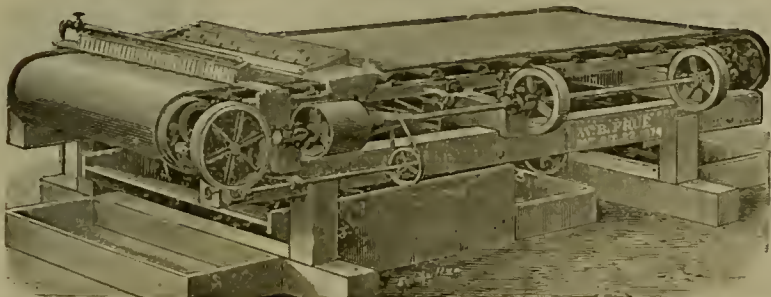
Location of principal places of business, Room 39, Merchants' Exchange, San Francisco. Location of works, Storey County, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 13th day of July, 1885, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 39, Merchants' Exchange, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1885, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the 31st day of August, 1885, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

A. C. HAMMOND, Secretary.

OFFICE—Room 39, Merchants' Exchange, San Francisco, Cal.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator in working order and ready to make tests at the Fulton Iron Works, No. 229 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

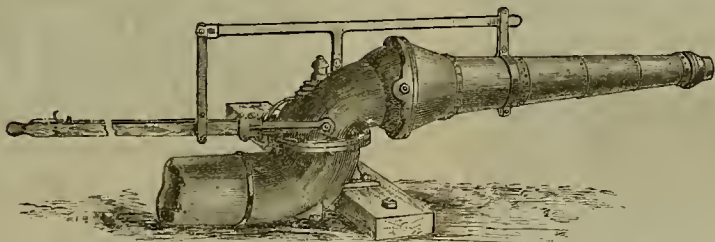
WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

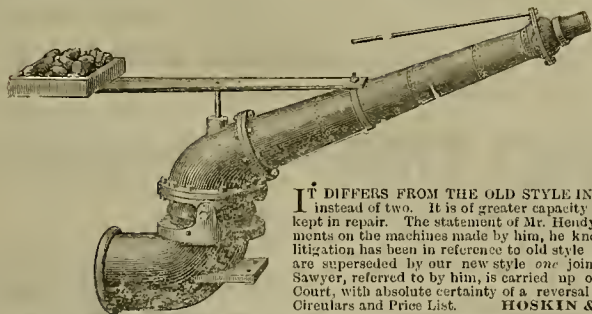
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



THIS CUT REPRESENTS OUR
**IMPROVED
HYDRAULIC
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,
22 Cliff Street, New York.



L. C. MARSHUTZ. T. C. CATNRELL.

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

**Stationary and Compound
Engines,**

**FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.**

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

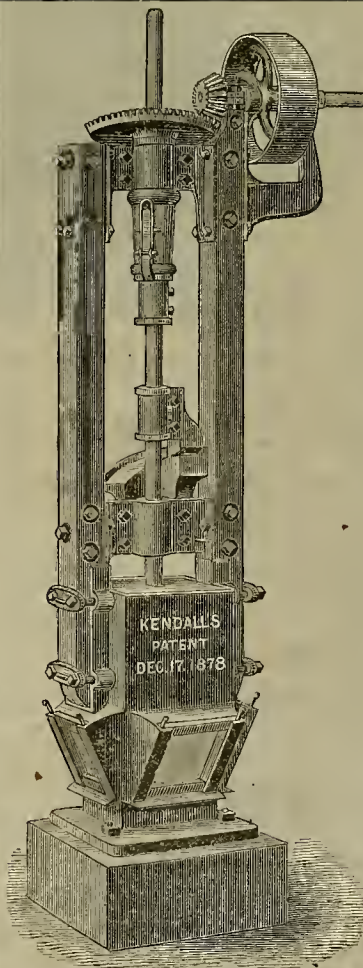
...SOLE MANUFACTURERS OF...

**KENDALL'S PATENT
QUARTZ MILLS.**

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that is claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL.

Send for Circulars and Price List.

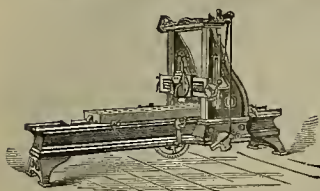


DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



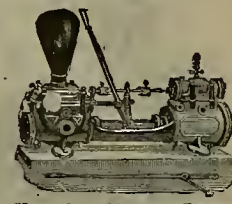
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

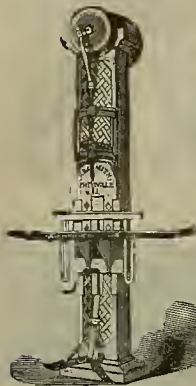
Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

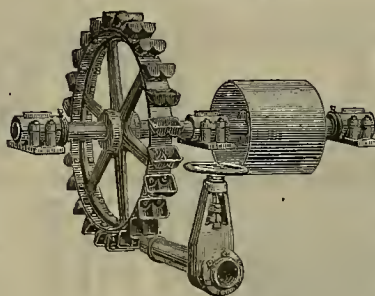
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR

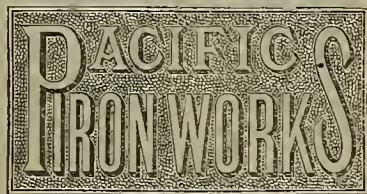


Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

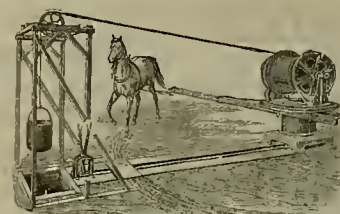
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



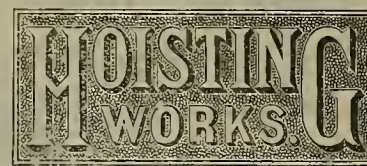
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Prest and Treas.

GEO. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS.

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 15, 1885.

VOLUME LI.
Number 7.

Professor George Davidson.

A Sketch of Our Most Prominent Pacific Coast Scientist.

Probably no name is better known in the scientific world of the Pacific Coast than that of Professor George Davidson, of the U. S. Coast and Geodetic Survey. His active and untiring efforts, extending over a long period of time in advancing the interests of science on this coast, are well known; and the work he has accomplished in the service in which he holds high rank has earned for him a name and reputation which might be envied by any man. A brief sketch of his life and services will be of interest to very many.

George Davidson is at the head of the Field Assistants of the U. S. Coast and Geodetic Survey. He was 60 years of age in May last, and has been on the Survey over 40 years on consecutive duty, serving from Newfoundland to Texas and from Panama to Alaska.

He came to the Pacific Coast early in 1850, when it was a new and difficult field, having been chosen for this special duty by Superintendent Bache. He served five consecutive years, winter and summer, on the Atlantic and Gulf Coasts before that, and afterward during the rebellion, and has been again upon the Pacific Coast since 1867.

In 1841 he was a student in the Philadelphia Central High School under Prof. Bache, afterward Superintendent of the Survey, who selected him for survey work, one year before graduation, from among hundreds of students who had been with Prof. Bache. He entered the Survey June 1, 1845, upon graduation.

Prof. Bache offered him the position of assistant in charge of the office in 1850, which offer was declined, and he was selected for duty in California before he was 25 years of age; and was for several years specially engaged in the determination of the latitude and longitudes of prominent capes, bays, etc., and of the magnetic elements of the Pacific Coast, reporting also upon the proper location for light-houses. Prof. Bache frequently declared that his energetic work in 1850 saved the Pacific Coast items in the appropriations in the succeeding Congress.

Prof. Davidson has made himself thoroughly familiar with the currents on the Pacific Coast and discovered the existence of the inshore eddy current which affects all bays and influences all improvements for harbors of refuge. He has given great attention to all hydraulic problems, to the water supply of large cities, the sewerage of the large cities of Europe and America, and the drainage of great districts (Egypt, Italy, Holland, etc.). Most of these studies were directly connected with the work of the Coast and Geodetic Survey.

Beyond these he has been an active member of the California Academy of Sciences and has published original investigations in geometry, in the devising of new instruments of precision, in the physical appearance of Saturn, Jupiter and Mars; on the constitution of the tails of comets, the plateau of the Pacific off the California Coast, etc. He has produced papers upon methods of determining the solar parallax, the introduction of science in our public schools, the endowment of scientific research by the State, the necessity for a physical survey of this State, etc. To the Geographical Society of the Pacific he has presented papers upon the ascent of the Makushin volcano, the eruptions of Bogoslov and other volcanoes, on the shoal-

ing of the bar of San Francisco bay, the dangers of future shoaling, etc.

He has been engaged in every variety of field work, and is familiar with the use and detailed construction of every instrument; he has devised new and economic forms; knows the methods of investigation employed; made the first complete series of observations for coefficient of refraction on this coast, and two subsequent series (published); has had charge of the San Francisco sub-office for the greater part of 17 years; and has proved his administrative capacity and executive ability in every position.

Outside of his regular official duties, Prof. Davidson has written three editions of the "Coast Pilot of California, Oregon and Wash-

cific Coast; and the records of the computing division show that the results of his observations stand higher than any ever executed in America, Europe or India. The superintendent has approved special results and operations of this work "as unique in the history of Geodesy," and has praised the character of all. And whilst its magnitude and difficulties are greater than any abroad, it has been carried on more economically and more rapidly than any other.

In 1881 he measured the longest base-line yet attempted in trigonometrical operations, and with the greatest accuracy. In acknowledgment of the character of the system of triangulation developed from the Yolo base-line to the



PROFESSOR GEORGE DAVIDSON.

ington," and at the request of the superintendent, is at work on the fourth edition. He also wrote the "Coast Pilot of Alaska, Part I," published in 1868. He has computed a field catalogue of transit stars (published), and by direction of the superintendent has completed an extended catalogue of 1,278 stars for a second edition (published); has computed a table of 67,000 star factors to three places of decimals (published), and is engaged upon another equally extensive, but requiring greater labor.

After Prof. Peirce's appointment in 1867, Prof. Davidson was placed in charge of the work on the Pacific Coast, and laid out all the schemes of work for all the land parties from 1868 to 1875, and inspected all the fields of work. An appeal to the records will show greater general progress, and more system in that period than at any other. He made telegraphic connections for longitude with all the different centers of triangulation and topography, and in the telegraphic longitude work between San Francisco and Cambridge, determined directly the signal time over 7,200 miles of line. He determined the Eastern boundary, 120th meridian, of California, in 1873.

After his return from Japan, Italy and Egypt, in 1876, he was placed in charge of the main triangulation and astronomical work of the Pa-

Sierra Nevada and the Coast range, and the high standard of the observations, the superintendent has designated it by the name of the "Davidson Quadrilaterals."

For his services when in charge of the Pacific Coast work, Superintendent Peirce had him promoted to the head of the list of field assistants for administrative capacity and special aptitude.

He has, moreover, kept abreast of all scientific progress correlated with the work of the survey, and in 1874 was elected a member of the National Academy of Sciences. He has been re-elected President of the California Academy of Sciences from 1871 to 1885; elected President of the Geographical Society of the Pacific, at its inception in 1881; made life member of the Academy of Natural Sciences of Philadelphia for special services (1855); elected member of the American Philosophical Society, 1865; Fellow of the American Association for the Advancement of Science, 1880; received the degree of Doctor of Philosophy from Santa Clara "for advancing the cause of true learning" in 1876.

Prof. Davidson holds the position of Honorary Professor of Geodesy and Astronomy in the University of California (1873), made at the suggestion of Prof. Peirce; and was a Regent of

the same institution from 1877 to 1884. At his own expense he has maintained the first astronomical observatory on the Pacific Coast of North America; and has given the use of his equatorial to the Survey when special observations demanded it.

In 1867 Prof. Davidson was appointed to make a special examination and report upon the geography and resources of Alaska, pending its purchase, and his published report and conferences with Congressional committees influenced the passage of the bill appropriating the money. In 1871 he was appointed by the Secretary of the Treasury to examine and report upon the weights and balances of the U. S. Mint at San Francisco (published). In 1873 was appointed by the President of the United States one of the three U. S. Commissioners of Irrigation of California, with General B. S. Alexander and Col. G. H. Mendell. The report made by these Commissioners was published by the Government. Prof. Davidson afterwards went officially through India, Egypt, Italy, etc., to study the same subject (published), and to examine and report upon harbors of refuge, etc. (published).

He was also appointed by the President one of the three U. S. Advisory Commission for the Harbor of San Francisco, with Admiral John Rodgers and Col. G. H. Mendell; was sent in charge of the U. S. Transit of Venus Expedition to Japan in 1874; determined (at his own expense) the telegraphic longitude between Nagasaki and Tokio, Japan, and presented the observations to the Coast Survey; was sent to Paris Exposition in 1878, to examine the instruments of precision applicable to astronomy and geodesy, and was there selected by the French and foreign jurors the president of the important jury on machinery, when that jury examined 3,800 pieces of machinery and awarded 850 prizes. For this service he received the large medal of the French Government.

Under instructions, Prof. Davidson has officially visited many of the observatories and most of the prominent instrument work-shops of Europe; has visited the field and conferred with the officers of the Great Trigonometrical Survey of India, examining their means and methods; has visited the headquarters and offices of the geodetic work of France, Prussia, Great Britain and Switzerland to study their methods and appliances.

This accompanying engraving, made from a photograph by Taher, is a very faithful likeness of Prof. Davidson. Aside from his scientific attainments in special branches, the subject of this sketch is an exceptionally well-informed man on general topics. Traveled and well read, there are few subjects which have escaped his attention. His social qualities are such as to have endeared him to a large circle of friends, and his conversational powers of a character to make him one of the most agreeable of companions. Few men are so frequently consulted for advice or information. It is one of his peculiarities that he takes the greatest interest in young men, and is always ready to assist them in any possible way, a fact to which many he has helped can testify. Having grown sons of his own, he appreciates the thoughts and feelings of young men better than most men in his position are apt to do.

The writer of this sketch has been, as Secretary of the California Academy of Sciences, a co-laborer with Prof. Davidson for some 13 or 14 years, and intimately associated with him during that period. He is, therefore, in a position to know how highly the Professor's talents and social qualities are appreciated by those with whom he has been connected and to know of the elevated position he has attained in the scientific world. The whole Pacific Coast has benefited by Prof. Davidson's talents and energy, for a large portion of his successful life work has been performed on this side of the continent.

C. G. Y.

Let Us not Mislead Them.

While it is very desirable that the present population of California should be increased, there being ample room for many more people to live in comfort than are now in the State, still we should be careful not to overcolor the picture when in bidding for immigration we undertake to present the advantages offered by California as a place of settlement, for this is not a country without its difficulties and drawbacks. No laborer or man of small means should be encouraged to come to this coast thinking he can make a living here without hard work and the practice of economy, the same as is necessary in most other parts of the world. We have here a good country, much cheap land of fair quality, a fine climate, healthful, equable and agreeable. We have good laws, pretty well administered; life and property are tolerably well protected, and society is not much worse than in the older States. We have good schools, plenty of churches, wagon and railroads, with not overdear transportation; living is cheap, the staples of subsistence, clothing, fuel and rents included, being not much dearer here than on the Atlantic seaboard. But, for all these luxuries, comforts and advantages, the mass of the people, all who have to depend on their own exertions for a living, are obliged to hestir themselves, work good long hours, save and practice self-denial if they mean to get ahead or even keep the wolf from the door. This the intending emigrant should be made to understand before leaving his old home or even making arrangements to come here. What the *Willows Journal*, published in one of the richest farming districts in the State, has to say on this subject is so much to the point that we copy it in part:

The East is again being flooded with circulars descriptive of California, its wonders, advantages and possibilities. Although these are, in many instances, misleading, and intentionally so in part, still the charge of positive falsehood might be evaded by the vastness of our State. To read some of them, those who are not acquainted with California would think the orange and the redwood, the pomegranate and the pine, grew side by side. That the loftiest mountains and the broadest valleys enjoyed equally the "glorious climate," and that the sad sigh of the forest fir and the gentle rustle of the olive were blended like the dulcet tones of a midnight serenade. We have yet to see in any of these so-called descriptions of California any statement calculated to prepare the immigrant's mind for California as it is. Let it be known that our State is 750 miles long by 250 in width, and that what is said of California includes all that is found within its broad bosom. That within this vast domain is found every variety of climate, from perpetual snow to eternal spring. That the productions of the four quarters of the globe are represented here. That enormous woods, vast plains, huge mountains, magnificent cascades, sublime waterfalls, pleasure resorts, prodigious crops, healing springs, mineral deposits, luxury, wealth, comfort, health and happiness are truly to be found in California, but that it requires a territory of 188,000 square miles to contain it. It requires money to travel in California. The exploration of a mountainous country is always expensive, and the man without capital will be able to see but very little of this coast. Again, what may he said of Los Angeles cannot be said of Laseen, and what is true of Humboldt is not true of Stanislaus. One portion of the State is adapted to one thing, another to another. True, a great diversity of products may be grown in many localities, but it requires the combined industry and capacity of the entire State to justify the glowing descriptions sent out by schemers and land sharks, and even then a flexible conscience will not be a bad auxiliary. But this is not the worst feature of these circulars. The immigrant is told that there is plenty of Government land still to be had, and either by insinuation or positive assurance is led to believe that it is capable of producing the most varied and enormous crops. Now the fact is, no State in the Union has a population so wide-awake to the importance of securing permanent and productive homes as California.

We, of this State, are a live people, and being conscious of our opportunities, have not been slow to make the most of them, and it is not to be supposed that we have failed to secure most of the good land that is eligibly situated for settlement, and the Government lands that are left are generally of an inferior quality and remotely situated. There are some that can be rendered valuable, and will be, no doubt; but it will require both labor and capital. Suppose, for instance, a man with a family, and the right of homestead, settles in one of our northern counties, how is he going to live? How will he build his house and buy his tools and seed? Where will he get his provisions? By his labor? No! In these new settlements—and there is no public land anywhere else—they are all poor and equally dependent on their labor for support. There is plenty of labor, but no capital. They are far removed from market. It takes money to move the product of their industry, whether it be shakes, posts or grain. It is not necessary to resort to falsehood. The truth is ample. People with a small capital, by industry and perseverance, can do well here, can make money, can enjoy health, wealth and luxury. But without capital, with but the two hands and a willing heart, our advantages

are comparatively insignificant. If Government land of any value is found, it still takes capital to weather the storm until a start is made. We have a prolific earth, an invigorating atmosphere and a smiling sky. Our products are varied, extensive and unsurpassed, and the world is our market. All this may be enjoyed by the man with small capital, but to the man without it the prospect is not more promising than in many other places. If fruit is the object it must necessarily be three or four years before any return can be realized. If stock, a start is required. If you go into the mountainous portion of the State you encounter cold weather in its season, and must be able to prepare for and provide against it. All this takes money, and to invite emigration to our State unprepared for these things is only to cause dissatisfaction.

Supposed Grand Opportunities.

Touching the opportunities offered for the investment of money in mining properties, the *Chicago Mining Review* discourses as follows:

The continued stagnation of idle capital appears to indicate that there has been no marked improvement or advancement made by those controlling large sums of money. While capital has the reputation of being conservative, the history of events proves its dullness of perception, and its inability to grasp, in advance of a general movement, important views of advantage. Let the tide of investment turn in any given direction and thousands and millions of dollars are poured thoughtlessly and recklessly and unreasonably out to secure some fancied advantage or benefit, where reason clearly indicates that there is no substantial basis of realization.

A season of general activity for a time appears to prevail, in which capital seeks the most absurd and illy advised adventures, and is easily lured from its hiding place, even over a pathway which is marked by misfortune and disaster. On the other hand, when a reaction comes, ending in a general depression of business, the most inviting propositions, based upon the most substantial assurances of a steady and generous return, are considered calmly and indifferently, while opportunity after opportunity, in which there is every assurance of safety and security, is passed by unimproved.

In the early history of mining enterprises, a piece of gaudily printed stock was sufficient to secure money, without investigation, examination or knowledge of the basis upon which the stock was issued. Millions of dollars have been paid for these stock certificates, in many instances representing no tangible evidence of value, present or prospective. Capitalists were eager to exchange their money for these painted bubbles, which in thousands of instances were based upon six location stakes, where there was not even a semblance of a mine within miles of the locality designated. At the present time the scene is vastly changed. Years of steady and unremitting toil have pushed down shafts hundreds of feet throughout the mineral belt of the country, and demonstrated to a certainty the character, quality, value, cost and profit and all the important factors entering into a demonstration of the real basis of the mining industry. In many cases the amount of ore actually in sight is greater than the amount asked for the mine. In other instances the work of development, the acquired facilities, and the demonstrated value of a property, as a producer, is equal to the amount demanded for the same. These opportunities are presented in hundreds of mining camps, from one end of our mineral bearing territory to the other, yet capital turns a deaf ear and is dead and cold to every opportunity presented. In addition to this important advantage, these years of experience have furnished a class of qualified and thoroughly responsible experts, upon whose judgment millions may be safely invested. Marked improvements have been made in mining appliances. New methods of utilizing the ore product have been discovered. Marked reduction in transportation and other matters bearing upon the cost of producing have been secured, yet, notwithstanding all these permanent advantages, the plethora in capital centers still continues, and a great industry, extending over an immense portion in country, languishes in its enforced idleness.—*Chicago Mining Review*.

GOLD AND SILVER.—The *Chicago Evening Journal*, which can by no means be classed as a silver paper, makes the following statement: "If there is great danger that professional alarmists may succeed in creating a panic by exaggerating the perils likely to grow out of the silver coinage, it should be allayed by an understanding of the facts in regard to the relative amounts of gold and silver coin in the United States. The amount of gold coin in circulation in the country or stored in the banks or in the Federal Treasury is \$610,500,000. The amount of silver coin in the country is \$262,000,000. In order to create any great disturbance of values it is evident that there will have to be a great deal more silver or a great deal less gold available for commercial uses.

AN artesian well on a desert station in Kern county, Cal., has been completed, which gives a flow of 1,570,000 gallons in twenty-four hours, and the water rises eleven and a half inches above the pipe. The cost was only \$700.

The Republic of Colombia.

Now that many citizens of the United States, including some former residents of California, have acquired mining interests and contemplate carrying on large operations of this kind in the Republic of Colombia, some information in regard to the institutions and resources of that country, the character of the inhabitants, etc., can hardly fail to be interesting to our people. This Republic, which constitutes the northern portion of South America, is made up of nine different States, the entire number containing about 4,000,000 inhabitants, composed as follows: 1,375,000 are whites; 2,000,000 are mixed whites and natives. There are 1,500,000 Indians and 475,000 negroes and mulattoes. The whites, so-called, being Spaniards or the unmixed descendants of the race.

The principal articles of export from the country are included in the following items:

Metals and precious stones mined in the States of Cauca, Antioquia, Tolima and Boyaca, per annum.....	\$4,500,000
Quinine found in the natural forests of Cauca, Tolima and Santander.....	3,000,000
Coffee and cocoa.....	2,000,000
Tobacco.....	500,000
Cattle (Atlantic Coast of State of Bolivar).....	1,000,000
Hides, rubber, vegetables, ivory, stuffed birds, plants, etc.....	1,000,000

Total exports.....\$12,000,000

Foreign merchandise is imported to the value of from \$12,000,000 to \$15,000,000. It is said that with capital and suitable machinery, the mines can be made to yield \$30,000,000 a year. The nine States comprising the Republic of Colombia expended the following sums last year, without embarrassing their finances, except Panama, which has for some time been on the verge of bankruptcy:

Antioquia.....	\$700,000	Boyaca.....	\$180,000
Cundinamarca.....	900,000	Bolivar.....	300,000
Tolima.....	80,000	Magdalena.....	80,000
Cauca.....	400,000	Panama.....	250,000
Santander.....	500,000		
Total.....			\$3,300,000

The national debt, the interest upon which has been paid only in part since 1880, amounts to \$26,000,000, of which \$15,000,000 is owed at home and \$11,000,000 abroad.

The State debts are said to be small. The receipts of the National Treasury last year amounted to \$5,155,000, while the expenditures were only about \$4,000,000. The cost of putting down the rebellion in the State of Panama will this year be added to the ordinary expenses. The Republic of Colombia having now about \$1,000,000 of surplus revenue, the following public works have been undertaken:

1. A railroad from Cauca to the Pacific, of which 30 miles have been constructed.
2. A railroad from Cundinamarca to the Magdalena river, 15 miles built.
3. A railroad from the Magdalena to the capital of the State of Antioquia, 48 miles built.
4. A railroad between the upper and lower portions of the Magdalena, where navigation is interrupted by the rapids, 16 miles built.
5. A railroad from Santander to the Magdalena, six miles built.
6. Railroads from the seacoast to Barranquilla and Cienaga, in the States of Bolivar and Magdalena, 32 miles built.

Senor Nunez is the President of the Republic of Colombia. He is described as a white man about 55 years of age, of fine intellect, who has resided abroad, having spent several years in the United States and Europe, fertile in speech, a brilliant writer, a Liberal in politics and an ardent lover of liberty, brave, heroic and a man of unexcelled honor. With this showing, surely the Republic of Colombia ought to prosper. There have been five bloody revolutions in the Republic of Colombia within the last 50 years. To these may be added the Panama Revolution, which destroyed the city of Aspinwall and involved the loss of a great many lives. Prestan, the negro revolutionist, has recently been captured and will probably be disposed of in the usual Latin way.

On the Magdalena river no less than 19 steamboats are plying, all built in the United States. These transport about 50,000 tons of merchandise and 6,000 passengers annually. There are about 87,000 children in the 2,200 primary schools of Colombia, who are receiving a fair elementary education. In this Republic of 530,000 square miles there is a vast amount of natural wealth. Manufactures are at a low ebb. Machinists, masons, carpenters, and skilled mechanics in other trades do not abound. The crop of noisy demagogues is very large. What the Republic of Colombia appears to need to day is greater industrial productivity. But this is the need of all the Latin Republics and States, from Mexico down to and including Peru. The Republic of Colombia is well affected toward the United States, and is brought to-day into closer sympathy with us than any other of the Republics, either north or south of the equator.

The specie reserve in the Bank of France on the 7th of May, 1885, amounted to \$429,600,000, of which \$213,160,000 coined at a valuation that would make our dollar of 412 grains worth 103.06 cents, and which, if valued with respect to gold as silver is valued in our standard dollar, would be worth about \$206,637,000.

THREE FOURTHS of the standard silver dollars coined are in circulation.

And the Future—What of It?

We really wish we could answer the question we have here propounded in a way satisfactory to ourselves or any one else; the which we confess we are unable to do, the outlook being so mixed, puzzling and uncertain. The *Journal of Commerce*, published in San Francisco, and an authority on financial, industrial and trade matters, speaks hopefully of the prospect, in so far as California, and even the entire Pacific Coast, are concerned. The *Journal* thinks there are many and evident signs of the return of better times, and predicts that our merchants will have a better fall trade than for two years past. Of the prospects in the East, leading papers there do not speak so hopefully, insisting that the causes that produced the depression have not been removed, and until they are the indulgence of hope will probably yield nothing but disappointment. Confidence in the future of values, which has been so conspicuously absent since the present decline in prices began, is not being restored, and while the general belief is that prices have touched bottom, there does not appear to be any desire on behalf of the capitalists to invest. That is to say, it is conceded that values have reached a point below which they cannot well go, but, in the face of remaining obstacles, it is doubtful they can be advanced yet. One of the chief causes of the present depression, as heretofore stated, is the appreciation of the purchasing power of gold. The depression set in when the attempt was begun in Congress to repeal Silver Coinage Act, and is likely to continue until the question is finally decided, or until the gold bugs become so disgusted with their own efforts to force a single monetary standard upon the country, that they will desert the field and leave it to the people. There is room for no doubt now that the effort to repeal the silver legislation of 1878 will be renewed at the coming session of Congress, and, therefore, little room to hope for a revival of speculative enterprise and industrial activity in the meantime. The adoption of the gold standard will have the effect of still further appreciating its value, and this will have the corresponding effect of still further reducing values. Indeed, it may be said that this is the primary object of the moment. The banks are still overburdened with surplus cash and loans on good security, (Government bonds) can be made at the borrower's own terms. But there are no horrors, for the obvious reason that there is no speculation. Nor can there be any while legislation calculated to increase the purchasing power of money and the depreciation of the value of all commodities is in contemplation. This is a plain proposition, and to our mind satisfactorily explains the long continued and, to many, mysterious business depression.

THE MINER'S MANY PERILS.—Every trade is subject to its peculiar line of accidents. Thus, the carpenter is liable to split his great toe with a broad ax or chip off his knee cap with an adz; the blacksmith is exposed to burns and bruises; the stone mason to falls and spawls of rock in the eye; the sailor to falls and death by drowning; but the miner is exposed not only to the accidents of his trade, but also those incident to all others. He may be drowned, like the sailor; killed by an explosion of gunpowder like the soldier; burned to death like a martyr at the stake; scalded in hot water, crushed by falling rocks and caves of earth, wound up in machinery, have his head split open with an ax in timbering, his legs and arms broken by falling through floors, his neck dislocated by being run up in the sheaves, his head broken off by falling from a cage, and his whole body knocked out of human shape or reduced to a pulp or scattered in shreds by falling down a shaft. Also, in falling down a shaft, particularly through the pump compartments, there are so many projecting points and sharp corners of iron that he may suffer all the cuttings and rendings incident to any or all the trades of the world. In other trades we may calculate and to a considerable extent guard against the accidents that are liable to happen, but in mining accidents are constantly happening, the like of which was never before heard of. The miner is exposed to the accidents common to the use of tools of various kinds, falls and falling things, fire, floods, explosions, suffocating gases, scalding water and to machinery of various kinds moving in all directions.—*Rocky Mountain M. Review*.

ON THE RIGHT SIDE OF THE LEDGER.—A statement of the commerce of the United States during the fiscal year, ending July 1st, shows a satisfactory balance in favor of this country. The excess of exports is represented by \$165,000,000, indicating an addition of this immense amount of capital to the channels of commercial activity. This not only is proof of a healthy condition, as we are producing and selling more than we are using and buying, but it proves, also, that a movement of capital may soon be anticipated in the direction of productive industry, as this volume of export must tend largely to reduce the surplus of over-production, which has been given as the cause of our present business inactivity.

PRODUCTION of the precious metals in Mexico since 1493 amounts to almost \$3,000,000,000 or about \$1,000,000,000 for each century.

MECHANICAL PROGRESS.

Broken Set Screws.

J. F. Hobert in the *American Machinist* throws out some pertinent shop hints in the following pleasant manner: How do you like to dig out broken set screws? Fun, isn't it? Broken cylinder studs are nice, too. How do you do it? You get half a dozen little cold chisels and dig away at the end of that screw or stud trying to make it turn out: This will very often start a set screw, and where the screw is loose or fits badly the chisel will bring it every time.

When you get hold of an old rusty stud in an engine or Noah's earliest patent then you don't fool with chisels long. Perhaps you rig up a drill and put a hole right down through that stud. When you get in an inch or so you take out the drill, stick a punch in the hole and try to start the rusty thread by pounding on a punch with a monkey wrench. Of course you use a wrench. No machinist in his senses ever would use a hammer when he could get a wrench to jump up. Perhaps the studs start so that you can drive a square piece of steel into the hole you drilled and turn out the old root with your battered wrench, or perhaps you have to drill clear through the stud and then chip it out piece by piece.

We used to have a little kink that worked well at this business. We had a racket stock that would work left-handed. We made some left-hand drills and used them for drilling out broken screws and studs. They worked nicely. Often the screw would start to turn around from pressure of the drill. With a right-hand drill they would only walk in deeper, but with the left-hander the stud would start out and cramp the drill. You could start back on the feed, and work the bolt right out of the hole in "less than no time." Small jobs that could be put in the lathe came to time pretty quickly with our left-hand drills.

A BROKEN FILE.—There is no tool so easily broken as the file that the machinist has to work with, and is about the first thing that snaps when a kit of tools gets upset upon the cross beam of a machine or a tool board from the bed of an engine lathe. It cannot even be passed from one workman to another without being broken, if the file is a new one, or still good for anything, if an apprentice has got anything to do with it, and they are never without mending however great may be their first cost, unless the plaster of paris and lime treatment can make a perfect well without injuring the steel or disturbing the form of the teeth. Steel as hard as a file is very brittle, and soft solder can hold as much on a steady pull if it has a new surface to work from. Take a file as soon as it is broken and wet the break with zinc dissolved in muriatic acid, and then tin over with the soldering iron. This must be done immediately as soon as the file is broken, as the break begins to oxidize when exposed to the air, and in an hour or two will gather sufficient to make it impossible for the parts to adhere. Heat the file as warm as it will bear without disturbing its temper as soon as well tuned, and press the two pieces firmly together squeezing out nearly all the solder, and hold in place till the file cools. This can be done with very little to trim off, and every portion of the break fitting accurately in place. Bring both pieces in line with each other, and for a file it is as strong in one place as in another, and is all that could be asked for under the very best welding treatment.—*Boston Journal of Commerce.*

IRON IN ARCHITECTURE.—A paper read by G. Richards Julian before an English engineering society a short time ago, throws such light as indicates the direction wherein cast-iron may be ornamented with fidelity to art principles. The subject seems to be a new one in England, though some advances have already been made in this country toward an artistic treatment of the iron work of buildings. It is one of the canons of art that whatever is false should be avoided; that works to be beautiful must be truthful; that wood must not represent stone, nor cast-iron imitate wrought iron or stone. This general principle was naturally violated when cast-iron was introduced as building material. Mr. Julian in his paper points out some of the ways in which iron may be ornamented without imitation of other materials. Round fluted columns, with Corinthian capitals imitating stone work, have been displaced by columns of a variety of cross sections, and the capitals are replaced by bracket forms suited to the material and wholly unlike anything permissible in stone. The surface decorations of panels has also undergone a change, which distinctly recognizes the nature of the material. It is in low relief, with sharp outlines, and conventional in form. This treatment of iron is in the right direction and will soon give us an iron architecture distinct from stone or other materials and as truly artistic. Utility and adaptation of means to ends lie at the base of all good design and decoration. When iron is structurally treated to give adequate strength with lightness, and the ornamentation required by cultivated people is strictly subordinated to utility and the nature of the material, we shall have done with offensive imitations and the architecture of iron will be as "true" as that of stone.

IMPROVED ENGINES.—An improved construction of locomotive is spoken of with much favor

by engineering authorities, the arrangement being such that while in ordinary engines the gases are usually thrown out of the stack, which is the cause of the density of smoke, in this case the gases are all burned, thus insuring the absence of smoke, which results, of course, in a saving of fuel. Instead of having a large conical smokestack in front, the new locomotive has a straight smokestack similar to those in use on English and French locomotives, in the rear, just in front of the cab. The boiler has two sets of flues, small ones in the lower part and larger ones in the upper. The smoke runs twelve feet through the lower flues, and then returns by the larger flues to the rear, where the smokestack is placed; thus the smoke traverses twenty-four feet before reaching the smokestack, instead of twelve feet, as in ordinary boilers. The heavy cinders and dust, not being able to rise from the lower small flues into the upper large ones, fall into a smoke arch in front, and can be emptied on the ground at any time.

MINERAL OIL IN BOILERS.—In regard to the use of mineral oil in boilers, to which reference was made in one of our late issues, it should be remarked that at a late meeting of English engineers a member spoke of the bad effects of the use of such oil, in substance, as follows: It leaves a residue which is a most effective non-conductor. He had made an experiment to prove this. He placed a quantity of water in a vessel over a fire until the water came to a boil. He then took it off and found he could place his hand on the bottom of the vessel without injury. He then made a solution of the residue of some mineral oil taken from a boiler, and with that solution painted the inside bottom of the vessel previously used. He then again filled it with water and brought the water to the boiling point. On removing the vessel from the fire he found the bottom red hot.

THE INTERCHANGEABLE SYSTEM.—There has been some inquiry lately as to who first invented the interchangeable system of making machinery. It appears that the first use of the system was made in France in 1717, but was not a great success. In this country various efforts were made from time to time to use this system, but the details were not worked out sufficiently to make the system useful. Every one who tried it added something to the perfection of the system, but the man who probably did the most toward its perfection was Thomas Blanchard, whose inventions were used at the United States armory at Springfield. The first complete success under his system was achieved in 1842, when guns were made which dispensed with the old system of numbering and lettering. The interchangeable system rapidly spread to every detail of machinery manufacturing.—*Ex.*

SODA IN STEAM BOILERS.—An exchange says: The best method of introducing soda into the boiler is in all cases to dissolve the soda and introduce it continuously with the feed, which can be done by connecting the vessel containing it with the suction pipe of the pump that supplies the boiler. The proper amount of soda to be used is best found by experience. The usual quantity varies from 1 lb. to 2½ lbs. per day, according to the quantity and quality of the water evaporated. With soda ash a larger quantity will be required, and with caustic soda a smaller quantity. Soda does not act injuriously on the boiler plates, unless the salt is concentrated from the want of sufficient blowing off, or unless the soda itself is impure, and contains acids.

THE SIZE OF JOURNALS.—Maximum efficiency of machinery in which journal friction is the main source of waste of work and energy, is secured by giving the journals such diameter that they will neither twist nor spring under their loads, such length that the load may be carried principally on the lower portion of the bearing, and such form that the "brass" shall not bind or grasp the journal or in any way subject the journal to serious lateral pressures. All lateral pressures due to grasping or binding action decrease efficiency.

WATER IN THE CYLINDER.—For an experiment, Herr Stoupler, of Lucerne, Switzerland, added fluorescence to the water of a steam boiler. The deep green color of the water was retained by it for weeks, and yet no trace of the coloring matter could be detected in the water contained in the steam cylinder, and he accepted this as a proof that the water which gathers there is entirely due to condensation caused by the expansion of steam, and very little water is actually carried over "mechanically" from the boiler by the steam.

ANOTHER ALLEGED FURNACE IMPROVEMENT. Thomas Hunton, of New Orleans, who controls patents by which, it is said, gases generated in the manufacture of iron can be utilized as fuel, is endeavoring to conclude an arrangement with the Birmingham (Ala.) iron men for the erection of a furnace in which his process shall be used. It is claimed this process will reduce the cost of fuel anywhere from 25 to 50 per cent and revolutionize the furnace business.

STAMP DIES.—Prof. Willard I. Pierce, in his address before the American Institute of Mining Engineers, in February, while speaking of stamp mills and their shoes and dies, said: "The adamantite shoes are of chrome steel and have given great satisfaction, the last set crushing over 3,000 tons; the dies are of the same material and weigh 94 pounds each."

SCIENTIFIC PROGRESS.

NATURAL BRIDGE IN ARIZONA.—Frederick Gardner, Jr., a correspondent of *Science*, furnishes that journal with a description and photograph of an interesting natural curiosity, which he recently discovered in Arizona, in the form of a natural bridge. It was guided to it by an Indian, and thinks it was never before seen by a white man. The bridge is located near the boundary between Arizona and New Mexico, and about 20 miles from the point where the Atlantic and Pacific Railroad crosses the line—the account does not say whether it is north or south of the railroad. The bridge forms a section of a ridge, which is here cut through by a small stream, like the well-known Virginia bridge. The section cut through is of dark red sandstone overlaid with grit, of which latter material the bridge is composed. The bridge is sixty-five feet long, fifteen feet wide at its narrowest point; two feet thick in the center, gradually increasing to fifteen at the sides. The light above the bed of the stream is not given, but by the photographic engraving given in *Science*, which shows the explorer's horse standing beneath it, we should judge the height to be about 20 feet. A petrified forest was found a short distance from the bridge. The locality, when better known, will undoubtedly be much visited by tourists. We trust that our cotemporary will give more accurate directions as to its locality, so that it may be readily found by travelers and others.

STEREOSCOPIC EFFECTS BY THE MAGIC LANTERN.—Mr. Crowther, of Manchester, has invented a contrivance for the production of stereoscopic effects by means of the magic lantern. Two lanterns are used, each of which projects one of the two corresponding stereoscopic transparencies so that one picture is superimposed upon the other upon this screen. The light thrown from the lanterns is not white, but consists of complementary colors, red and green. The observers wear spectacles colored of corresponding tints with those used in the lanterns, and each eye perceives only its appropriate view, the mind combining the two pictures into a representation possessing strong stereoscopic relief and some peculiar properties of luster. By a slight alteration in the adjustment the image can be made to advance and retreat, appearing suspended in mid-air between the spectator and the screen, somewhat after the manner of the well-known illusions produced by concave mirrors. The inconvenience of supplying colored spectacles to a company of observers can be overcome, it is thought, by paralyzing each eye, as required, by alternately exhibiting a strong light of the complementary tint required. Mr. Crowther has also in progress a further optical contrivance for intensifying the stereoscopic effect when the landscape is viewed directly.

CHANGES IN LANGUAGE.—The rapid changes which are taking place in the language, the almost daily introduction of new words, largely impairs the usefulness of any but the most modern dictionaries. Look into any ordinary Webster or Worcester, for instance, for the word "altruistic," and it will not be found; yet the word is now as essential a part of the language as any that are in use. And so with hundreds of other words of a philosophic or scientific nature, which have been created to describe new conditions of thought or invention, and, with the hundreds of others that are constantly being adopted from other languages, none of them can be found in the ordinary dictionaries. It is, therefore, satisfactory to note that a commission, composed of President Porter of Yale College, Prof. Ralph O. Williams, Mr. Dorsey Gardner, Mr. Frederic S. Allen, Mr. Lucius Fitch and Mr. Campbell, all men of learning, is sitting daily at New Haven, Conn., preparing a revision of Webster. When their labors are completed, the world will be able to put itself up to the latest date in the use of many words which now present great difficulty.

In science nothing can be permanently accepted but that which is true, and whatever is accepted as true is challenged again and again. It is an axiom in science that no truth can be so sacred that it may not be questioned. When that which has been accepted as true has the least doubt thrown upon it, scientific men at once re-examine the subject. No opinion is sacred. "It ought to be" is never heard in scientific circles. "It seems to be" and "we think it is," is the modest language of scientific literature. In science all apparently conflicting facts are marshaled, all doubts are weighed, all sources of error are examined, and the most refined determination is given with the "probable error." A guard is set upon the bias of enthusiasm, the bias of previous statement, and the bias of hoped for recovery, that they may not lead astray. So, while scientific research is a training in observation and reasoning, it is also a training in integrity.—*Pop. Sci. Monthly.*

ELECTRICAL FIRE BALLS.—M. C. Meigs, of Washington, communicates the following to *Science*: By one who was near its base, the stroke of lightning which injured the Washington monument is remembered as a ball of fire coming towards him. Does not this observation explain the ball of fire so often reported? An electric spark passing between two points, will to a circle of observers, present various ap-

pearances. If two inches long, it will be seen as a line of fire two inches long by some, while to those in the line of its motion it will be a single spark. So when a flash of lightning (a line of fire) is directed toward the observer, it must appear as a ball of fire, motionless if the movement is directly toward the observer, moving with comparative slowness if slightly off that direction, and with electric rapidity if across the field of view at right angles with the line to the observer's place.

GETTING RID OF ELECTRICITY IN MACHINERY.—A correspondent of the *American Machinist* writes to that paper as follows: "Last January, the saws, planers, etc., in the pattern-room became heavily charged with electricity, which at times developed great intensity, and rendered working the machines quite unpleasant, if not dangerous. The pattern room is in the second story, and as live steam is used for heating, the floor was dry as tinder, insulating the machines as completely as if they stood on a glass plate. The frictional electricity from the belts charged the machines so heavily, that sparks one-half inch long could be obtained by presenting the knuckles. To overcome the difficulty, a small wire was driven into a crack in the floor and connected to each of the machines, and to the water pipes, thus allowing the electricity to pass off gradually without acquiring intensity. This plan was perfectly successful, and can be applied in a few minutes."

ARTIFICIAL OIL OF LEMON.—By treating the rectified spirit of turpentine in the following manner curious chemical changes take place: Spirit of turpentine, 2 quarts; rectified alcohol, 3 pints; nitric acid, 1 pint. Agitate the mixture in a glass or earthen vessel and allow it rest. After one month the reaction will be complete, and a large quantity of hydrate of spirit of turpentine is obtained. This hydrate, mixed with alcohol, produces voluminous crystals. Submitted to the action of hydrochloric acid gas, the hydrate of turpentine loses a part of its water of crystallization and is transformed into a hydrochlorate, having all the properties of the camphor of lemon. When heated it loses part of its acid; then treated by potassium, it is transformed into a fluid colorless oil, possessing the odor and chemical properties of the natural oil of lemon.

FORESTS AND TEMPERATURE.—Professor Muttrich, of Berlin, has reached the following conclusion from his forest meteorological researches: That the forest exercises a positive influence on the temperature of the air. That the daily variations of temperature are lessened by the forest, and in summer more than winter. That the influence of the leafy forest is in summer greater than that of the pine forest, while in winter the tempering influence of the pine forests preponderates over that of the deciduous forest. An attempt to determine the influence of the forest on the mean annual temperature led to no sure results.

LIQUEFYING OXYGEN.—Oxygen, it seems, can, after all, be brought to the liquid state under such easy conditions that the experiment is likely to become an ordinary laboratory one in consequence of a recent discovery by M. L. Cailliet. He has found that formene, when slightly condensed and cooled in boiling ethylene under atmospheric pressure, is resolved into an extremely volatile, colorless fluid, which, while again passing to the gaseous form, produces a cold sufficient to cause the liquefaction of oxygen immediately.

A NEW SCIENTIFIC SOCIETY is being formed in New York for the purpose of investigating and sifting the psychical phenomena of man and the lower animals, and of discussing psychological questions. The "Nature and Psychological Relations of Pain" is to be the subject of the president's opening address—a subject upon which he holds, as a starting point, that in general terms whatever tends to undue tissue disintegration and disturbance is a source of non-pleasurable sensation.

THE DRAGON FLY is one of the most peculiar of the winged tribes. It can outstrip the swallow; nay, it can do in the air more than any bird; it can fly backward and sidelong, to the right or left as well as forward, and can alter its course on the instant without turning. It makes twenty-eight beats per second with its wings, while the bee makes 190 and the horse fly 330. The swiftest race horse can double the rate of the salmon. So that insect, bird, quadruped and fish would be his order according to velocity of movement.

NICKEL AND ITS ALLOYS.—Herr Fleitmann, of Iserlohn, has shown that pure nickel and its alloys with copper, cobalt and iron can have other metals added without losing the property of being welded, and therefore can still be used for making plate. The metals which can be added in this way are zinc, tin, lead, cadmium, iron and manganese up to as much as ten per cent.

ROTATION OF THE PLANET JUPITER.—Recent observations on Jupiter appear to show that the period of rotation at its equator is more than five minutes less than in the latitude of the great red spot—a result which is of great interest, as tending to confirm the suspected resemblance of that planet to our sun. That is, that its outer surface, as seen from the earth, is a fiery, nebulous mass of floating matter.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
 Take the Elevator, No. 13 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS.—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
 Per line (agate)..... .25 .80 \$2.20 \$5.00
 Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
 One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
 DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 15, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Professor George Davidson, 113. Passing Events; Mechanics' Fair; Lead Deposits in Limestone; Windmills, 116. Death of James W. Marshall; Terra Furnaces, 117.

ILLUSTRATIONS.—Portrait of Professor George Davidson, 113. Portrait of James W. Marshall; Continuous Terra Furnace for Quicksilver Ores, 117.

MECHANICAL PROGRESS.—Broken Set Screws; A Broken File; Iron in Architecture; Improved Engines; Mineral Oil in Boilers; The Interchangeable System; Soda in Steam Boilers; The Size of Journals; Water in the Cylinder; Another Alleged Furnace Improvement; Stamp Dies, 115.

SCIENTIFIC PROGRESS.—Natural Bridge in Arizona; Stereoscopic Effects by the Magic Lantern; Changes in Language; Electrical Fire Balls; Getting Rid of Electricity in Machinery; Artificial Oil of Lemon; Forests and Temperature; Liquefying Oxygen; Nickel and Its Alloys; Rotation of the Planet Jupiter, 115.

USEFUL INFORMATION.—Comparative Wear of Coin; The Moss Industry in Florida; Utilizing Sawdust; Coating Zinc with Nickel; Patent Pulleys; To Determine the Safety of Coal Oil; To Detect Lead in Culinary Vessels; The Location of Mining Claims—

GOOD HEALTH.—Remember the Skin; A Remedy for Felons; A New Remedy for the Headache; Huxley on the Weight of Man, 119.

MISCELLANEOUS.—Let Us not Mislead Them; Supposed Grand Opportunities; The Republic of Colombia; And the Future—What of It, 114. The American Exhibition in London; Gold in Colorado; Custom Mill Wanted; Location of Mining Claims—Right of Possession, 113. Where Capital could be Invested; Mexican Grants, 119.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 120-21.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 124.

Business Announcements.

Ore Mills.—F. A. Hill, S. F.
 Mechanics' Institute Fair.—S. F.

See Advertising Columns.

Passing Events.

The mining locality just now attracting considerable attention is that of Pine Creek, Union county, Oregon, about 45 miles northeast of Pouker City. Some 60 or 70 locations have been made. The ledges are at an elevation of 5,500 feet above the sea; the country is well watered and timbered, but very rough to travel over. A good wagon road runs within one mile of the camp. The showing thus far, however, is not such as to induce poor men to waste time in going there from any distance.

A company was recently formed to prospect for gold in New Guinea, prompted by the production of a very valuable nugget, alleged to have been discovered in the Fly River valley. Evidence is now brought forward that the nugget was of Australian gold, and the expedition is delayed, pending further investigation. The evidence is strong that a grand swindle was intended.

The season of fairs will shortly commence, and in the various counties preparations are being made. The Mechanics' Fair in this city, the most important, usually, on the coast, will shortly open, all the arrangements having been perfected, and a good exhibition being insured.

In the death of Marshall, the discoverer of gold in California, an historic figure passes from view. A sketch of this well-known pioneer will be found in another column.

Windmills.

There are more windmills in use at the present time than at any other period in the history of the world, and as economical prime movers they are better appreciated to-day than they have ever been before. To place the number of windmills at work in America at several hundred thousand is to give an estimate which those who have been interested in this department of engineering, and who have traveled along the main railroads of the country, must pronounce as low. In some single large cities of the Union over 5,000 windmills are manufactured on an average each year.

Some persons have an idea that windmills are antiquated contrivances, but they have been constantly improved and perfected, and are by no means the cumbersome, unwieldy things they used to be. There was a time when the natural forces of wind and water were the only ones at the command of man for industrial purposes, and when the motors driven by these forces monopolized all industrial pursuits which man did not accomplish by his own physical exertion.

Then came the recognition of the value of steam as a motive power. This was certain to speedily and effectively displace windmills in many places. Though the advent and general application of steam replaced the windmill in many of its strongholds and restricted its use to a few specific purposes, such use has become a very extended one, and will be still further enlarged in the near future, as the true value of the windmill as a prime mover becomes better appreciated, and as electrical storage batteries become more of a success.

For certain specific purposes, and primarily among them for pumping water in moderate quantities, the windmill is not only a thoroughly reliable, but at the same time the most economical prime mover, and, as far as judgment can now be passed, will hold this place for many years to come. The power purposes which windmills are specially fitted to subserve are circumscribed and defined by the character of the motive fluid used. Though the wind may be relied upon to blow with sufficient velocity to drive a windmill to its average working capacity eight hours a day, it is evident there are minutes and hours of total calm.

Therefore the employment of the windmill is restricted to two classes of use: 1st. To work of that nature which admits of a suspension during a calm. 2d. To work where accumulated power can be stored for future use. In a new book on "The Windmill as a Prime Mover," by Alfred R. Wolff (published by John Wiley & Sons, 15 Astor place, New York), three specific applications are suggested under the second heading. The first is that which now claims the extended employment of windmills, viz., for pumping and storing water. A few special adaptations of this use may be mentioned: Water is supplied to country houses and farms, to manufacturing establishments, and to the upper stories of office buildings and domestic dwellings, when the pressure in the reservoir is not sufficient to effect this; railway water stations and tanks are supplied with water, and dry lands are irrigated. Sand has also been raised in place of water, and has been applied to the driving of an overshot wheel.

Windmills can also be used for compressing and storing air, and for driving dynamo machines to charge electrical accumulators. The latter application was first suggested in 1881 by Sir William Thomson. The application of the windmill to this purpose will come actively into play when storage batteries have been developed to a greater success than is attained at the present time.

NEARLY 7,000,000 gallons of water per day now flow from the Sutro tunnel. About 6,000,000 gallons of this vast aqueous output is lifted by the splendid hydraulic pumps from the 3,100 level of the Combination shaft to the 1,600 level, where it is turned into the big tunnel.

THE tunnel at Big Bend, by which the Feather river is to be turned, is now in 10,000 feet; it is to be 11,200 feet in length, and will dry the bed of the river for 12 miles. It is expected that very rich diggings will be developed.

CALICO mines, San Bernardino county, in this State, have shipped so far this year \$1,566,681 in bullion.

The Mechanics' Fair.

We are assured that the prospects for the Mechanics' Fair, which will open Aug. 15th, could not be better. Enough space is already taken to fill the Pavilion comfortably. The southern counties particularly seem disposed to make good displays of their productions and resources. San Diego, San Luis Obispo and Ventura counties are especially considering the matter, and the latter county has engaged space. In the north, parties in Napa and Solano counties are taking great interest in the agricultural features of the fair. Mr. C. F. Bassett, one of the trustees, who is traveling in the southern part of the State on business of his own, writes very encouragingly of the interest taken by the people of the southern counties, and thinks there will be a particularly good exhibit from that part of the State.

There has never been as good an exhibition of dairy products as ought to be made by such a State as California. All the fairs have been unfortunately deficient in this respect. The cool climate of San Francisco is especially adapted to such an exhibit. Dairy products make a handsome show if taste is displayed in their arrangement, and as the managers of the fair have invited a special exhibit of this character there should be dairymen willing to embrace the opportunity and make a good display in butter and cheese.

There is a great deal of interest taken in the floral exhibit this year, and a prospect of an unusual display, exceeding last year and every previous year. The machinery department is well filled. The art gallery is to be very fine and full, as the entries for space show. One of the special features of the fair will be a large Bergstrom organ. It will be the largest organ ever put up in the fair and will be finished in all its parts. Last year the instrument, owing to lack of time, was not as complete as intended. There will be an organ recital three or four times a week, which will be very attractive. It (the organ) is one of the largest in the city.

A new hoiler is to be put in, and there will be 40 per cent more available steam power than last year, and 50 per cent more power can be obtained if necessary. It has been decided by the directors that any person under 21 years of age, who is actually engaged in learning any trade, will be entitled to be admitted to the exposition at apprentice's rates for \$1.50 a season ticket. The Institute will furnish each applicant, for reduced rates, with a blank certificate, which will have to be filled out by the applicant's employer.

There has been some discussion as to the last method of accommodating the public school children at the fair. There are in this city 42,000 school children, besides many from Oakland and Alameda, who will attend. It was at last decided to issue invitations to the Board of Education for the children, and make the request that it be so arranged that classes and schools be admitted every morning under the guardianship of the teachers. Heretofore the children have thronged the building in the afternoon, and have roamed around in great disorder, to the annoyance of adults.

The managers earnestly request choice exhibits of fruit, green and dried. There will also be an attractive and instructive wool exhibit. Contributions both of wool and mohair will be gladly received and prominently displayed.

The importance of the Mechanics' Fair as a means of bringing our products before the eyes of many people should not be forgotten. The city is the point to which the eyes of all tourists turn, as well as the multitude of our own people who come here during the month of duration of the fair. The attendance daily is said to be from ten to fifteen thousand. Certainly all these people should have an opportunity to see our fine fruits, grains, dairy and other farm products, as well as the attractive displays of manufactured goods and merchandise. There is still time to prepare creditable exhibits, and we hope it will be done by all who have confidence in the results of their own work and desire to add to the good opinion which visitors get of the State. Mechanics and manufacturers should aid as far as possible by making good exhibits, so it is a very easy way to bring articles to the direct attention of thousands who buy.

The opening exercises will take place in the Grand Opera House at 2 o'clock Tuesday, Aug-

ust 25th. H. C. Dibble will deliver the oration. Miss May F. Cooper will recite "The Forging of the Anchor." The program is not yet complete, but with what talent is already secured, the exercises will be very interesting.

Lead Deposits in Limestone.

The type of ore deposits to which those of Eureka district, Nevada, belong, is one often met with in the older limestones of the Great Basin, and although these particular deposits have been of more value, and are more widely known than any of the others, and exhibit some very interesting structural features, they cannot be said to form an isolated class. Although the gold and silver in the Eureka ores are the metals which render their mining possible, yet the quantity of them present in these ores, measured by weight, is so small, in comparison with the lead, that a classification based on these metals alone would be misleading. As in many of their features they resemble other lead deposits in limestone, it seems best to regard them simply as lead deposits in which the gold and silver are merely accessory, though very important ingredients. All lead ores carry some silver, and with it some gold, though in many of these it is only possible to obtain traces of these metals.

Throughout the Great Basin there are a large number of lead deposits, all of which exhibit many features of similarity. In Mr. J. S. Curtis' monograph on the "Silver Lead Deposits of Eureka, Nev.," he states that they occur in limestone and dolomitic limestones of Paleozoic age, and are mostly of very irregular form. Their ores consist principally of argentiferous galena with antimonial and arsenical combinations and pyrites, and the decomposition products derived from these minerals. Compounds of copper, zinc and other metals occasionally accompany these ores. In by far the greater number of instances the oxidation has been carried to a great depth, sometimes reaching or exceeding 1,000 feet. The extent of this oxidation is in a great measure due to the absence of any large quantity of water until considerable depth is reached. The characteristic gangue of these ores is the hydrated oxide of iron, with more or less calcite. Quartz is rarely found in any great quantity, except where the deposits occur in the form of contact lenses between limestone and porphyry, the quartz being probably derived, Mr. Curtis says, from the decomposition of the porphyry. An example of such lenses is offered by the 2 G mine, in Tybo District, Nevada. It is found to be more profitable to reduce all these ores by smelting than by any other process. Among the principal districts where such ores are found may be mentioned Eureka, White Pine and Bristol, in Nevada, Cerro Gordo, in this State, and Ophir, Big Cottonwood and Little Cottonwood, in Utah; all of which occur in Paleozoic rocks.

THE product of the Plymouth Con. mine, Amador county, for June is reported officially at \$82,656.70, making the product for the six months ending with 30th June, \$493,607.65, or a monthly average of \$82,267.94. The operating expenses of property aggregated \$160,792.84 for the six months, being a monthly average of \$26,799. The profit for the half year was \$332,814.81, which, added to cash left over on 1st of January, 1885, made the sum disposable for dividends \$407,109.87. The six dividends paid this year, aggregating \$300,000, together with \$10,914.86 expended in constructions, left a cash balance of \$96,195,000. The stockholders of this company have already received \$13 per share in the form of dividends. The introduction of water for power, together with economical management, have reduced operating expenses to a minimum. The figures show a gradually increasing surplus after payment of the usual dividend of \$50,000 each month.

RICH RASCALS CORRALLED.—It has been the claim that only the poor were punished for crime while the rich went free. This is too often the case, but it is a satisfaction to know that there are notable exceptions to the rule. In New York two wealthy and prominent citizens, Fish, the late president of the Marine Bank, and Buddensheik, the wealthy real estate owner, have been sent to the penitentiary for terms of ten years, Fish for stealing the Marine Bank dry, Buddensheik for erecting buildings of such rotten materials that they collapse and kill and maim their occupants. It is to be hoped that the punishment of crime, irrespective of the wealth or social position of the criminal, will become general throughout the country.

Death of James W. Marshall.

On this morning of the 10th inst., James Wilson Marshall, the discover of gold in California, was found dead in his bed in a cabin he had long occupied at Kelsey's Diggings, El Dorado county. From anything that appears to the contrary, he was in his usual health up to the night of his death; wherefore it is probable that he was carried off by heart disease, an attack of apoplexy or something of the kind. He was nearly 73 years of age at the time of his demise, having been born in the month of October, 1812, his birthplace being Hope Township, Hunterdon county, New Jersey. He has been buried on an eminence overlooking the town of Coloma, near the site of Sutter's saw-mill, in the race of which the first piece of gold was picked up. This locality chosen for the interment of his mortal remains, selected by himself, is a fit one, seeing it was here the great event of his life occurred.

By the death of Marshall, one of the most notable characters connected with the gold era of California, and a historical figure of the times in which he lived, has been removed. Next to General John A. Sutter, he occupies the most conspicuous place among the California pioneers, who will ever cherish his name both for the many sterling virtues of the man and the memorable event with which it is so intimately connected.

James W. Marshall died, as for the greater portion of his life he had lived, a very poor man, having belonged to that class of persons who, however favorable the conditions, never get rich. Why this is so cannot always be explained. Generally speaking, this unfortunate class of individuals are deficient in some of the elements of business success, such as prudence, stability, economy, etc. Just what was the matter with the subject of this sketch we do not know, other than that he seems to have been without the acquisitive faculty; then, too, he was generous, given to acts of hospitality and prone to share what little he had with those in want—qualities that, joined with his inability to accumulate, were quite enough to keep him constantly poor. He did at one time own a comfortable home at Coloma, with a vineyard which, being planted to choice vines, possessed some value. But having parted with this he was never after the owner of anything more than a bare cabin like that in which he died.

It was unfortunate for Marshall that he came to be possessed with the idea that the world, and especially California, owed him a great deal. That this debt was not discharged, nor always even acknowledged to the extent he conceived to be his due, chafed him not a little, and so soured his disposition that he became at last somewhat querulous and misanthropic. The State of California did allow him a small pension, which, having been limited by law to a few years, at the end of that time ceased and was never renewed. It was a pitiful sum, anyhow—just enough to wound the recipient's pride without being of much benefit to him. In the case of both Marshall and Sutter, California has laid herself open to the charge of meanness, if not ingratitude, in refusing to grant these men a decent subsidy in consideration of the service they rendered the public. Far better would it have been for both had not an ounce of gold ever been found in the country, since in that event they would have retained the lands they once possessed, and been saved the humiliation and hardship of dying homeless and poor. As for Sutter, though perhaps in some things a little indiscreet, he had, by his boundless hospitalities to the early immigrants and the splendid services rendered in the conquest of California, established such claims upon both the general and State Governments as should have secured to him almost anything he requested at their hands. As regards Marshall, he was, of course, entitled to less consideration, yet the State might, as a matter of policy, have done enough for him to save itself from the stain of reproach: the world pointing to the case of Hargrave, the discover of gold in Australia, and contrasting the munificence of the Imperial and Colonial Governments with the niggardness of ours.

Some of the stories related about Marshall, and one or two of which are now being repeated on the occasion of his death, are at least apocryphal if not wholly without foundation. For instance, what is said about people

persecuting him with a view to forcing disclosures of rich diggings, of which he was supposed to have had a knowledge that he selfishly kept to himself; also of his having been dispossessed of a large tract of land by the squatters, etc., all of which are sheer fictions. He never was the owner of or claimant to any large tract of land, wherefore it could not have been wrongly



James W. Marshall.

wrested from him. As to the story of his having had any knowledge of rich diggings that he refused to reveal for the benefit of others, that was still more absurd. Marshall, though the discoverer of gold, was not much of a prospector, having never gone far from Coloma in search of

ing gotten his mill started, he would have gone on making lumber, from the use and sale of which, being in this business a partner of Sutter, he would have, in the course of a few years, realized a competency. This accomplished, he would, following the ordinary course of events in those halcyon days of California, have applied to the Mexican Government for and obtained a large grant of land, to which he would have retired, and, becoming a raiser of stock, would have lived in comfort and independence, and died, lord of many acres and owner of cattle upon a thousand hills.

Tierra Furnaces.

At the New Almaden mine, in this State, the "vein matter" is run out in ore cars on an elevated tramway above the dressing floor belonging to each center of production. Beneath these tramways, at convenient intervals are placed har-screens, inclined at 45°. The bars, slightly chamfered at the bottom to prevent choking, are placed an inch to an inch and a quarter apart. To prevent spreading they are stayed with iron cross-hars at intervals of four inches. Their total outside width is five feet. Upon these screens the ore is dumped, and what passes through is known as *tierras*. The coarse fragments which fail to pass the screen are carefully examined, and any lumps that show signs of cincharr are broken by hand to a maximum diameter of nine inches and the waste is rejected. This picked ore is known as *granza*. There is a great deal of this fine ore, or *tierra*, about half the ore worked using of that character. Special furnaces known as *tierra* furnaces, are used to work this fine ore. Engravings of a continuous *tierra* furnace are shown on this page. It was described by S. B. Christy in a paper on "Quicksilver Reduc-

rests at either end on rollers running on T rails, at right-angles to its length. Each of these aprons is connected with a lever-arm outside of the furnace, by means of which a gentle oscillating motion may be given to it.

When the apron is in its central position the foot of the ore column rests upon it, and runs out at its natural slope to each edge of the apron, and the whole ore column in the chamber above is maintained in equilibrium. As soon, however, as an oscillating motion is given to the apron, the ore resting upon it is discharged in a shower from either edge of the apron into the ear beneath, and the ore in both chambers, from bottom to top, descends.

It will be noticed that the partition-wall in each pair of ore chambers rests upon a hollow cast-iron girder. As originally constructed, the space below this girder was entirely free to the passage of ore from either chamber. But, with this construction, it was found that, in discharging the ore either chamber of the pair got the start of that in the other, the velocity of this descending ore on that side would be great enough to impede the discharge from the other side. This difficulty was obviated by Mr. Randol, who introduced a vertical iron plate bolted on to the middle of the hollow girder. In this outside pairs of chambers these plates reach to within three inches, and in the middle pair to within five inches of the discharge-slits. This improvement entirely obviated the difficulty, and the discharge of this furnace is now effected with perfect ease and regularity.

In the setting of this tile shelving in this furnace, the tiles are of peculiar shape, and were made to order for the furnace at Staten Island, N. Y. Those for the *tierra* chambers were made 20.7-16 inches wide on the upper face, while those for the *granza* have a width of only 18.7-16 inches. Both are three inches

thick. All of them were made with a square lug or shoulder, 5½ inches thick, and forming an angle of 45° with the face of the shelf. The width of the lugs on their upper face was made 4.9-16 inches, or 6½ inches, according to the thickness of the partition-wall between the chambers. The wall between each two pairs of ore chambers was made 13½ inches thick, and between the two chambers of each pair only 9½ inches. Two shelves, projecting into adjacent chambers, are set with their shoulders abutting against each other, allowing for ¼-inch to ½-inch joints. Consequently, the shelves form an integral part of the partition-walls. Beneath the shoulders of the two shelves is set another tile, also 5½ inches thick. This has the form of a frustrum of a wedge, whose faces are at right angles to each other. This tile also forms an integral part of the partition-wall, and projects out into either chamber so as to support the shelves from beneath for half their width. Beneath the supporting tiles are four tiers of fire-brick, then the next pair of abutting shelf-lugs and their supporting tiles, and so on. The ore chambers are 22½ inches wide, and the shelves in each wall are 21 inches apart vertically. This method of setting has given good results, but the method now used in the latter constructions is to be preferred on account of cheapness and simplicity.

In this furnace the fire-place is placed five feet above the discharge-opening, and the air to supply the fire is drawn through the hot ore below the level of the grates, so that the ore reaches the apron free of fumes, and cooled to such a temperature that it may be easily handled.

This furnace is entirely enclosed by a sheathing of heavy iron plates, bolted and cemented, with rust-joints. The arrangement of this sheathing and the distribution of the peep-holes is shown in the elevation.

The normal capacity of this furnace is 36 tons. The furnace holds, when under working conditions, 51 tons of ore; a charge is, therefore, 34 hours in the furnace.

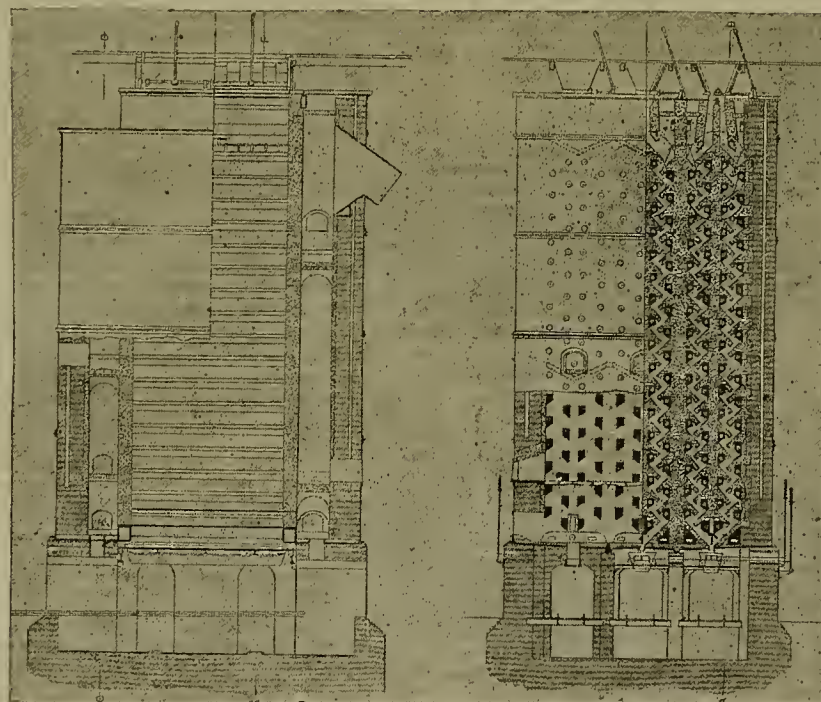
The routine of operations at this furnace is as follows:

The aprons or shaking-tables under each of the three pairs of ore chambers, are operated at intervals of 10 or 15 minutes, so as to discharge from each one ton (by volume) every two hours. After the ore has descended in the various chambers, subsequent to discharging below, one ton of ore is added to each of the three ore-hoppers at intervals of 40 minutes, i. e., each hopper receives 1 ton every 2 hours. The firing and tramping of the spent ore goes on meanwhile as at the other furnaces.

The fuel required at this furnace is 2½ cords of wood per 24 hours, if that alone is used; but, if coal is used, the amount of wood is reduced in proportion. The working force is: Two men, at \$2.50 per 12-hour shift; one man, at \$1.25 per 12-hour shift.

SECTION A B and part of side elevation.

SECTION D C SECTION E F and part of front elevation.



CONTINUOUS TERRA FURNACE FOR QUICKSILVER ORES.

new diggings. The bar at Coloma, though extensive, was not extremely rich. The miners working on it even as early as '48 averaged not much over one ounce per day to the man, the average earnings in '49 having been considerably less, while from that time on till the bar was worked out, five or six years later, the average wages made were quite moderate. It is, therefore, evident that, as the old pioneer never made any very big raise at that place, so neither could he have had any knowledge of rich deposits there, as very likely he had no knowledge of any elsewhere.

The truth is, the great gold find at Sutter's Mill proved altogether a misfortunate event for Marshall. It lifted him above himself and his surroundings, caused him to lose his equanimity, and, so to speak, let go his grip on the small and certain, and grasp to the grand, distant, and, as it proved in his case, unattainable. But for this untoward incident it is easy to see what sort of a life he would have led, and how he would probably have fared in the end. Hav-

tion at New Almaden," read before the American Institute of Mining Engineers.

Furnace No. 3 is shown in section and elevation in the engraving. It has three pairs of ore chambers, placed side by side. The two outer pairs of ore chambers for roasting *tierras* have three-inch shelf-slits, while the inner pair, originally intended for *granza*, have five-inch shelf-slits. They are now all used, without alteration, for roasting *tierras*.

The discharging arrangements were as follows: Beneath each pair of ore chambers a discharge pit is arranged to contain the "slag" cars, which are run in from a track on the floor of the works. The whole furnace rests on the usual inclined cast-iron plates, in which are discharge slits for each pair of ore chambers; the outside ones are three inches and the middle one is five inches wide, and they run the whole length of the ore chambers. Immediately beneath each of these slits is its discharge apron. This apron is a cast-iron girder, flat on top, and three times as wide as the slit above it. It

The American Exhibition in London.

A Novel but Effective Way of Promoting Trade.

The exhibition to be held in London next year will furnish a new departure in the history of exhibitions. It will be opened May 1st, 1886. It will not be international in any sense of that word, and yet it will be held beyond the limits of the territory of the nation in whose interest it has been projected. It will be a purely American exposition held in London, just 101 years after John Adams presented his credentials as the first American Minister from the United States on a friendly mission to the mother country. It will be the first exclusively American exhibition ever held in Europe—and the first exhibition of the exclusive products of any one country ever held within the limits of another.

It is a bold as well as a novel project. The idea of thus demonstrating, in the midst of the greatest and busiest mart of the Old World, the progress made in the pursuits of art and science by the principal nation of the Western Hemisphere—a nation scarce a century old—is worthy of the energy and enterprise of our people. There is probably no other nation on the globe that could attempt it with any hope of reasonable success.

A Purely American Idea.

It is obvious that an exhibition held in the British metropolis, and exclusively devoted to the arts, inventions, manufactures and products of a single foreign country, could not be initiated by the Government of that country. Private enterprise alone must have initiated and set on foot such a project. The United States Government has not been invited to extend any subsidy to it; all that is expected of the Government is that it will add interest by contributing a choice selection of the products of Government works and of its collections.

A very large number of our heaviest manufacturers, merchants, inventors, artists and producers of every name, have taken hold of the matter for their own and the nation's interest and honor. The products of the New World will simply be placed on exhibition for the examination and criticism of the people of the Old World.

The advantages to be hoped from such an exhibition are manifold. The friendly relations between the two countries will be strengthened; American inventors, manufacturers, and producers will have for the first time an opportunity of presenting to Europeans the many improvements made during the past half century, while visitors to the exhibition from all parts of the Old World and its colonies will carry away valuable lessons on the improved modes of production stimulated in America by the dearth of labor.

The opinion of the United States consuls throughout Europe upon the importance of the exhibition has been most emphatically expressed in the affirmative. The United States Government and the governors of all the leading States are also unanimous in their approval of the scheme.

The Great Advantage

Which America possesses over all other nations, by reason of the variety of her climate and soil, in the possibilities of diverse productions, has never yet been properly brought to the attention of other nations, and cannot be, under the necessary disabilities of international exhibitions. America herself, and alone, can, of her own productions, present almost as full and complete a variety of exhibits as is usually found in a world's exhibition. This is a fact which cannot be properly brought out and made manifest in the mass of material always shown at an international exhibit. So far as the show is concerned the proposed exhibition at London will be, in its variety, if not in its extent, an international exhibit. Almost everything will be there shown which could be collected by the united efforts of all other nations—thereby showing in a most effective manner the great and wonderful variety of our natural productions.

The Grounds Selected

Will be in communication with 14 different lines of railway. It is stated that about ten millions of people reside within one hour's ride of the proposed American Exhibition Station, in addition to 150,000 strangers, who, it is estimated enter the city of London daily. The exhibition will be

Unique in Its Make-up

As well as novel in its conception. It is proposed to arrange the entrance hall so that the European visitor shall take leave of his native soil, and shall temporarily be in, and commence his visit to North America from the harbor of New York, with the Bartholdi statue of liberty, and the striking features of the eastern entry to the United States, around him.

On leaving New York harbor, the visitor's first excursion will be through the various States across the continent to San Francisco—from the Atlantic to the Pacific seaboard. He will have the opportunity of inspecting collections illustrating the wealth and civilization of the entire country from east to west, north to south.

The railway routes and the picturesquely diversified scenery of the agricultural, pastoral, forest and mining States will be illustrated by

paintings, maps and products. The material resources and characteristic social conditions of the various parts of the vast territory extending from ocean to ocean, and from the lakes to the Gulf of Mexico, will thus be exposed to view, and offer exceptional facilities for comparison.

The condition of the respective agricultural, grazing, mineral and manufacturing localities will be particularly shown, and in a manner which will be intelligible and interesting to all; whilst the state of development and the undeveloped resources of the various sections will be brought under the visitor's notice in such a form as will enable him to establish a trustworthy basis for judgment as to their respective advantages.

All the principal phases of American life, from the parlor on Fifth avenue in New York, or a broker's office on Wall street, to the camp fires of the miners in the Sierra Nevadas, will be shown, and the wild Indian in his native trappings with the buffalo and bear, will be there, as well as his industries in the way of canoe-building, mat and blanket weaving, hide tanning, etc. The trapper's art and life in the wild regions of the Rocky mountains will also be shown.

A separate building will be devoted to our exotic products and labor—the handicrafts pursued by Mongolian workers and their mode of life, etc. The colored man will also be there, with all his peculiarities of labor, and life and song.

The United States Government will send a most unique collection to be contributed by the Patent Office, the Smithsonian Institute, the Agricultural Department, the War Department, etc.

Among the members of many representative associations, a celebrated American regiment, with its band of skilled musicians, and an American fire engine corps, are expected to pay a visit to London during the exhibition. Their arrival will be made, if possible, to coincide in date with the Wimbledon meeting and the military tournament, in order that the volunteer military services of the two countries may meet together on a friendly footing, worthy of the feelings of mutual esteem which characterizes the present relations of the two kindred nations.

There will be organized, in connection with the exhibition, such sports as may be practicable, including roller-skating, baseball playing, lacrosse, trotting matches, cycling tournaments, billiards, and the American variations of every form of recreation which is popular in the Old Country.

Our Labor-Saving Inventions and Machinery.

Will form a most conspicuous feature. Our elevated and cable railways will be shown in a practical way. Our mines and the methods of working them, also our oil wells and their peculiarities will be shown. Our immense industry of stock-raising, and our unlimited timber resources will be shown by plans, by figures, sketches and paintings, and in such a manner as to give something like an adequate idea of our immense resources in those directions. In short, the entire exhibit will make a display, national and representative, in the fullest sense of the words.

Approved by Our English Friends.

We learn from an English journal that the entire plan of the exhibition meets with the most cordial approbation of our English cousins and continental friends. As a most emphatic evidence of this it is stated that Englishmen and other Europeans will organize for the opening a "Grand Council of Welcome," for the purpose of extending the right hand of fellowship to greet, in the most cordial manner, their "kith and kin from beyond the sea," and to show a manifest approval of our laudable effort to exhibit to the Old World the gigantic strides which the leading nation of the New World has made in the broad fields of material progress.

As a further evidence of the cordial good feeling shown towards the exhibition, it may be added that arrangements are being made, under which a delegation of the Freemasons of England will appear at the opening ceremonies to receive and join hands with a similar delegation from the Order in America.

Other societies will also appear, to whom the corresponding English societies have already cordially offered hospitality and the use of their respective headquarters.

All these expressions of approval and friendship may be regarded as a public recognition of the joint standing of England and America as the representative people of the world; speaking one language, and imbued with almost identically the same political and social aspirations. This exposition, more than any one which has preceded it, will, no doubt, serve to stimulate and give expression to the desire which so universally prevails in both countries for a more intimate knowledge and appreciation of each other.

This exhibition will, moreover, present one of the most valuable, instructive and entertaining which has ever been held in any part or in age of the world, and will no doubt accomplish more for material progress on both sides of the Atlantic than any other movement of any kind which has ever before been set on foot.

The mineral product of the United States last year was valued \$413,104,620. This was about \$3,000,000 less than in 1883, caused by lower prices than the decrease of output.

Gold in Colorado.

Those mining sections of Colorado, where gold is the principal product, are strong advocates of silver coinage. The Breckenridge Journal thus represents the sentiments of the people of that gold camp:

Now that the discussion throughout the world is whether silver shall be continued as one of the monetary metals or not, it is a source of satisfaction to know that an adverse decision can work but little injury to this immediate locality, while every resident of Summit county is not only friendly to silver, but a positive advocate of its continued coinage and are willing to labor for its equality with gold. Yet it is well known that the great wealth of this region depends more upon the gold product than upon its silver veins.

During the years when silver and carbonates were the object of every delver in this section, it was a notorious fact that the total value of the whole output for the season did not equal the monthly shipments of gold now quietly leaving for Denver. Where it took a huge freight-car to transport a few hundred dollars' worth of cheap ore, it now requires but a small package no larger than a pound of sugar to carry away \$1,000 worth of gold, hence the outward show is less, while the value is vastly greater.

The prospects for a continuance and a vast increase in the production of gold are all that could be desired. On Gibson more openings are being made daily, and those opened are being developed, and in no instance has any falling off in quality or pinching out in quantity been observed.

The Lincoln properties and the Swan properties are developing bonanzas in a score of openings, and last Nigger hill, clear to the foot of Baldy, is coming with its contribution of gold. The Laurium, a well-known gold-producing property in days gone by, has been for years a non-producer because of bad management and litigation, but beyond that, in the same neighborhood, good properties have lately come out with paying gold-bearing rock. The Mountain Pride, at the foot of Baldy, worked by Bacon, Winslow and Bush, had a run of three tons put through at the Wiswell mill this week, which left a yield of something over two ounces of gold to the ton. While not a large yield, it shows the presence of gold in that vicinity in paying quantities. As the placers on the foothills of Baldy were exceptionally rich, it is evident there must be feeding fissures on the mountain, which time and industry will develop. The few heavy veins of low grade silver bearing ores are of value, still they do not compare with what this camp has a right to expect from its gold-producing property.

Custom Mill Wanted.

The Shasta County Democrat says: What is needed more than anything else to assist in encouraging and further developing the mining interests of this county is a custom mill and smelting works, located at some central point on the river, where miners and prospectors on both sides of the stream could haul their best ores easily and have them crushed. We can think of no enterprise that, at present and for some time to come, would be more advantageous and beneficial to all concerned. To illustrate: On the east side of the river in the Old Diggings and Buckeye districts there are many claims held by poor men, who, if they had some way of realizing ready money from the best ore they can take from their several claims, would enable them to further prospect their property as it should be prospected, and also give them extra money besides. With this help, we know of many fine-looking prospects that would soon be developed into good property, whereas at present they are worth but little to their owners and the country at large. The cost of a plant for such milling and reduction works as would be necessary for the time being would not cost near as much as the saw-mill to be erected here, and we are confident would be of as great value to the county.

The moment small works of this kind are started here the mining industry of this county will hound forward and the whole county in a very short while realize its beneficial effect. Nevada and Placer counties would be nothing to what they are to-day were it not for custom mills which enable the miner and prospector, who are not able to erect milling machinery, to realize ready money from their ores. Redding would be a central point for a small custom mill, smelting and chlorine works. Those who have noticed are aware that many tons of rich ore and sulphurets have been shipped from this county to places where such works are located. This could be averted, and the county and all concerned would be greatly benefited were such works of a small capacity erected in the vicinity of Redding. Our county is rich in ores that would handsomely support and make exceedingly profitable such an enterprise, and we can think of no movement that more earnestly demands serious consideration by our citizens. With such help, where there is one miner now laboriously eking out an existence, a hundred would be prosperous and making money. Sober thought upon this subject we guarantee will soon convince any one at all familiar with the mining industries of the county that what we say in the above is true.

Location of Mining Claims—Right of Possession.

The Supreme Court of California—in decision 5, June 3d—in the case of Horswell vs. Ruiz, held as follows: "The instructions given at the request of the defendants, in some instances, contradict those which were given at the request of the plaintiffs. For example one instruction, given at plaintiffs' request, reads:

"You are instructed that if a party goes upon the mineral lands of the United States, and works thereon, without complying with the requirements of any law, either Federal, district, or local customs, and relies exclusively on his possession or work, and a second party locates peaceably a mining claim covering the same ground and in all respects complies with the requirements of the Federal and district mining rules, laws and regulations, then such second party is entitled to the possession of such mineral ground as against the party in prior possession, who is from the time said second party has perfected his location and complied with the law, a transgressor."

"At the request of defendants, the following instruction to the jury was given: The jury are instructed that, independent of any mining laws or customs, a party who first takes possession of an unclaimed mineral lode for mining purposes, may hold the same by actual work and occupation, to the extent of such work and occupation, as against all the world, except the paramount proprietor, provided that he neither claims nor holds in excess of that to which he would be entitled by virtue of a compliance with the mining laws."

The Court decides that "The law is correctly stated in the one first given," and cites as authorities *Morenauht vs. Wilson*, 52 Cal. 263; *Chapman vs. Toy Long*, 4 Sawy, 28; *McCormick vs. Varnes*, 2 Utah, 355; *Belk vs. Meager*, 104, U.S., 284; and *Hopkins vs. Noyes*, 4 Mont. 550.

Boundary of Claim.—The same court and in the same case cite the decision in the *Eureka* case, 4 Sawy, 302; in which Judge Field, delivering the opinion, said:

"The provision of the statutes of 1872, requiring the lines of each claim to be parallel to each other, is merely directory and no consequence is attached to a deviation from its direction."

From the above decision on those conflicting instructions, miners will observe that mere naked possession, work, and occupation of claims, without complying with location laws, will not hold, as against subsequent locators of the same ground, who do comply with those laws.

SALTING MINES IN BRAZIL.—We have often heard, says the *London Mining Journal*, of attempts made by dishonest persons in different parts of the world to float worthless mines, at the same time issuing elaborately-conceived prospectuses. But we do not always hear honest persons publicly exposing these attempts. It was in every respect satisfactory to hear a speech at Levant meeting, made by Captain Henry Eddy, of St. Just, who has just returned from an inspecting tour in various parts of the globe, a speech which, moreover, cannot but prove interesting reading. Captain Eddy gave it as his candid opinion, that assertions of the discovery of lodes were often fraudulent, that the specimens shown were imported, that it was said the specimens came from certain lodes, whereas they had never been broken within 100 miles of the place. Very suggestively, at this observation, two gentlemen ventured to say such things had been known in Cornwall, and even in St. Just. Following this, Captain Eddy furnished this incident, which has occurred recently. This gentleman was in Brazil. He went to inspect a concession; there were pits dug here and there, and the concession it was proposed to sell to an English company for £100,000. Coming down from the mine, and walking in single file down the mountains, gold was placed by some one with the specimens he had taken. He afterwards informed those interested that he had discovered what had been done. At the second inspection he detected that gold had been brought from some other source, and he also made this known. But the others were not to be outdone. It was suggested to Captain Eddy he should await in the morning until the "men got their holes in." The inspector agreed, and upon reaching the spot found the holes charged, and that the men were about to fire. The blasting done there was plenty of gold to be seen. Captain Eddy counted twenty specks on one stone. He removed three of these with his thumb, and with his pen-knife four others. He told the chief person the gold was not in the stone. He said nothing just then to the other people about; these were interested, and he had a lonely journey of six days before him. The explanation of the gold on the surface of the stone, at the final inspection, was that the gold had been placed in the hole, and the force of the dynamite charge had blown the gold along the faces of the stones. Truly the ways of some company-floaters are mysterious.

The electric light has now been in use at a considerable number of mines in Europe long enough to demonstrate its value.

It is now conceded that the majority of mineral bearing lodes are formed either by sublimation or infiltration.

Where Capital Could be Invested.

The continued stagnation of idle capital appears to indicate that there has been no marked improvement or advancement made by those controlling large sums of money. While capital has the reputation of being conservative, the history of events proves its dullness of perception, and its inability to grasp, in advance of a general movement, important points of advantage. Let the tide of investment turn in any given direction and thousands and millions of dollars are poured thoughtlessly and recklessly and unreasonably not to secure some fancied advantage or benefit, where reason clearly indicates that there is no substantial basis of realization.

A season of general activity for a time appears to prevail, in which capital seeks the most absurd and ill advised adventures, and is easily lured from its hiding place, even over a pathway which is marked by misfortune and disaster. On the other hand, when a reaction comes, ending in a general depression of business, the most inviting propositions, based upon the most substantial assurances of a steady and generous return, are considered calmly and indifferently, while opportunity after opportunity, in which there is every assurance of safety and security, is passed by unimproved.

In the early history of mining enterprises a piece of gaudily printed stock was sufficient to secure money without investigation, examination or knowledge of the basis upon which the stock was issued. Millions of dollars have been paid for these stock certificates, and in many instances representing no tangible evidence of value, present or prospective. Capitalists were eager to exchange their money for these painted hubbles, which, in thousands of instances, were based on six location stakes, where there was not even a semblance of a mine within miles of the locality designated. At the present time the scene is vastly changed. Years of steady and unremitting toil have pushed down shafts hundreds of feet throughout the mineral belt of the country, and demonstrated to a certainty the character, quality, value, cost and profit, and all the important factors entering into a demonstration of the real basis of the mining industry. In many cases the amount of ore actually in sight is greater than the amount asked for the mine. In other instances the work of development, the acquired facilities and the demonstrated value of a property, as a producer, is equal to the amount demanded for the same. These opportunities are presented in hundreds of mining camps, from one end of our mineral bearing territory to the other, yet capital turns a deaf ear and is dead cold to every opportunity presented. In addition to this important advantage, these years of experience have furnished a class of qualified and thoroughly responsible experts, upon whose judgment millions may be safely invested.—*Mining Review.*

Mexican Grants.

Those familiar with the notorious public history of land titles in this State, need not be told that our people coming from the States east of the Rocky mountains, very generally denied the validity of Spanish grants, and their proper limits or location, and determining the rights of holders for themselves, selected tracts of land wherever it suited their purpose, without regard to the claims and actual occupation of holders under Mexican grants, with a view of acquiring pre-emption rights and title under the United States at some subsequent period. Many of the older, best authenticated, and most desirable grants in the State were thus, more or less, covered by trespassing settlers. When the claims of Mexican grantees came to be presented for confirmation, these settlers aided the United States, the most formidable opposition usually coming from them, first to the confirmation of the grant on every imaginable ground, of which the most frequent was fraud in some form, at some stage of the proceedings. When confirmed, and the officers of the government came to the location, the contest became still more vigorous and acrimonious—the trespassing settlers or adverse claimants under other grants, seeking to have the confirmed grant located so as not to interfere with their claims or interests. One body of settlers or claimants would seek to move the location in one direction, and another, for similar reasons, in another.

Thus the opposition to confirmation and location, from trespassers and contesting claimants, was more violent than the contest between the government and the petitioners for confirmation. Charges of fraud are easily made, and they were by no means sparingly made by incensed defeated parties, and these reckless charges by disappointed trespassing and opposing claimants in many instances, involved the officers of the government as well as the claimants under the grant.

These were the matters most embarrassing to the tribunals and officers appointed to adjudicate them. It is not improbable, that more or less frauds were committed in some of the many grants confirmed. In a recent decision of the Circuit Court of the district of California, the Judge said that it is far more conducive to the public interest and public peace, as well as to private interests, that they should, pass unpunished, than that this kind of acrimonious litigation should be indefinitely prolonged.

USEFUL INFORMATION.

Comparative Wear of Coin.

In the annual report of the deputy master of the English mint for 1884, just issued, there appears an interesting note by Mr. Hill, superintendent of the operative department, and Prof. Chandler Roberts, chemist of the mint, as to the comparative rate of wear of coins of different metals and alloys. Experiments made by the same gentlemen on a former occasion pointed to the conclusion that differences in the mechanical treatments of coin affect the durability of such coins. They have now made experiments as to the effects on the wear of coins of extreme hardness. They coined 100 pieces in a variety of steel which was capable of receiving sharp impressions when soft, yet would harden energetically when rapidly cooled in water. Fifty of the coins were hardened after striking, and fifty left just as they came from the dies. The former lost an average of .0029 after 26 hours, and the latter .0032 per cent when separate from each other. When the two lots were mixed together the soft steel coins lost an average of .0077 after 52 hours and the hard one .0042. According to the experimenters, these results show that the wear of steel against steel is considerable. In comparing equal times they say: "The amount of metal lost, even in the case of hardened steel, approximates closely to the loss sustained by coins struck in gold (standard 916.6) and silver (standard 925). A further objection to the use of steel coins is the destructive influence they would exert if allowed to mix freely with coins of other metals, and it is set forth that when fifty hard-steel coins and fifty silver coins were revolved together in a drum for seven hours the former lost nothing, while the silver coins lost an average of .046 of their weight, some of these coins losing as much as .0050. Experiments with coins of 25 per cent nickel and 75 per cent copper, the alloy usually employed for the coinage of nickel, showed that the loss was very small as compared with coins of pure nickel, being, after thirteen hours, .0004 with the former and .0011 with the latter, thus demonstrating the advantage of the copper alloy.

THE MOSS INDUSTRY IN FLORIDA.—The moss industry of Florida is said to surpass in value and importance the cotton industry of that State. We clip the following from a recent Florida paper: W. H. Barlow and C. C. Davis, of Longwood, are to establish a factory near Gee creek, at the west end of Lake Jesup, for the manufacture of moss mattresses. They are having a steamer 50 feet in length constructed to convey the moss from any part of the lake to their factory, and they will give 75 cents for each hundred pounds of cured moss delivered at any point on the lake. The moss is cured as follows: A pit is dug four feet wide and two feet deep, in which the moss is placed and covered with earth, and allowed to remain one month, at the end of which time it will be perfectly cured. They claim that their mattresses will wear well and not flatten out and mat down as do those manufactured of imperfectly cured moss. Converting the moss to domestic uses will prove mutually beneficial, as it will enable many people to earn considerable in gathering and preparing the moss for use, and it will add another to our limited industries. If they should get more moss than they can use, it will be shipped to furniture manufacturers to be used in upholstery.

UTILIZING SAWDUST.—Refuse sawdust is now made to yield a handsome profit. When dry it is carbonized in iron retorts, and in the process is given off some 80 per cent of volatile products, the remaining 20 per cent being granulated charcoal, which can be used in making gunpowder, filters, lining refrigerators and as a disinfectant. With a very little tar it can be pressed into bricks and useful as a fuel. Twenty-two of the 80 per cent volatile product is in the shape of fixed gases, useful for lighting, heating, etc.; 47 per cent is pyroigneous acid or crude acetic acid, and after being purified and concentrated, is valuable in white lead, color, print, and vinegar manufactures. There remain 10 per cent of tar and 1 of wood alcohol. The former has the same properties as coal tar, with its almost endless variety of applications in art and industry, while the wood, or methylic alcohol is employed as a solvent for gums, in varnish making, and in the manufacture of aniline colors, etc.

COATING ZINC WITH NICKEL.—In coating zinc with nickel by means of a galvanic current the zinc must be first cleaned by diluted hydrochloric acid and thoroughly washed. It is then hung in the nickel bath for a short time, taken out, rinsed and thoroughly scraped, so as to remove all the metal that does not adhere firmly. This operation is repeated till the zinc is covered with a thin film of nickel, which can afterward be made as thick as required. The suitable current strength is easily found, and when the zinc is once thoroughly covered the current may be increased without risk of the nickel peeling off.

PAPER PULLEYS.—The strength and inflexibility of paper, when pasted or glued together in blocks, and subjected to heavy pressure, had been fully tested in the paper car wheel, and why inventors were so tardy in discovering its utility in the construction of belt pulleys is the

old question asked on the discovery of every valuable improvement in machinery. Three patents have been granted for this purpose. One is for a composite pulley, formed of a cast-iron hub, a web or body made of paper, pasted and pressed into a solid block, of the thickness to give it the required strength, and this web, surrounded by a wrought or cast rim, secured to the web by means of knees or flanges riveted through the rim and the paper. The inventor claims that by actual test it has been found that the rim having a uniform bearing upon the paper body, is more steady, even, and perfect than any one pulley heretofore made.

TO DETERMINE THE SAFETY OF COAL OIL.—To ascertain whether a sample of petroleum is sufficiently volatile to be dangerous, Herr Montag points out a very simple and conclusive method. He fills a glass three parts full with the petroleum to be tested, and fills up the glass with boiling water, at the same time holding a flame over it. If the vapor disengaged becomes ignited the petroleum should not be considered a safe liquid to leave exposed to the atmosphere.

TO DETECT LEAD IN CULINARY VESSELS.—M. Fordoz gives in *Cosmos* a very simple and useful method for detecting lead in the tinning of culinary utensils. The vessel being carefully cleaned to remove grease, a drop of nitric acid is applied to any part, and a gentle heat is employed to dry the spot. A drop of solution of iodide of potassium is applied to the spot, and if lead be present a yellow iodide of lead is formed.

THE TELEGRAPH IN CHINA.—China, which only six years ago had but six miles of telegraph lines, has now completed a system by which Canton, the capital of Southern China, is brought into direct communication with the metropolis of the north. News from the principal cities can now reach London within four hours.

When putting away the silver tea or coffee pot, which is not used every day, lay a little stick across the top under the cover. This will allow fresh air to get in and prevent the mustiness of the contents, familiar to boarding house and hotel sufferers.

GOOD HEALTH.

Remember the Skin.

There's a skin without, and a skin within, A covering skin and a lining skin; But the skin within is the skin without, Doubled inward and carried completely throughout.

The palate, the nostrils, the windpipe and throat, Are all of them lined with this inner coat, Which through every part is made to extend, Lung, liver and bowels from end to end.

The outside skin is a marvelous plan For exuding the dregs of the flesh of man, While the inner extracts from the food and the air What is needed the waste of the flesh to repair.

Too much brandy, whisky or gin Is apt to disorder the skin within, While if dirty and dry, the skin without Refuses to let the sweat come out.

Good people all, have a care of your skin, Both that without and that within, To the first give plenty of water and soap, To the last, little else but water, we hope.

But always be very particular where You get your water, your food and your air, For if these be tainted or rendered impure, It will have its effect on the blood, be sure.

The food which will ever for you be the best, Is that you like most, and can soonest digest, All unripe fruit and decaying flesh Beware of, and fish that is not very fresh.

Your water, transparent and pure as you think it, Had better be filtered and boiled ere you drink it, Unless you know surely that nothing unsound Can have got to it over or under the ground.

But of all things the most I would have you beware Of breathing the poison of once breathed air; When in bed, whether out or at home you may be, Always open the windows and let it go free.

With clothing and exercise keep yourselves warm, And change your clothes quickly if caught in a storm, For a cold caught by chilling the outside skin Flies at once to the delicate lining within.

All you who thus kindly take care of your skin, And attend to its wants without and within, Need never of cholera feel any fears, And your skin may last you a hundred years.

N. Y. Herald.

A REMEDY FOR FELONS.—The *Phrenological Journal*, which is not apt to give currency to humbugs, publishes the following: "Cures" for whitlow or felon, are as common as "cures" for cancer, and we are always inclined to smile at the easy credulity of the periodicals that give them space in their columns. Lately we have met with the following, alleged to be the statement of a physician, named C. C. Gratiot, in several of our medical and other exchanges, and as it is of a character that is simple enough for anyone to try who may be suffering from this painful form of periostitis, we publish it: "Take common salt, roasted on a hot stove

until all the chlorine gas is thrown off, or it is as dry as you can make it. To a teaspoonful, and also a teaspoonful of pulverized Castile soap, add a teaspoonful of Venice turpentine; mix them well into a poultice and apply to the felon. If you have ten felons at once, make as many poultices. Renew this poultice twice a day. In four or five days your felon will, if not opened before your poultice is first put on, present a hole down to the bone, where the pent up matter was before your poultice brought it out. If the felon has been cut open or opened itself, or is about to take off the finger to the first joint, no matter, put on your poultice; it will stop right there, and in time your finger will get well, even if one of the first bones is gone. Of course it will not restore the lost bone; but it will get well soon. So far as my faith went in the treatment of a felon in that way, I never would have tried it. My patient came back to me in four days, with pain and throbbing all gone, and with no tenderness or swelling. Upon removing the poultice there was a round hole down to the bone, discharging a bloody thick pus, such as I have sometimes seen come from acute ulcers. He stated that after the first application of the poultice, about eight hours after he left my office, he suffered no more pain; in three days more, he was almost entirely well. This induced me to determine to try it on other felons that I might be called upon to treat; and from July until the middle of October a great many felons occurred among the farmers, caused by the frequent handling of pitchforks in making hay, and in stacking and threshing grain. Sulfur to say I tried it on seven cases of felon, and it never once failed me. It is simple in preparation, and the soap and salt are always at hand, which, with a very few cents' worth of Venice turpentine, will make many poultices. The cases in which I used it got well more rapidly and suffered less pain, and the finger regained its normal condition more quickly, than after incision or any mode of treatment I had ever previously adopted."

A New Remedy for the Headache.

We clip the following from the *Physicians and Surgeons' Investigator*—a good medical authority: We desire to call attention to a simple, and at the same time wonderfully efficient, treatment for headache. We lay no claim to originality, nor do we know who the originator was, but having used it for a year or more, and in many cases with remarkable results, we feel disposed to give our endorsement, and desire to make it more generally known. The remedy is nothing more or less than a solution of the bi-sulphide of carbo. A wide-mouth glass stoppered bottle is half filled with cotton or fine sponge, and upon this two or three drams of the solution are poured. When occasion for its use occurs the mouth of the bottle is applied to the temple or as near as possible to the seat of pain, so closely that none of the volatile vapor may escape, and retained there four or five minutes or longer. For a minute or so nothing is felt, then comes a sense of tingling, which in a few minutes—three or four usually—becomes rather severe, but which subsides almost immediately if the bottle be removed, and any redness of the skin that may occur will also quickly subside. It may be re-applied, if necessary, several times in the day, and it generally acts like magic, giving immediate relief.

We believe that this was the basis of a once popular nostrum. The class of headaches to which it seems especially adapted is that which may be grouped under the broad term of "neurotic." Thus neuralgic, periodic and hysterical headaches, and even many kinds of dyspeptic headaches, are almost invariably relieved by it. True, the relief of a mere symptom is quite another thing from the removal of the cause, yet no one who has had the distress, and even agony, caused by severe and frequent recurring headaches (and who has not seen it?) but will rejoice to be able to afford relief in so prompt and simple a manner; besides, it is sure to secure the hearty gratitude of the patient if he has suffered long. As to the modus operandi we have nothing more definite than a theory to offer, and that is that the vapor being absorbed through the skin produces a sedative effect upon the superficial nerves of the parts to which it is applied. We know by experiment that its influence is not due to its power as a counter-irritant. We, however, know that it does act, and if we do not clearly see in what way it acts, that is no more than can be said of several other remedies which are firmly established in professional favor and confidence.

HUXLEY ON THE WEIGHT OF MAN.—Prof. Huxley asserts that the proper weight of man is 154 pounds, made up as follows: Muscles and their appendages, 68 pounds; skeleton, 24 pounds; skin, 10½ pounds; fat, 28 pounds; brain, 3 pounds; thoracic viscera, 3½ pounds; abdominal viscera, 11 pounds; blood which would drain from the body, 7 pounds. The heart of such a man should beat 75 times a minute, and he should breathe 15 times a minute. In 24 hours he would vitiate 1,750 cubic feet of pure air to the extent of 1 per cent. A man, therefore, of the weight mentioned should have 800 cubic feet of well ventilated space. He would throw off by the skin 18 ounces of water, 300 grains of solid matter, and 400 grains of carbonic acid every 24 hours; and his total loss during that period would be six pounds of water and a little more than 2 pounds of other matter.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KEYSTONE.—Amador Sentinel, Aug. 5: We understand that the force of men at the Keystone mine of Amador has been somewhat increased of late. Messrs. Stewart and Tevis, who are interested in the John Bull mine, were up from the city last week looking at their property. John Belluomini has a fine quartz prospect in his ranch back of the Moore mine. A shaft is down some distance and it has been determined to fully discover the extent and character of the lead. Operations in the Valparaiso tunnel are still being pushed. Crosscutting will be undertaken next week.

Del Norte.

NEW MINES.—Del Norte Record, Aug. 6: The excitement in regard to the newly-discovered quartz ledge near the headwaters of Coon creek still continues, and prospecting is going on all about this location. The discoverers are anxiously waiting returns from the assay of quartz sent below. Parties who have had some experience in quartz mining have burned some of the rock brought from this ledge and say that it is very rich in silver, with some gold. The ledge is reported to be 20 or 30 feet wide, and if it is as rich as indications seem to predict, it is a bonanza, not only for the discoverers, but for many others. The foothills in the vicinity of this find have never been thoroughly prospected, and we are in hopes, in fact very confident, that the strike will prove a rich one.

Inyo.

BROWN MONSTER.—Inyo Independent, August 8: The mine is six miles south of Independence station, on the Carson & Colorado railroad. A tramway is laid from the mine to the railroad, and beyond to the mill on the banks of Owens river. The mill has 30 stamps, and when in working order will crush about 45 tons of gold ore daily. There is plenty of water power for 100 stamps if needed; the water is carried from Owens river in a ditch six miles long. The water right is the oldest located on Owens river. The mine is a limestone formation in the Inyo mountains; both mine and mill site are patented; the latter covers 160 acres of good land. The mine is opened by a large incline shaft, following the dip of the vein its entire depth—about 400 feet. Five levels have been run north and south of the shaft, the longest 300 feet and the shortest 50 feet. On the surface the vein can be easily seen cropping out over a distance of over 2,000 feet. The vein in the levels has a width varying from 3 to 8 feet; the angular dip is about 30°. The ore is enclosed by well defined walls, from which it parts easily; very little of it is waste. The ground is the strongest this reporter has ever seen; very little timber is required in the mine and the roof is everywhere sound in chambers standing from 8 to 10 years. Not a trace of water is seen in the mine. About 12 inches of the vein next the hanging wall is silver-lead ore. The only work now doing in the mine is taking out this silver ore. Four men are at work; the ore they take out is shipped to San Francisco. The gold ore mined in taking out the silver is stored in the mine; about 3,000 tons of this is now broken out ready for milling. The silver ore now being shipped contains 50 per cent lead and about 75 ounces silver per ton. The mouth of the shaft is about 1,800 feet above the level of the valley. On the north end of the claim is a canyon at the mouth of which a tunnel could be started near the level of the valley, and by running 1,000 feet would strike the ledge at a depth of at least 1,500 feet below the level of the incline shaft.

BEVERIDGE.—There is now a large quantity of ore from the Keynot mine at the mill; it is intended to start the mill to-day, and the prospect is good for a long run. The Arambula extension of the Straus and Cohen ledge is now getting so rich in silver that a different process of working the ore has become necessary from what served when it was worked for gold alone. The two claims on this ledge show an immense amount of ore. About 60 miners are at work at Beveridge.

INDIAN MINERS.—Miners who were at work some time ago at Old Coso hired Indians and kept them employed until they had learned how to run arrastras. Now the Indians work on their own account. Last week Mr. Eddy, of Darwin, paid one of those Indians \$21 for a dab of gold taken from 150 pounds of rock. Surely there is a chance for white miners where Indians can pick up rock worth \$168 a ton.

MINNETTA MINE.—Last Saturday night a fire at White Hill was the prearranged signal that something good had been found. Next day Mr. Eldred went up from Independence to the Hill; on his return the next day he reported that a good body of fine ore had been struck in the Minnetta mine. The extent of the ore body has not yet been ascertained.

UNION MINE.—The lower workings of the Union mine, at Cerro Gordo, all beneath the main tunnel, have been leased by Locket, Casey and Basto. Already quite a force of men are at work and the number will increase as the mine is opened up. There is a large amount of ore already out and ready for shipment.

Mono.

STANDARD CON.—Bodie Free Press, Aug. 10: The 300-level south drift has been cleaned and re-timbered for 30 feet from station. The 400-level north drift has been advanced 14 feet. South drift same level advanced nine feet; upraise 18 feet. The 450-level drift advanced 15 feet. The 500-level north drift advanced 11 feet; upraise 8 feet. The ore bodies average fully as well as per last report of August 1st. Owing to accumulation of ore at the mill the tramway was run but five days, delivering 406 tons. Mill is running steadily and well. Total number of men employed 67.

BODIE CON.—The east crosscut 700. Lent Shaft level is now in 167 feet. The south drift, same level, is in 202 feet. The east drift, 550 level is in 15 feet. North drift second incline level is in 27 feet. Upraise from 400 level is up 12 feet. East drift from north drift between 300 and 400 levels is in 20 feet. Upraise 300 level was advanced 10 feet. The joint east crosscut 400—Mono—level was advanced 13 feet. Twenty-five men employed.

MONO.—The joint east crosscut 400—Mono—level was extended during the past week 13 feet. Winze No. 2,550—Lent Shaft—level, 400 feet from Bodie line is down 60 feet. South drift, same level is in 15 feet. Six miners and one engineer employed.

Mariposa.

MINES NEAR COULTERVILLE.—Mariposa Gazette: On Monday last, Charles Haderer, an old-time resident on the north side of the river, above Coulterville, called upon us, and from him we received many bits of information concerning that section. Mr. Haderer answered our questions about the mines over there the best he could, by first stating that the output of quartz mining by machinery in that section is not very flattering at this time. That at the Bandereta mine, Charlie Mast, the superintendent, is still pushing the work forward to the best advantage. At present the water in the North Fork, from which a supply of water has been obtained is so extremely low that the mill is idle and crushing of rock suspended for the present. They only have about a dozen men employed in and about the mine at this time. The Hasloe mine started up about six weeks ago. It took nearly a month to get the water out. It was originally a ten stamp mill, but they have taken the stamps out and the quartz is crushed by some other kind of machinery. They have 100 cords of wood at the mill, and are taking out ore. The vein lies very flat, which vastly increases the labor of getting out the ore. It is hoped a favorable report will be heard from this mine before long. A quartz vein was found on the ranch of A. D. Gordon by Mr. Clark, son-in-law of Aug. Olney. The five stamp mill of Pete Longhurst has been procured and put upon it. It is thought to be an excellent mine and has been bonded to some San Francisco parties. The Quail mine extension, belonging to Bill Warner, is no doubt a good vein. It is situated on Indian gulch, and is worked by Warner whenever he has time and money. Informant thinks it about the best vein and mine in that section. The Red Cloud mine is owned by a San Jose company, Gaines & Carter. They have a ten stamp mill put up by Jim Piper, and is in good condition for crushing rock. This mining property in the past has been subject to too many fangled machines. It has undergone the Dodge process and Huntington's new invention, but is now back to first principles, the regular stamps. The last sinking on the vein is 100 feet below the 400 foot level, and is on excellent ore, with a three foot vein. The mill will start up soon. The Compromise mine is still idle, but is guarded by Superintendent Lawrence. It is thought that this mine is as good as it ever was. The cause of its failure was, the Chinamen employed stole all the specimen quartz and coarse gold. The Reed brothers have found a good vein on the North Fork, below the mouth of Goodwyn gulch. It is a rotten decomposed rock, and shows one foot in thickness at nine feet depth and extremely rich. They think they have a bonanza ahead. We hope they have. The Grub claim, belonging to Tom Byrd, as usual furnished him, through the process of a hand mortar, all the gold he wants to purchase a bill of grub.

Nevada.

WASHINGTON ITEMS.—Nevada Transcript, Aug. 6: The Spanish is one of the most promising mines in Washington township. Although comparatively a new development, it is already on a paying basis. The Huntington crusher recently erected is running smoothly and with the best of results. Twenty-five men are employed. The San Francisco gentlemen who recently bonded the Baker mine on Diamond creek, are now making a test crushing of 100 tons of ore at the mill on the Ocean Star claim with which it is connected by a tramway half a mile in length. If the crushing gives favorable results, extensive machinery will be put on the Baker ledge and its systematic development begun. Frank Hathaway, of this city, is prospecting an extension of the Spanish mine and getting some encouraging indications.

Plumas.

INDIAN VALLEY MINE.—Greenville Bulletin, Aug. 8: For some time past 45 men have been employed making necessary repairs and prosecuting new work. Sinking on the shaft continues and the rock is good. A tunnel is being run west under the old Union works at a depth of 212 feet below the lowest workings. One is being run east, also, at a depth of 418 feet below the lowest workings in the eastern end of the mine. The excavation for the new hoisting works will be completed this week, and the machinery at the Greenville Iron Works is nearing completion—is to be ready by the 20th inst. The "pipe tunnel," tapping the shaft, is completed, its length being 500 feet. A great deal of work has already been done. Good progress is reported.

RIVER ITEMS.—Plumas National, Aug. 8: Cameron is getting good prospects out of his quartz at the head of Rich Gulch. C. R. Hallsted is taking out some nice chips on the Yorks' Ranch claim. Fred. Lewis has some very rich quartz, but is doing nothing, as his claim is in litigation. Cap. Corser's claim on the gulch is paying good dividends regularly. Mitchell Phelps & Co. will have the frame of their quartz mill on Deadwood finished next week. Charley and Alfred Hyde are fitting up their claim at Twelve Mile Bar in good shape for next spring's run.

Placer.

A NEW QUARTZ LEDGE.—Herald, Aug. 8: A valuable quartz lode was struck last week at Star-town, two miles above Last Chance, by P. W. McArthur, Tillotson & Dixon and Messrs. Byrne and Rumbold. These gentlemen were running a tunnel toward a gravel channel, and in doing so cut a ledge thirty inches wide some 300 feet below the surface of bedrock. The ore shows finely in free gold, iron pyrites and galena sulphurets; and as there will be no hoisting or pumping to do in extracting the ore, it is the opinion of competent miners who have examined it that it is the most important quartz strike that has yet been made in the upper part of Placer county.

Shasta.

NOTES.—Shasta Co. Democrat, Aug. 5: The amount of mining machinery shipped here and unloaded at the depot speaks volumes for the mining industry of the county. Dan Haskell, the messenger, has struck a rich gold quartz prospect about six miles north of Redding near the Sacramento. Messrs. Dale and Hiatt of Buckeye are doing good work on their quartz mine near Churntown. They have a shaft down 30 feet. At this depth the vein

is four feet wide and the rock prospects exceedingly well in free gold. The Portuguese flat hydraulic mine has closed down for the season. We are told the cleanup for the past season's run was much better than was anticipated by the company. The claim is being put in order for a big run next season. The Breslausers think they have discovered a tellurium mine on their land between Redding and Salt creek. They have given parties a big interest in the find to prospect it. It is said the croppings greatly resemble the ore in the Schearer mine. The quartz mill and other machinery, which Hon. Reuben Clark, of Colusa, will erect on the Harrison mine at Quartz Hill, is expected here this week. Harrison has got the mill-site ready to receive the machinery. The pump and pipe arrived Monday. Ed. Reid tells us that his company will not have their quartz mill running as soon as expected. A piece of the machinery was accidentally broken which will have to be duplicated. This will cause a loss of time, but they expect, however, to be crushing rock inside of 15 days. Dan O'Neal is crushing ore from the second extension of the Florida. This mine was located last spring by a company of prospectors, and since then they have taken out about 200 tons of high grade ore, all of which Dan has contracted to mill. The boys have a good stake in hand and of course are happy. The new Winthrop Company at Copper City are highly elated over their latest prospect. Since commencing to develop the mine they have opened up a body of ore that in richness is way beyond anything they expected to find. They have found silver ore, so we are informed, that is malleable and can be panned with a knife. The Schearer & Rattler tellurium mine continues to hold out in rich ore and is attracting as much attention from the curious as ever. Last week a working shaft was commenced 50 feet east of the old one. They expect to strike the drift tunnel with the new shaft in 60 feet. People from all over the country, many living 500 miles distant, have come to see this wonderful mine. We are informed that Jas. Sallee told parties in Redding last Saturday that the Lost Confidence mine is positively sold this time and that the transfer of property will be made this week; that he has been to Copper City to secure the old saw-mill at that place, and partly negotiated with Lee Fader to haul the mill to Iron mountain, where it will be re-erected to saw timbers for the mine.

CENTERVILLE.—Shasta Courier, Aug. 8: Ward and Cornell are busy on their mines at Centerville and no doubt have the "deadwood" on fortunes. Some of the rock brought in from one of their ledges by Johnny Deoblin is said to contain tellurium. It is also said that some of the rock taken from the Potosi mine there, and left around the old mill site, has been tested, and tellurium found in that. The Potosi claim paid well as long as worked, and that, too, with machinery not fit to crush corn cobs. We understand that the Lost Confidence mine at Iron mountain has been sold to a solid company of San Francisco who will work it on a large scale and begin operations at once. It is expected a 10-stamp mill will soon be running there. Reports from the Copper City mines are very favorable and the prospects are bright for some people to get rich there.

Sierra.

A PROMISING LOCATION.—Tribune, Aug. 7: The Cleveland quartz claim, located on the east side of Nigger canyon, and about one mile north of the Florence mine, has every indication of being one of the most important finds made in this section for some time. A tunnel has already been run in on the ledge a distance of 125 feet and the prospects obtained there are hard to beat. A shaft is also being sunk to connect with the tunnel, which is run 45 feet below surface. The shaft is down 20 feet and the vein is improving every day. Four men are employed there at present, and the owners, Antone Demartine and Joe Topia, of Sierra City, propose to commence the erection of a five-stamp mill in a few weeks. They consider that there is a sufficient quantity of ore already in sight to justify them in going ahead with the mill. The vein has an average width of about two feet and in a great deal of the rock gold is plainly visible to the naked eye. The ledge can be traced by the croppings for several hundred feet down the mountain side. There is an abundance of water near at hand, which can be utilized for milling purposes.

San Bernardino.

PROVIDENCE MILL BURNED.—Calico Print, Aug. 8: The hitherto prosperous camp of Providence 100 miles east of Daggett and 22 miles from the Atlantic & Pacific railroad, has met with a misfortune that will retard its progress for several months at least. Last week the beautiful and thoroughly equipped 10-stamp mill, that it is said cost \$100,000 to build the same, was burned to the ground on the 31st inst., not a vestige of the structure and its contents escaping destruction. In consequence the miners employed in the Bonanza King mine were discharged excepting a few. The business of the town will suffer considerably until operations are resumed in the mine. It is thought that the work of erecting a new mill will begin shortly and that its capacity will be greater than the one destroyed. Mr. Wilson Waddingham arrived at Providence last Friday and no doubt he will immediately commence to make preparation for the erection of a larger and finer mill than the other, which can be accomplished for considerable less than the former, on account of cheap transportation. The last run of the unfortunate mill resulted in turning out 26 bars of bullion, so we were informed, which shows that the Bonanza King is still a healthy bullion producer. We expect to see that promising camp make rapid strides within the next six months, and the present active operations on the Kerr mine will be an important factor in the progress of the camp.

BUENA VISTA.—Calico Print: This mine lies north and west of Calico and distance 40 miles or thereabouts by wagon road. The owners are the Bugbee Bros., Levi Pennington of Calico, and Col. Barstow. The ores carry principally copper. A shaft was sunk on the vein or rather sunk in proximity to it, to a depth of 175 feet. At a depth of 40 feet a cross-cut was run, disclosing a vein of red cuperite of copper, of a high grade of some three feet in width. At the 100-foot level a cross-cut was again run. The vein at this depth is five feet wide in a body of solid black oxides of copper, yielding at the average of 40 per cent. At the bottom of the shaft 120 feet the vein was again cross-cut, and now found to be no less than nine feet in width in solid copper ore, commonly nominated as black oxides here, carrying a high percentage of bismuth.

Great credit is due the owners of the above named mine for the energy displayed and used in thus opening up and developing a mine so comparatively remote and isolated as is Granite district.

San Diego.

PINACATE MINE.—San Diego Sun, August 6: A force of thirteen men are at work on the Mennifee mine, divided into day and night shifts. They have run a drift 110 feet. The drift is about 28 inches wide and the ore will average between \$12 to \$15 per ton. Seven or eight tons have been taken out, and the men are engaged in rocking it as fast as received for shipment to San Francisco. It will be shipped via San Diego. B. F. Paterson is superintendent. A five-stamp mill is being erected, and very little more ore will be shipped away. On the Pinacate mine a force of men are at work developing. A new discovery of tin has been made between Pinacate and the old Temescal tin mines. The tin crops out in magnetic iron, and was supposed to be gold. It assays from 4½ to 6 per cent on the tin surface. A shaft has been sunk six feet, and no walls yet discovered. The mine is owned by Mike Kinney, lately of Butte, Montana. A rich discovery of gold quartz has just been made on the high mountain west of Elsinora.

Tuolumne.

BUCHANAN.—Tuolumne Independent: Mining operations are being rushed at the Buchanan. On Tuesday, 14,000 lbs. freight went up from Summerville, from San Francisco, for the mine—consisting of a new boiler, machinery for the hoisting works, etc. It was brought by Hall & Campbell's teams, and the freight bill to Summerville footed up \$204. The road extends no further, and the machinery will have to be let down the side of a hill by means of ropes and pulleys, ferried across the Tuolumne river, and moved up steep hills by means of ropes and pulleys again. Altogether a distance of six miles will have to be traversed after the road ends, and the moving for that distance will cost \$700 or \$800 more, making a total of about \$1,000 from the city to the mine. The new saw-mill is now running, and turning out all the lumber they need, at a cost of about \$10 per 1,000 feet. Heretofore lumber laid down at the mine cost about \$25, and hard to get in at that figure. It is to be hoped that this mine will prove all that is expected of it, and that other good mines, now idle, will soon be started up.

STARTED UP.—The Gilkey Slide mine started up this week. The water will be out in a few days, and they will then be ready to commence sinking the shaft. Mr. G. has erected new hoisting works, and has a larger boiler and engine, so that he will be better prepared to work the mine. He is sinking for gravel, and has considerable water to contend with. It is Mr. G.'s opinion that this is an old river channel. If this be the case, there is no doubt but what he will be well paid for his work if he can get deep enough. They will work 3 men 8 hours shift in the mine (single hand). The engine is under the management of H. Pierce and T. Soulsby, of Soulsbyville.

GRAVEL.—Alt. Messenger, Aug. 8: A few days since the Red Oak Co. raised a shaft at the inner end of their tunnel, and at a height of about eighteen feet encountered a body of quartz gravel. None of the gravel had been prospected when our informant left the mine. The wash is heavy, and that they have opened a genuine Pliocene gravel channel, there cannot be a shadow of a doubt. Much credit is due the owners for their perseverance, and they deserve the reward which they will, in all human probability, soon reap. Only one quartz mill is running at Poker Flat, due to the scarcity of water. The new pumps were got to work in the Extension shaft last Sunday, and have furnished the necessary water to enable washers to keep up with the drifters since. The clean-up of the Bald Mountain Extension Co., Forest City, for last week's work was 103 ounces. We learn that an arrangement has been entered into by which the Phoenix quartz mine at Sierra City, owned by the Beard brothers, is to be more thoroughly developed. It is reported that a tunnel is to be put in until it reaches the shaft, that is to say, under the shaft but deeper, when if the development is satisfactory, a sale of the mine will be made. What price is to be paid we do not know. That the mine is a good one there is not the shadow of a reasonable doubt. Messrs. Deidesheimer and Busch are the parties who have taken hold of the work of development, and they already have a force of men at work.

Trinity.

DEADWOOD.—Cor. Trinity Journal, Aug. 8: Our mines never looked more brilliant and our people more happy than at the present period. Our business houses are flourishing and we begin to appreciate the full value of a rich and extensive mining camp. The latest strike is that of Jud and Walter Van Matre upon the Diener location. The vein is from 5 to 10 inches in width, and prospects, at the lowest estimate, \$100 per ton. Jud and Walter are faithful and enterprising young men and may their recent strike prove a bonanza. Wm. Blagrove on the extension of the Black Bear is doing lively work, and the ledge never looked more promising. When stoping commences we may expect to see some nice specimens of rich ore. Westlake and Cosgrove have struck it in their mine richer than ever. Before there was considerable gold hanging to the quartz, but now there is considerable quartz hanging to the gold. McDaniels, on the Enterprise location has struck it very rich. The vein in places is 15 inches wide, and prospects immense. I prophesied some time ago that you would "hear from him again," and now the prophecy is fulfilled. Gibson and Leavitt are running a lower tunnel which will tap their rich vein about sixty feet and when the task is accomplished we will "feast our greedy eyes with gold." Thomas Simons, superintendent of the Shattuck mines is doing very active work and ore is being extracted continually. J. F. Doliff's mine looks favorable from all accounts that can be learned, and Boothby and Hendries on Dennison's location are satisfied with the outlook.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Virginia Enterprise, Aug. 8: The deep winze was down about 80 feet below the 3,000 level at three o'clock yesterday afternoon, well timbered throughout, and the bottom still continued in ore. The north lateral drift from crosscut No. 2 is now extended over 125 feet from the crosscut and making good progress, skirting

along the eastern side of the ore vein, with its face in clay, quartz and porphyry. Like the wine, it is in a comparatively dry formation, water giving no trouble whatever. As before remarked, when this drift shall have reached a distance of 150 feet from crosscut No. 2 its face will be directly under the north development of the ore body on the 2,900 level, and two crosscuts west will be started from it. The new hydraulic pump addition will be in working position in about two or three weeks, ready for any possible influx of water that may be tapped in any direction, when exploration and development work can and will be done fearlessly and practically.

CIOLLAR.—The only work being done in connection with this mine is at the Combination shaft. The whole of the ponderous and massive castings constituting the new half or duplicate section of the big hydraulic pump, six carloads in all, have arrived from San Francisco, and to-morrow the management will commence putting the same in working position. This will take about two weeks. The whole was put together and thoroughly tested in San Francisco, therefore when set up in practical working condition it is expected to start into successful operation at once. The shaft is now down 116 feet below the 3,000 level, and further sinking is abandoned at present in order to allow of placing the hydraulic pump. The rock is hard and no increase of water met with, but further sinking cannot be done until the pump is completed, as all the working force and opportunity at the shaft will be employed in so doing. Work in this shaft, as well as in the Hale and Norcross and other mines, is suspended to-day on account of the funeral of General Grant.

THE GOLD HILL GROUP.—Little is being done in the Yellow Jacket beyond repairs to the main incline. The Brunswick mill, on Carson river, which has been reducing the ore, is now too much reduced in its water power to be of much use, and it is being overhauled with a view to adding steam power to its reducing facilities. If this is found to be a paying proposition further ore and bullion production from the Yellow Jacket may be looked for. Crown Point, Belcher and Kentuck continue their diminished production of low grade ore from the old workings. A few men have been put on again in Crown Point to open out new prospects and explorations and put things in better shape for ore extraction.

CON. CALIFORNIA AND VIRGINIA.—The average extraction from the Jones lease section is reduced to about 50 tons a day, but when the repairs to the old Consolidated Virginia shaft are completed better facilities will be given and the ore yield much increased. The ore assays \$18 per ton from car samples. Over 100 tons per day are being extracted from the 1,750 level, on company account. It is of good quality, assaying over \$20 per ton from battery samples. The upraise above this level has been connected with the old drifts above, giving better ventilation.

MONTE CRISTO.—The new shaft is now down 55 feet, and has been substantially timbered from top to bottom. The galleys or hoisting frame is being put up, and a steam engine will soon be called into requisition in further sinking.

ALTA.—The explorations are being steadily continued in the upraise from the 900 level, searching for the ore deposit indicated by the stringers heretofore met with. A small force of men are employed in this work.

SIERRA NEVADA.—The north lateral drift on the 520 level is now 983 feet in length, having gained 46 feet during the past week. The face is in fine looking vein matter, carrying little or no ore.

BULLION.—The drift west on the 160 level is in 100 feet from the Fairview shaft, and is getting into close proximity to where a good ore vein is expected to be found.

GOULD AND CURRY. Crosscut No. 1, west on the 1,000 level next to the Savage line, is now out a little over 100 feet, and running in very promising vein material.

BEST AND BELCHER.—On the 1,000 level the crosscut west near the north end of the mine is now out over 400 feet and making good progress in favorable looking ground.

OVERMAN.—A small force of men are employed in explorations and prospectings on and above the 226 level. No ore is being shipped to mill.

Cortez District.

BULLION.—*Silver State*, Aug. 8: S. Wenban shipped by Wells, Fargo & Co.'s express to San Francisco, yesterday, six bars of bullion, valued at \$6,000, from his mine at Cortez.

Eureka District.

ORE SHIPMENTS.—*Eureka Sentinel*, Aug. 8: The ore shipments from the small mines of the district to the furnaces in town go by fits and jerks, so to speak. During the past week they have been unusually small, despite the fact that new and valuable developments have recently been made and the number of producing properties is fully as great, if not greater than any prior time this year. The Virginia in New York Canyon made a shipment the other day to the Eureka Con. furnace, and the Mountain Boy, a property in the range of mountains immediately west of the Ruby Hill tunnel, sent in quite a lot of good ore to the Richmond works. To the latter works the following shipments were also made: Silver Connor, 39 tons; California, 5; Rescue, 9 and Hartnett 5. The Jackson mine on Ruby Hill shipped to the Eureka Con. furnace 78 tons. The Eureka Con. mine continues to look and produce well. The Williams ore body on the seventh level is proving even more extensive than was anticipated, and the ore is of a good quality. The Richmond mine is also said to be producing well.

Ophir District.

RUMORS.—*Belmont Courier*, Aug. 6: Rumors come floating in that the Twin River Mining Company will soon recommence operations in their mines at Ophir. They have a good property and it ought never to have been shut down.

Park Canyon District.

THE GRANT.—*Belmont Courier*, Aug. 6: Park Canyon will soon be the scene of active operations, and when the music of the stamps disturbs the stillness that has reigned there so long, the Giant mine will have been added to the list of bullion producers. The ore is of a rebellious character, but it is claimed by those who know that it can be successfully and profitably leached. From reliable authority we hear

that there are 30,000 tons of ore in sight and on the dump at the Giant mine, Park Canyon. This ore is of a character that does not require sorting and can be run through the mill as it is taken out. Twenty thousand pounds of the old Jefferson mill started on Thursday for Park Canyon on the Hon. A. H. Greenhalgh's prairie schooners. More shipments will follow regularly till nothing but the mill site is left in Jefferson.

Willow Creek District.

THE WILD DEER MINE.—*Silver State*, Aug. 8: News has been received here of an important strike in the Wild Deer mine at Willow Creek. This mine is owned by H. H. McColley and R. McLeran, who also own the Silver Wave mill. The extent of the new ore body in the Red Deer has not yet been ascertained, but it is said to have created quite an excitement in the camp.

ARIZONA.

BULL WHACKER.—*Prescott Courier*, August 8: Messrs. Curtin and Jackson have erected several buildings at the Bull Whacker mine, and are preparing to increase the working force as soon as the timbering is completed and the mine opened sufficiently to admit of more men working. They have four skilled miners at present, and are confident of a big thing. The first announcement of the completion of the Sterling mill was given out yesterday afternoon, by the shrill whistle of this plant. This morning the machinery was started on its steady run on ore from the mine that is represented to be of such immense wealth, which we hope will be duly verified by the number of gold bars it is expected to turn out.

IDAHO.

PHILADELPHIA SMELTERS.—*Ketchum Keystone*, Aug. 8: The Philadelphia smelters, after exhausting all efforts to procure a supply of fluxing iron, yesterday run out of that commodity, and in consequence were obliged to cease operations. It is particularly unfortunate, as there is plenty of ore on hand, and receipts daily are sufficient to continue work right along. The O. S. L. Ry. have contracted to supply 20 tons of iron ore per day, but through some at present unaccountable inadvertence or failure, they failed to fulfill their contract. The two large 50-ton stacks have now made a continuous run of eight weeks, which in itself is remarkable. Supt. Haddess will no doubt take advantage of this suspension and clean up with a view to vigorous resumption, which we learn will take place in a few days, when we may look for a continuous fall run. The company are buying all ore right along, so pile it in and encourage them and boom our flourishing camp. You get the best market rates for all ores, and get your money on the nail head.

SENATE.—The Senate company are making active preparations to blow in their smelter at Galena, which will take place in a few days. A limited amount of ore is intended more as a test with a view to extend operations in future. The run will probably last about twenty days, and will thoroughly develop the capacity of the smelter for treating the ores of the Galena region, and the cost of turning them into bullion there.

FROM SMOKY.—*Wood River Times*, Aug. 8: Pierce Dorgan came in last evening from Smoky. He says that four of J. O. Swift's teams will be in here Tuesday evening with 20 tons of King of the West ore. When they return they will bring in Galore ore, then Carrie Leonard ore, then McCarter's, Jos. Reedy's and George Merrill's, and so on. The shippers are compelled to take turns because of the lack of teams. The rate for hauling is \$10 per ton. At this rate, if snow does not fly too soon, between 400 and 500 tons will be brought in from Smoky before winter sets in.

THE ALMA.—The Alma claim, which is situated in Ruby Gulch, a tributary of Little Smoky, and about 2,100 feet below the Galore, on the same hill, is opening up splendidly. A drift 115 feet long, and the shaft, which is 75 feet deep, show a vein of pay ore 14 inches thick. This ore is a mixture of gray copper, zinc blende and fine-grained galena, which averages over \$225 per ton. There is a considerable quantity of this in sight, and a lot of 25 or 30 tons is being taken out, to ship to Hailey as soon as teams can be secured to move it. The Alma is owned by George Merrill, Anton Ellexson and Abe Belin.

THE SWEET GRASS MINES.—*Cor. Inter-Mountain*, Aug. 6: Prospectors should wait for more particulars before they start for the new discoveries in the Sweet Grass hills. To commence with, it is impossible to get water in any quantity. There are a few springs but no creeks, and water would have to be brought from the Rocky mountains, a distance of about 110 miles, in a flume about 600 feet high, to enable placer mines to be worked at all. This is only one of the obstacles. Moreover, there is a special order of President Cleveland in regard to prospecting on the Piegan and Gros Ventres reservation, and a party of blue coats will probably be on hand in the hills to welcome any invaders. As far as the discovery of gold and other metals is concerned that is no new thing. That has been known for the last 15 years. Not only are there enormous gold bearing bars, but there is probably the largest galena lode there in the world. The ledge can be traced by a broad black line for more than 30 miles, and varies from five to ten feet in width, and in addition has numerous spurs which jut out from it almost at right angles. These mines would have been worked long ago if the Government had permitted it. It is a shame that a few Indians, numbering not more than 300, should own a whole district—125 miles by about 200. Most of these live on the British side of the line, and eat British rations.

COAL.—*Idaho Messenger*, Aug. 8: B. W. Nelson placed on our table on Saturday a specimen of coal, which, although we are unable to tell the exact quality, is of a good grade. The specimen was taken from Wm. Hodges' location and from the face of a drift about 20 feet from the surface. We state that the coal is of a good quality, from the fact that Mr. Hodges uses it as fuel for his camp fire. It burns well and gives good heat. Mr. Nelson informs us that the whole sand reef, in which the coal is found, is full of small strata of coal, but the strata are so small and the formation so broken that he questions whether bodies in paying quantities can be found. Quality is established, quantity seems doubtful. Mr. Nelson also informs us that the contractors on the Bayhorse road have cut

through a vein of coal some 12 inches in thickness, in the said bluff, around which they are building the road bed below the mouth of Bayhorse creek. The vein cut is about 100 feet north of some old prospecting works which were driven by parties looking for coal.

MONTANA.

PURCHASE OF ORE.—*Helena Independent*, Aug. 6: Within the last few days A. M. Esler has purchased of Geo. S. Kennedy 40,000 pounds of ore from the Kennedy group of mines on Jackson creek. The ore is worth 200 ounces per ton, and consists of rich sulphurets, galena and brittle silver. A number of men are now working upon the property and the output of ore will be much greater in the course of a few weeks. Mr. Esler has also purchased 30 tons of \$400 rock from the Legal Tender Company. Under its present management it looks as if the Legal Tender was again destined to come to the front as a bonanza mine.

BUTTE.—*Miner*, Aug. 5: A *Miner* reporter yesterday visited several of the mines of the camp, and everywhere signs of continued prosperity for Butte were seen. The work of sinking and opening up our mines seems only to have just commenced. Those in charge of the larger mines of this district are only just proving that the mineral resources of Silver Bow county are simply inexhaustible, while those who are fortunate enough to own the smaller mines are confident that there are hundreds of mining properties in this camp, that will, in a short time, be as valuable as the Anaconda, Alice, Moulton, Parrot, or any of the other great mines of this section. There is enough ore in sight in the several mines of this camp to keep the mills and smelters now in operation here, in full blast for an indefinite period.

THE LEXINGTON.—It only requires a visit to the Lexington mine and mill to convince one of the prosperity that company is enjoying. The main shaft is being sunk below the 650-foot level at the rate of four feet a day. It is expected that the shaft will reach the 800 in about five weeks. When that point is reached, cross-cutting for the ledge will be commenced, and the work of opening up of the lower portion of the mine will be carried on with vigor. The mine is looking well throughout, the different stopes are producing their usual quota of ore, and the several prospects are looking very well.

MONTANA COPPER CO.—The series of mines owned by the Montana Copper Company are all looking well. The Parrot is down a depth of 330 feet, and important developments are constantly being reported at that point. The Colusa, also owned by the Montana Copper Company, has been opened up as far down as the 600, and on every level, from the 100 to the 600, the stopes are looking grand. Large quantities of fine ore are being extracted, and the ore resources are simply immense. At West Colusa, the work of sinking the shaft below the 380-foot level is going bravely on, while cross-cutting for the ledge on the 280-foot level is in order.

THE ALICE.—At the Alice everything is running along in a very smooth manner. The usual quantity of ore is being extracted from the different stopes on the 300, 400, 500 and 600-foot levels, and the general appearance of the mine is very encouraging, in fact, the mine never looked better than it does at the present time. Active preparations are being made to lower the pump below the 800-foot level, which will be done in a few days.

MAGNA CHARTA.—At the Magna Charta mine, everything denotes enterprise and prosperity. The 500-foot level continues to look well, and good ore is being extracted from the ledge at that point. The 400 and 300-foot levels are looking well, and the different stopes, drifts, etc., are producing the usual quantity of ore. The Magna Charta, from the 100 to the 500-foot level never looked as well as it does at the present time.

THE RISING STAR.—Work on the several stopes of the Rising Star was resumed last week, and large quantities of ore of a good quality are being extracted. The 300 and 400-foot levels are looking even better than usual. The pumps are working in a very smooth manner, and are handling the water very easily.

THE MOULTON.—Everything in and around the Moulton is working in its usual smooth manner. The stopes on the different levels, from the 200 to the 500, are producing the usual quantities of ore. The work of sinking a winze at the bottom of the 500-foot level is being conducted with vigor.

BLACK ROCK MINE.—The strike in the Black Rock mine, of which mention was made last week, is improving with every blow from the pick. The ledge is now seven feet wide, of which two feet will assay 100 ounces to the ton. The mine looks well all through, and Messrs. Stoner & Co. are very jubilant over the prospects they have of becoming millionaires.

THE ELM ORLEE.—Messrs. Clark & Co. have a grand property in the Elm Orlee. The mine looks grand, and the company can extract as much ore as they please. This mine is a veritable bonanza.

MINOR NOTES.—Messrs. Butcher & Boggs are taking out some very fine ore from the West Poyer. Dennis Leary is pushing matters at the Poyer mine, and his efforts are being rewarded by finding some very good ore. The Poyer looks well. The Silver Queen mine has decidedly improved during the past week, and some very important developments are confidently expected in a short time. The work of putting up the new hoisting works at the Amy Silvermine mine is progressing very favorably. When completed this will be one of the nicest buildings in the camp. The Wild Bill mine continues to look well, and the usual quantity of rich ore is being extracted. The Belle of Butte mine is producing a great deal of high grade ore.

NEW MEXICO.

IRON ORE.—*Silver City Enterprise*, Aug. 7: During the month of July ten carloads of iron ore from Santa Rita were shipped from White-water station. One carload of silver ore from Lone mountain was shipped from the same place. A large amount of leasing is going on in Chloride Flat, and on Legal Tender hill. The leasers are making money. Lone mountain miners are furnishing the reduction works with a large quantity of ore, and that camp is again

becoming one of the liveliest in the county. This time it is coming out on its merits. The Argenta mine, at Fleming, is attracting some attention from mining men. A showing of sixteen inches of high grade ore that has paid well to ship, seems to be the attraction. The claim is owned by Van Lone and others, who have unbounded faith in its outcome. The old Victoria mine, at Shakespeare, is showing up very nicely. J. N. Evenson, the owner of the property, has had two sample assays made of the ore recently, which was rated as first and second-class. The first-class went \$170 and the second \$15, which is not a bad showing. The claim will be worked by Mr. Evenson, and the ore either shipped to the most convenient sampler or allowed to remain on the dump and accumulate for the contemplated Shakespeare reduction works to treat. Several small shipments of ore have been made from the Telegraph district within the past month, mostly by J. T. Mitchell, which have given satisfactory returns. During last summer these mines paid off an indebtedness of \$12,000 from ore taken out by Mr. Mitchell, who will again endeavor to make arrangements by which the property will be worked extensively. There are mountains of low grade ore in this camp that would pay handsomely if treated near the mines. J. W. Huntly, of Tombstone, is the new superintendent of the Carlisle, vice L. E. James resigned. Mr. Huntly is said to be one of the best mill men on the coast, and will doubtless make a success at the Carlisle as soon as the new plant is completed. The principal trouble at the Carlisle has always been a lack of water. The new rolls now being put in, and which have a capacity equal to one hundred stamps, can be operated with the amount of water on hand. This will increase the milling capacity four-fifths without adding materially to the running expenses. Two hundred tons of ore are now in the bins ready for the rolls as soon as they are in shape to run. There has always been an abundance of ore in the mine, and if the new process of treating it proves successful, Carlisle will soon again be one of the best camps in New Mexico.

OREGON.

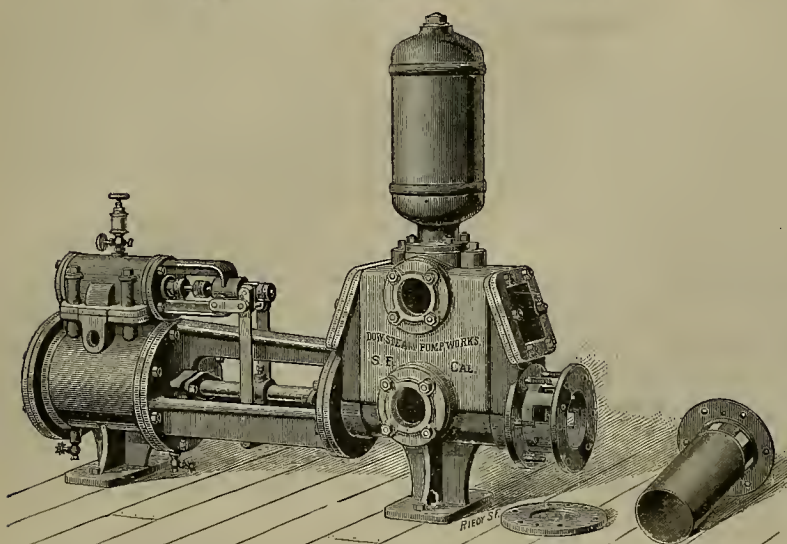
QUARTZ AND PLACER.—*Jacksonville Times*, August 7: A large number of quartz and placer claims are being located in this and Josephine counties. Thos. Brown is prospecting a quartz ledge on Jackson creek, the ore from which promises well. Parties have bonded Savage Itos' placer mines on Rogue river and are now engaged in sinking a shaft. J. Griffiths, who is mining on Hungry creek, Cal., reports good prospects both in his quartz and placer mines. Elmer Stephenson informs us that O. Collins and Chas. Williams of Big Applegate are about wingdamm the river. Several parties outside of this town have taken stock in the proposed quartz mill. It will no doubt prove of great benefit. Klippel, Denoff & Co. are about commencing work on the bed of the Applegate, their wingdam being nearly completed. Mining operations are generally suspended, though considerable prospecting is going on in both Jackson and Josephine counties. J. T. Hayes, whose friends are legion in this section, is engaged in working an excellent mine on Cow creek. We hope he will strike a bonanza. Work is being continued on Grob and Brandel's quartz ledge on Jackson creek with excellent prospects. The rock is becoming richer and more plentiful. The American Mining Guide, the best authority on this subject, for sale at the *Times* office: also blank notices for location of placer and quartz mines. John Beckner, of Applegate, was in town yesterday. He informs us that Jack Layton's supply of water is failing and he is now engaged in cleaning up one of his races. Several hundred pounds of ore from the tunnel being run across the Yank ledge is sent to San Francisco every month for assay. If it comes up to the requirements after being thoroughly tested, machinery will be put there for work on an extensive scale. It is said that the ledge is improving right along and those who have the enterprise in hand are satisfied with it.

UTAH.

PARK NOTES.—*Park Mining Record*, August 8: During July there were six location notices filed with Recorder of this district and two so far this month. The Apex will ship fifty tons of first-class ore this month which, it is believed, will run about \$225 per ton. Frank E. James has put a jigger or two in the creek running through town for the purpose of saving the silver that escapes from the Ontario tailing dams. If they prove successful he will add two or three more shortly. The interest lately taken in mining matters in this (Utah) district appears to be contagious. Mr. Chas. P. Brooks, the surveyor, started yesterday on a week's surveying trip through Blue Ledge District. This section has been under the weather for some time, but will show up well by fall. Recent important mining transactions have caused no small stir among interested parties, and prospectors are eagerly scanning every piece of rock or float which they encounter, while owners of small properties are cleaning out their old prospects and preparing for active operations. Varcoe & Bowditch are now actively engaged in jiggling the Sampson dump. They haul the ore to the springs in Woodside Canyon, where there is an abundance of water for the purpose. They expect to ship about ten tons of concentrates from here at the end of the month, and at least forty tons from their jig in Ontario Canyon. The Anchor Company's office, store-room and blacksmith shop at the mine are now completed. Ground for the hoisting works will be broke on the coming week. The hoisting engine from the Utah is going to be used, and two new steel boilers will soon arrive to furnish steam for the same. The Black Diamond and Nimrod are both patented claims, adjoining the Daly on the southwest, and are owned by Conrad and Wilfrid Abegglen, of this place, and James R. Shepard, of Zena, Polk County, Oregon. These claims were first located seven years ago and work commenced, the developments up to the present being some 200 feet in all. Several tons of ore, which the owners claim will go as high as \$500 to the ton, are now on the dump. A short time since the owners concluded that they were too far west of the main vein as indicated by the croppings, and they immediately began another shaft fifty yards east of their old workings. They are working four men at present but will increase their force as soon as indications will warrant.

DOW STEAM PUMP WORKS,

San Francisco, Cal.



DOW'S IMPROVED STEAM PUMPS And Pumping Machinery

FOR EVERY POSSIBLE DUTY.

COMPOUND PUMPING ENGINES,

Condensing and Non-Condensing,

.....FOR.....

**Water-works,
Mining Purposes,
Irrigation, Etc.**

WORKS: 114 and 116 BEALE STREET.

Correspondence Solicited.

Call or Send for Catalogue.



GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

**SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,**

653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

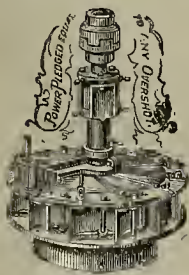
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



GOLD MINE FOR SALE.

The Etna mine in El Dorado county, with 20 acres patented ground, and nearly new machinery, such as Steam Hoisting Works and a 20-Stamp Mill and Engine, can be bought for \$5,000, which is half the cost of the improvements. This is a good chance for practical miners. For particulars call on or address

H. JOHNSON,
515 O St., Sacramento, Cal.

RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$16. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, cor. Third, San Francisco.



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF


MACHINERY

SOLE AGENTS FOR

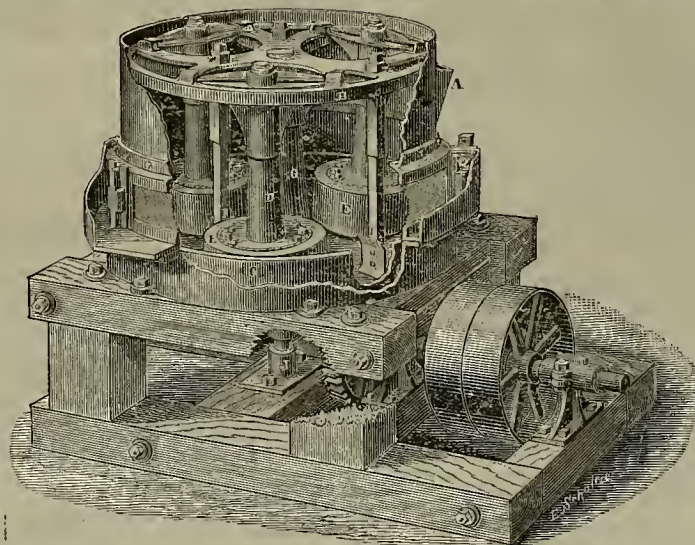
J. A. Fay & Co.'s Woodworking Machinery.	Williamson Bros' Hoisting Engines.
Frank & Co.'s Woodworking Machinery.	Atlas Engine Works Engines and Boilers.
New Haven M'fg Co.'s Machinists' Tools.	Payne's Vertical and Horizontal Engines.
Bement & Son's Machinists' Tools.	Otto Silent Gas Engines.
Bickford's Power Drills.	Clapp & Jones' Steam Fire Engines.
Blake's Improved Steam Pumps.	Pickering Engine Governors.
Perry's Centrifugal Pumps.	Judson Engine Governors.
Perin Band Saw Blades.	Tanite Co.'s Emery Wheels and Machinery.
Sturtevant Blowers and Exhausts.	Nathan and Dreyfus Oilers.
Shimer Matcher Heads.	Korting Injectors and Ejectors.
Brainard Milling Machines.	Disston's Circular Saws.
Turbine Water Wheels.	New York Belting and Packing Company's Rubber Goods.
Bradley Cushioned Hammers.	Lane and Bodley Saw mills.
Massey's Steam Hammers.	H. W. Johns' Asbestos Packing, Paint, etc.
Schlenker's Bolt Cutters.	
Holloway Fire Extinguishers.	

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

 A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ill.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe,
Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing,
Eclipse Blowers,
Frue Vanners.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

... MANUFACTURERS OF ...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG GISTS' OLDSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounces Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes will be sent free upon application. Agents for Plumbago Crucibles Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

118 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations Mines; Plans and Reports furnished.
O. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. H. KUSTEL.

METALLURGICAL WORKS,

318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
624 SACRAMENTO STREET,
SAN FRANCISCO, - CALIFORNIA.

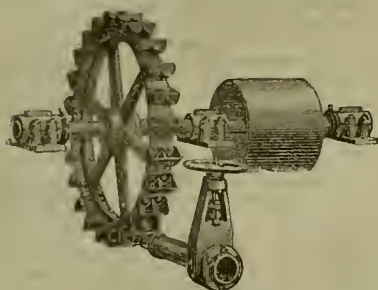
THE HARMON SEMINARY, Berkeley, Cal.

A BOARDING AND DAY SCHOOL FOR YOUNG LADIES.

Pupils taken at any time.

For Catalogue or other information, address:
THE MISSES HARMON, Berkeley, Cal.
Or E. J. WICKSON, 414 Clay St., S. F.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 56 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

MECHANICS' MILLS.



Water Tanks. Wine Tanks.

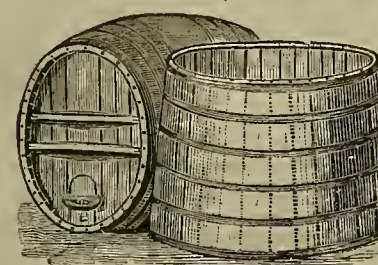
Our well-known TANKS are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills
Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!

CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,
30 to 40 Spear St., - San Francisco.
ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

Dewey & Co. { 252 Market St. } Patent Ag'ts

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

DEWEY & CO.'S

Scientific Press



Patent Agency.

(ESTABLISHED 1860.)

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

OEO. H. STRONG.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,

22 Cliff Street, New York.



Persons so receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in Dwyer & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING AUGUST 4, 1885.

- 323,556.—THERMOSTAT—Frederick Biven, S. F.
 323,556.—GUIDE TRACKS FOR HEAVY FURNITURE—F. Delmont, S. F.
 323,567.—PIPE COUPLING—D. Dillenburg, S. F.
 323,568.—STOVEPIPE DAMPER—J. H. Doherty, S. F.
 323,669.—ORE FURNACE—E. Green, Oakland, Cal.
 323,424.—CUTTING AND EMPLOYING WOODEN BEAMS AND GIRDERS—P. H. Jackson, S. F.
 323,691.—SHEEP SHEARS—E. Kellogg, Reno, Nev.
 323,817.—GRIP CAR FOR CABLE R. R.—F. P. H. Loftis, S. F.
 323,726.—THRESHER—F. Payne, Portland, Or.
 323,749.—THILL COUPLING—E. H. Smith, Ruthersford, Cal.
 323,545.—HEAT TRANSMITTER—J. H. L. Tuck, S. F.
 323,611.—FEED WATER HEATER—D. D. Wass, S. F.
 323,770.—PLOW—John Zeeb, Canby, Or.

NOTE.—Copies of U. S. and Foreign Patents furnished by DWYER & CO., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dwyer & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRIP CAR FOR CABLE RAILWAYS.—Frank P. H. Loftis, S. F. No. 323,817. Dated Aug. 4, 1885. This is a grip car or dummy for cable railroads. The improvements relate to a grip-releasing mechanism adapted to be operated independently by a lug or projection in the road-bed, and by the safety-guard previously patented by the same inventor, and also by a brake-mechanism adapted to be operated either by hand or by the safety-guard referred to.

ORE-ROASTING FURNACE.—Edmund Green, Oakland, No. 323,666. Dated Aug. 4, 1885. The invention consists in the combination of the ore-chamber, the lower and upper flues, the escape pipe at the rear of the chamber, the suction blower in the pipe, the condenser with which the blower communicates, and the air-passage extending within the shell of the furnace, above the chamber, communicating with the open air at the rear of the furnace, and with the ore-chamber at its forward end. The object of the invention is to provide a furnace for treating the sulphureted ores of gold, silver, cinnabar and tellurium ores of gold, and others containing volatile matters, which is simple and cheap in construction and effective in operation.

GUIDE TRACK FOR HEAVY FURNITURE.—Francois Delmont, S. F., No. 323,566. Dated Aug. 4, 1885. On these tracks or ways, heavy articles of furniture may be mounted, in order to permit said articles to be readily moved and save the carpets from continual wear. The invention consists in independent strips of wood or other suitable material grooved or otherwise prepared for the reception of the casters or rollers on the furniture, and having a folding or swinging end. These strips, forming the track, are laid upon the floor under the casters of the furniture, which are thus adapted to travel upon them. Their hinged or folding ends, when not in use are turned inwardly under the article of furniture, and when in use are extended so the furniture may be moved a sufficient distance.

THERMOSTAT.—Frederick Biven, S. F. Assignor of part interest to C. C. Moore and Wm. C. Seamands, of Stockton. No. 323,556. Dated Aug. 4, 1885. This invention relates to that class of heat regulators in which the expansive force of the air is utilized for the purpose of transmitting power through suitable intermediate mechanism to cause a variation in the amount of heat supplied; and the invention consists of an air-tight, independent air-chamber located within the apartment to be regulated, an inverted, vertically moving casing or vessel containing a liquid seal, a connection between said inverted vessel and the air-chamber, and a peculiar string or lever connection between the vertically moving casing or vessel and the heat-adjusting apparatus. This regulating apparatus can be used in connection with the egg chamber of an incubator.

STEAM TRAP.—Charles Watson and Alvert Gankroger, of San Francisco, Cal. No. 321,556. Dated July 7, 1885. This steam trap consists of an enclosing case, having an ingress pipe through which the water of condensation is admitted; an egress pipe through which it is discharged, the latter being controlled by a valve of novel construction; a float within the casing connected with and operating said valve, and also connected with a counterbalance lever exterior to the casing; stops for the valve and also for the counterbalance lever, and a novel means for connecting the float with the counterbalance lever without the use of a stuffing-box or packing. The valve controlling the egress pipe is of simple but effective construction, permitting a perfectly free delivery without danger of

choking. It is perfectly balanced under whatever pressure it may have to act. The capacity of the valve is such as to avoid any danger of the trap becoming over full or water-logged. The connection between the float and the counterbalance lever being a slender rod or wire passing over and through the top of the casing; no stuffing-box is needed, for while the passage is sufficiently large to allow the wire to move freely through it, no appreciable amount of steam will escape. This connection avoids the friction incidental to the use of stuffing-boxes, as they must be packed tight enough to prevent leakage, and when this is done they are apt to be so tight as to prevent the delicate action and movement of the parts which are necessary to make the trap effective.

PIPE-COUPLING.—Michael Dillenburg, S. F. No. 323,567. Dated Aug. 4, 1885. This pipe-coupling consists of a split-sleeve fitting on the pipe, and having a conical or wedge-shaped exterior surface, a head having a correspondingly shaped aperture, in which the sleeve is seated, a tubular connecting sleeve or link fitting upon the end of the pipe and seated within the inner portion of the aperture of the head, which is made with a plane-surface to receive it, a washer between the tubular connecting sleeve and the split-sleeve, and tie-bolts connecting the two heads. The object is to provide an effective coupling without having to resort to threading the pipes. The coupling is a two-part one, the parts on one side being the counterpart of those on the other.

CUT OFF VALVE FOR ENGINES.—Henry Joseph Oliver, of S. F., Cal. No. 323,065. July 28, 1885. This invention consists mainly in the employment of a hollow piston-valve, working within a valve-chamber, having passages by which steam may be admitted freely to both ends of the valve, hollow cylindrical cut-off valves working within the main valve, which is provided with suitable steam ports communicating with the ports of the cylinder, a governor of any suitable pattern, and intermediate mechanism connecting the governor with the cut-off valves, so that they may be adjusted to regulate the supply of steam to the work to be done. The cut-off valves which are short sections of cylinders, fitted and guided within the hollow main valve, are made to reciprocate and control its ports by a very simple but effective mechanism. The valves are internally threaded or provided with spiral grooves, those in one being right-handed and those in the other left-handed. A stem which passes through both valves, has radial arms upon it, the ends of which fit within the spiral grooves. The stem may be turned on its axis directly or indirectly by suitable gearing from a bar or spindle reciprocated by the governor. As the stem turns, its arms cause the valves to move in opposite directions, and in straight lines, they being guided by guide fitting in a longitudinal groove in the main valve.

DOOR OPENER.—Julius Finck, of S. F., Cal., assignor to Will & Finck, of same place. No. 323,308. July 23, 1885. This device has for its object the opening of a door from a distance. It consists of a bent lever pivoted to the back of striking plate, one end of the lever being adapted to act against and push back the latch; a vertically moving rod, the upper end of which bears under the other end of the bent lever and operates it, while its lower end extends to the

sill, and has a plunger foot guided in a tubular socket; a vertically moving rod passing upwardly through the sill, and bearing under the foot of the upper rod a pivoted bell-crank lever by which the lower rod is operated, and suitable drawing wires attached to and adapted to operate the last named lever, and extending to any convenient portion of the house. Though the device is applicable to a single door, it is particularly adapted to be used in connection with a double door, and this lies in the fact that there is a break in the power-transmitting rods, right at the surface of the sill, so that both doors may be opened, when desired; a result which could not be effected if the upper and lower rods were one continuous piece. But for a single door this could be so, as they would be located in the door frame.

CONCRETE MIXING MACHINE.—Ernest Leslie Ransome, of San Francisco, Cal. No. 322,006. Dated July 14, 1885. This is a machine for rapidly and effectively mixing materials to form concrete. The effectiveness of concrete, while depending upon the quality of the materials used in the mixture, depends also to a great extent upon the thoroughness with which the various ingredients are intermingled. This machine has not only a large capacity both in speed and amount of work it can perform, but has also this most essential feature of thoroughly and intimately mixing the materials. The machine consists of a large drum or circular casing, or shell mounted on anti-friction rollers, and adapted to have a rotary movement imparted to it. The casing has circular openings in each end or head, through one of which the materials are fed to it by means of a short chute with which a platform communicates, on which platform the workmen roll their wheelbarrows and dump their contents into the chute. An inclined discharge spout of an approximately semi-circular shape in cross section is mounted transversely through the casing, its ends projecting through the side apertures, and its lower end having a swinging regulating gate. This spout is stationary, being secured on fixed supports without and independent of the casing. Although the spout is fixed during the progress of an operation, it is so arranged as to be readily swung out of the casing when not in use, and to be moved in again when needed. Supported under and parallel with the spout is a perforated pipe by which water is supplied. On the inner surface of the casing are a number of peculiarly arranged flanges, which not only keep the materials in motion, but direct them first to one side of the casing and then to the other, thus causing them to mix thoroughly and intimately. There are also adjustable shelves in the casing, which, while the mixing is going on, are turned to lie close to the surface of the casing, so that they are not in the way. But when it is desired to begin discharging they are turned inwardly, and coming up under the mixed material raise it in small and regular quantities and drop it into the discharge spout, from which it is delivered through its end-gate.

The most reliable place to procure pebbles: Muller's, 135 Montgomery street, opposite Occidental Hotel.

VENTURA is to build on oil tank to hold 30,000 barrels.

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more voluminous and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth, 1884. Price, \$1, postpaid. Sold by DWYER & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.
Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part II; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DWYER & CO., Publishers, No. 252 Market St., S. F.

These are much needed books for miners and other practical men, by an intelligent, energetic and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

TWENTIETH Industrial Exhibition

OF THE

MECHANICS' INSTITUTE

Opens August 25th,
Closes Sept. 26th.

With a most Comprehensive display of

MANUFACTURES, NATURAL
PRODUCTS AND ART.

Grand Instrumental Concert Each Day and Evening.

SPECIAL FLORAL DAYS

Each Week. Over \$1200 offered as premiums for floral work.

ADMISSION:

Double Season Tickets.....	\$5 00
Single Season.....	3 00
Apprentices' Season.....	1 50
Child's Season.....	1 50

Single admission, 50c; Child's 25c.

Season Tickets to Members of the Institute at half rates.

P. B. CORNWALL, President.

W. P. STOUT, Secretary.

HILL'S TRIUMPH ORE MILL.

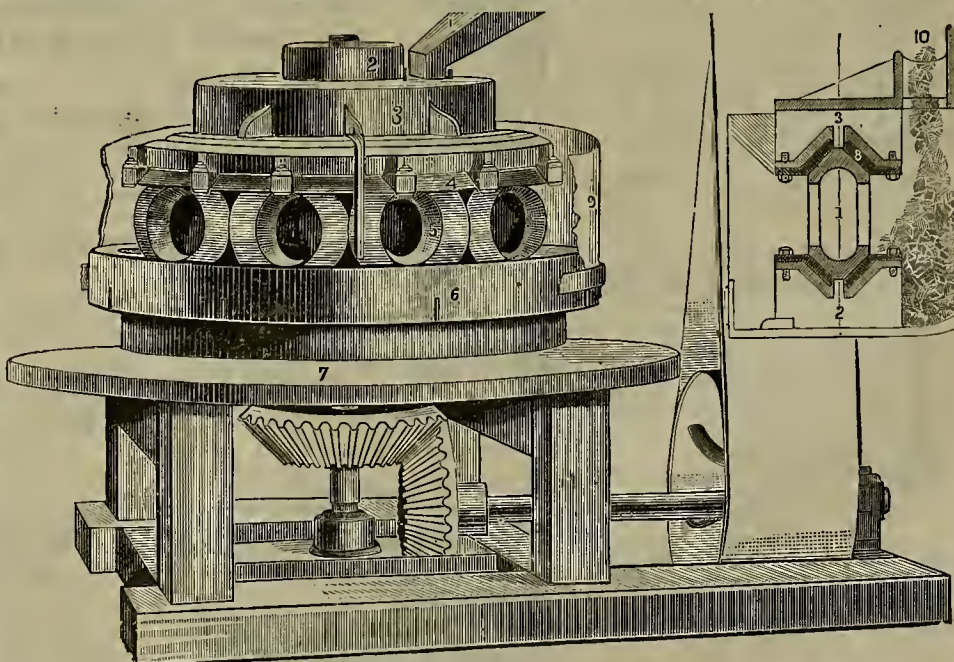
The successful working of this Mill warrants us in saying to the Mining Public that we are ready to make contracts for these Mills and to give a reasonable guarantee of their doing all we claim for them. We would respectfully refer to the letters below from Mr. B. F. Wilson, of Galena, Lander county, Nevada. Please write to Mr. F. A. Hill or myself for all and full particulars.

GALENA, NEV., May 8, 1885.

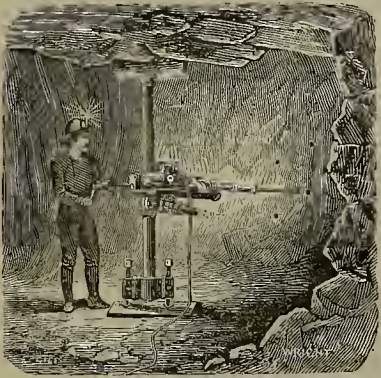
Mr. F. A. Hill—DEAR SIR: I think it is due you that I write you some of my impressions of Hill's Triumph Ore Mill I purchased of you in March. I got it in position, and have had it running for the past two weeks. The mill is in every way more than Mr. Hill claims for it. In quantity it will do all any one wants to do. The important part to me was, will it save the gold? My mine is quartz, oxidized iron and some clay. It had been a question with me, will the gold amalgamate? The gold is very fine. The result in the working of the mill has been satisfactory. It saves a high percentage of the gold and mostly inside of the mill. Below the plates and blankets we fail to find any free gold. The wheels and channels stand well so far, and show no signs of wear. The mill appears to be serviceable and durable, and no doubt Mr. Hill has struck the correct idea in his invention, and mining men should congratulate him on inventing an ore mill to take the place of expensive stamps. I am well pleased with mine, and think there will be more wanted in this camp soon. Respectfully yours, B. F. WILSON.

GALENA, NEVADA, July 15, 1885.—Mr. F. A. Hill—DEAR SIR: Since writing the above letter I have been running the Mill up to the present time, and have worked over 500 tons of ore, and will cheerfully recommend the Mill. Respectfully yours, B. F. WILSON.

For any Mine owner having a mine partly developed, with ore ready for crushing, we would put Machinery on the ground to work the ore, taking our payment from the proceeds of the rock. Farther particulars on application.



Manufactured by H. W. RICE,
ENGINE, BOILER AND PLOW WORKS,
No. 56 Bluxome Street, San Francisco, Cal.



INGERSOLL ROCK DRILLS

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor, SAN FRANCISCO, CAL. Room 5, First Floor, BOSTON, MASS.

PYROMETERS



GAUNTLET'S, ROBINSON'S, and STEINER'S
PRESSURE GAUGES
Hot-Well THERMOMETERS
ANEMOMETERS
SAFETY LAMPS
BAROMETERS
SALINOMETERS
Mining and Meteorological
Instruments of every description.

List and Description of our Ten Catalogues sent free on application.

JAMES W. QUEEN & CO.
924 Chestnut St. Philadelphia

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.
Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

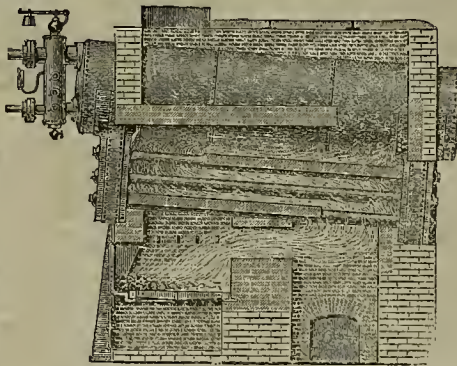
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Box Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.



Send for Circular and Prices.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made.



Chicago Prices Beaten!

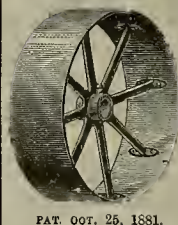
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street - - - SAN FRANCISCO, CAL.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing;" and is for sale by the Trade generally.

Manufactured only by

For Sale by DUNHAM, CARRIGAN & CO., San Francisco, Cal. JENKINS BROS., 71 John St., New York.

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings, and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Congas of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WOOD.

V. KINGWELL.

THOMAS THOMPSON THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF—

Steam Engines, Flour Mill, Mining, Saw Mill and Dredging Machine

Brodie Rock Crushers, Steam Power, Hydraulic, Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

using Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets, SACRAMENTO, CAL.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

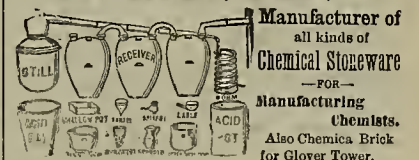
Saws.

SAW MILLS AND MACHINERY of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of

all kinds of

Chemical Stoneware

FOR

Manufacturing

Chemists.

Also Chemical Brick for Glover Tower.

ASSESSMENT NOTICE.

Grosh Consolidated Mining Company.—

Location of principal place of business, Room 39, Merchants' Exchange, San Francisco. Location of works, Storey County, Nevada.

NOTICE is hereby given, that at a meeting of the Directors, held on the 13th day of July, 1885, an assessment (No. 1) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 39, Merchants' Exchange, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 15th day of August, 1885, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the 31st day of August, 1885, to pay the delinquent assessment, together with costs of advertising and expenses of sale. A. C. HAMMOND, Secretary. OFFICE—Room 39, Merchants' Exchange, San Francisco, Cal.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

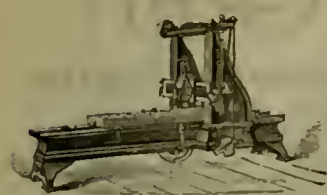
PORTLAND, OREGON.

PARKE & LACY.

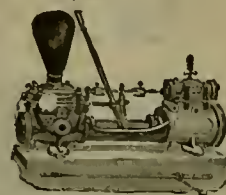
.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.



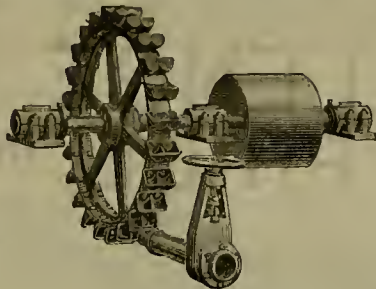
Putnam Planer.

Knowles Steam Pump
The Standard.

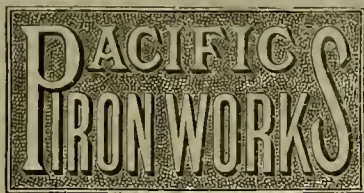
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery **ENGINES and BOILERS.**

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
 Putnam Machine Tools,
 National Bolt Cutters and Headers,
 New York Safety and Haskins Vertical Engines,
 Phoenix Engines and Boilers,
 Kendall & Roberts' Hoisting Engines,
 Knowles Steam Pumps for any service,
 Valley Machine Company's Bucket Plunger Pumps,
 Heald & Sisco's Centrifugal Pumps,
 Jessop & Son's English Cast Steel,
 Hazard Manufacturing Co.'s Wire Rope.

SEND FOR CIRCULARS.**PELTON**
HURDY-GURDY WATER WHEEL.**SOLE AGENTS FOR**

Witherby, Rugg & Richardson's and
 H. B. Smith Machine Company's
 Woodworking Machinery,
 Novelty Iron Works' Shingle Machinery,
 Sturtevant Blowers and Exhausters,
 Waters' Governors,
 Hancock Inspirators,
 Harrington's Screw Hoisting Machines
 Leffel Double Turbine Water Wheel,
 Pelton's Hurdy-Gurdy Water Wheel,
 Babcock Fire Extinguishers and
 Chemical Engines.



1850. 1885.
RANKIN, BRAYTON & CO.,
 BUILDERS OF
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING and REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATORS, WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

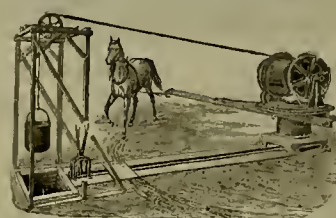
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.

**Baker's Mining Horse Power.**

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Geo. W. Prescott, President.
 IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

Geo. W. Dickie, Manager.
 J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.**Agents of the Cameron Steam Pump.**

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
 HORIZONTAL ENGINES,
 AUTOMATIC CUT-OFF ENGINES,
 COMPOUND CONDENSING ENGINES,
 SHAFTING,

BABY HOISTS,
 VENTILATING FANS,
 ROCK BREAKERS,
 SELF-FEEDERS,
 PULLEYS,

STAMPS,
 PANS,
 SETTLERS,
 RETORTS,
 ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
 LOGGING, PORTABLE, STATIONARY, MARINE
 AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
 222 & 224 FREMONT STREET, SAN FRANCISCO.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR**LOCOMOTIVE AND MARINE FORGINGS.**

ALSO Steel Rods, from 1 to 3 inch diameter and Plats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

All Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

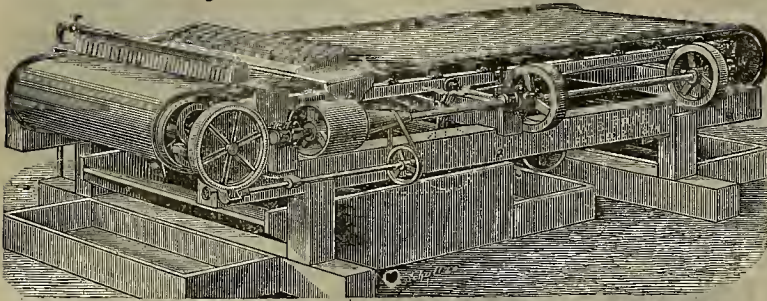
Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

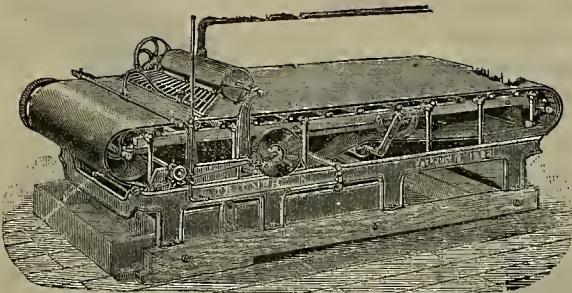
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

**PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.**

THE "TRIUMPH" TRIUMPHANT!

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test, which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flanked by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
1883
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,
Machine and
Engine Works
22 Fremont Street,
SAN FRANCISCO.



**L. PETERSON,
INVENTORS. MODEL MAKER,**
258 Market St., n. e. cor Front, up-stairs, S. F. Experimental
machinery and all kinds of models, tin, copper and brass

"CLAYTON" IMPROVED

ROCK DRILLS. MINING PUMPS.

AIR COMPRESSORS

For CATALOGUES, ESTIMATES, Etc. Address,
Clayton & Compressor Works,
Near Brooklyn Bridge, BROOKLYN, N.Y.

PATENTS. Thousands of Inventors throughout the Pacific Coast can and will willingly attest to the promptness, reliability and success of Dewey & Co's U. S. and Foreign Patent Agency. No. 252 Market St., Elevator 12 Front St., S. F.

W. E. CHAMBERLAIN, JR. T. A. ROBINSON.

PACIFIC Business College,
320 POST ST.
SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN & ROBINSON, Prop's.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

DEWEY & CO
PATENT
SOLICITORS.
252 MARKET ST. S. F.
ELEVATOR 12 FRONT ST. S. F.

MISS BISBEE'S SCHOOL
FOR YOUNG LADIES,

1020 Oak Street, - - Oakland, Cal

WILL RE-OPEN

Wednesday, JULY 29, 1885.

Engraving. Superior Wood and Metal Engraving, Electrotyping, and Stereotyping done at the office of the MINING AND SCIENTIFIC PRESS, S. F., at favorable rates.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 22, 1885.

VOLUME LI.
Number 8.

A Staunch Jigging Machine.

In a description of the systems of ore dressing and smelting at Příbram, Bohemia, read before the American Institute of Mining Engineers, by Ellis Clark, Jr., of Philadelphia, appears an account of a continuous working, two-sieved staunch jigging machine, for working the 6 mm. size of ore. This machine, intended for material from 4 to 20 mm. (0.16 to 0.79 inch), makes 140 strokes of 31.4 mm. (1.24 inches) a minute, and requires 2.9 horse power. The sieve is divided into two parts by a vertical wooden partition, A, (see engravings) 10.5 cm. (4.13 inches) high, which is fastened to a frame of small angle iron, and is supported by a wooden frame, which, fitting closely into the box, tends to prevent the water from splashing up at the sides. The sieve frame is provided with sheet-iron sides, and is suspended by two connecting rods, B, having an up and down motion given them by an eccentric which can be so regulated as to give a stroke from nothing to 2.07 inches.

The discharge of the heavy particles settling on the sieve is through a tube, C, 52.5 mm. in diameter, the aperture of which is closed by a puppet valve, and is opened at intervals, allowing the ore to run into a larger iron pipe, D, and thence into the receivers, E. The upper portion of the smaller discharge tube is surrounded by a low sheet-iron cylinder, covered by a sieve of 0.04-inch mesh, which, by being raised or lowered, regulates the discharge of material. That portion of the material which falls through the larger sieve collects in boxes of a triangular section, and is drawn off into receivers, by means of stop cocks, F, at the bottom. At the lower end of the jig frame is a curved piece of sheet iron, G, the object of which is to facilitate the passage of the waste material.

The transport screws for the *berge* and water are the same as those used in the middle corn jigging machines. The water which is lifted by the propeller pump passes into a wooden trough and falls on the second sieve. The automatic feed, H, of the material to be jigged is similar to that of the middle corn jigging machines. In the strict sense of the word this is not a continuous working jigging machine, inasmuch as the discharge of ore takes place only when a sufficient amount has collected on the sieve, when it becomes necessary to stop the machine.

By this operation two products are won, ore for stamping and ore for jigging. The ore for jigging goes to a neighboring jigging machine, from which, besides the waste, 3 products are obtained, all of which are generally rich enough to be sent directly to the smelting works. The 0.16 inch stuff goes to a jigging machine with 0.06-inch mesh, giving a waste and two products, which are also taken to the smelting works. The material under 4 mm., together with the water, is conducted through a gutter to a concentrating house directly opposite at a somewhat lower level.

The material falling through the trough previously mentioned (under 35 mm.) passes to the jigging house, and enters a revolving screen 3.28 feet long, 3.8 feet in diameter, making 25 to 30 revolutions a minute, and requiring 1.75-horse power. This screen is between two others situated at right angles to it, one of which is 10.37 feet long and 1 meter in diameter, and the other 9.33 feet long and the same in diameter.

In the upper revolving screen, which is provided with a sheet-iron trough, the material is separated into two grades. That which passes off the screen of 0.35-inch mesh is conducted to

rial: 1st. Ore to be farther separated by hand (*klaubwerk*), which gives the same divisions as were obtained in the separation of the larger sizes of material. 2d. Galena, which is sent

sulting in similar products for the smelting works and stamping-house to the one just mentioned.

The material going through the 9 mm. mesh of the upper revolving screen is conducted to the revolving screen on the left hand side, and there divided into four sizes, 0.08, 0.16 and 0.24 inch, and the material passing away from the screen between 6 mm. and 9 mm.

These products are all concentrated on five jigging machines, giving as a result galena, which is sent to the smelting works; a more or less enriched product, which is rejigged, giving ore for stamping; and the material passing off the jigs (*berge*), which is taken to the waste dumps. The slimes from these revolving screens are led in channels to the slime concentrating house and there worked.

Co-operation.

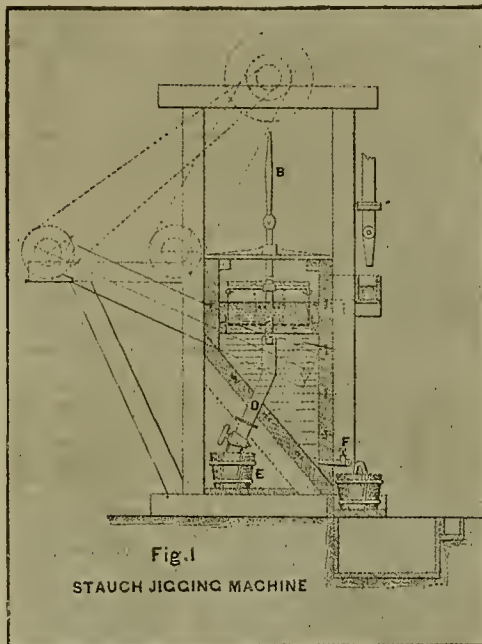
The principles of co-operation between labor and capital have been diligently discussed for many years. Numerous attempts have been made here and in Great Britain to carry on establishments on the co-operative plan, but few have been successful, and these only on a small scale. Wherever large works have been conducted in this way there has been some hitch or disarrangement, resulting in abandonment of the plan. Nevertheless there are many well-wishers of the human race who believe this co-operative principle will in the end be that on which many kinds of business will be carried on.

It will please these persons to know that at one place, at least, a co-operative community is doing well and gaining ground. It is in France. The association was formed 25 years ago, and is composed of some 1,400 persons. The capital employed has a preferential interest of five per cent. Further profits are divided among the workmen. Last year the capital share was £13,500, and the laborers' share was £76,000. The average wages of workmen is 30 shillings, six pence per week—higher than those earned by foundry hands in England.

Even this phenomenal success, however, does not seem to attract laborers to co-operative enterprise, there or elsewhere in Europe. There seems to be a fear among workmen that there is some trickery connected with such enterprises, where they are to share profits. The abstract principle of co-operation always appears to be correct, but in practice, as stated, there have been so far more failures than successes. It may be that the result should be attributed to individual management rather than to the principle; but the workmen have got an idea that co-operation is of little more use to them than any other form of carrying on work. Of course co-operation, if properly conducted, would do away with the serious feature of "strikes," which cause so much loss each year, both to capital and labor; but the capitalist and the laborer must be imbued with more confidence in the system than they now have, before any great advancement will be made in that direction.

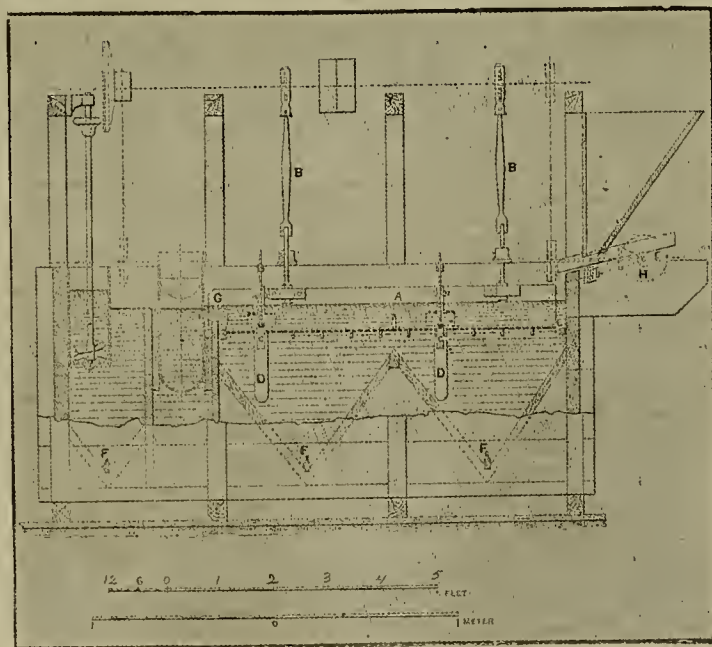
It is said that quite a number of miners on Adams Hill and Prospect Mountain are holding their ores, confidently expecting to see silver appreciate in value shortly.

CHARLES CLARK, a successful and well-known miner, died at Sonora, Tuolumne county, last week.



the revolving screen on the right hand side, and there divided into four sizes; the largest, between 0.87 and 1.34 inches, passing off this screen, is removed to a separating table giving

direct to the smelting works. 3d. A more or less enriched galena (*bleierz*) which, after a sufficient amount has been collected, is rejigged on the same machine in conjunction with the raw



SIDE VIEW OF CONCENTRATING MACHINE.

two grades, sterile and rich. The latter is further separated into galena, which is sent to the smelting works, and ore for stamping, which goes to the stamp house. The sterile stuff goes directly to the waste dump. The material passing through the 22 mm. mesh is worked on a jigging machine, giving four grades of material: 1st. Ore to be farther separated by hand (*klaubwerk*), which gives the same divisions as were obtained in the separation of the larger sizes of material. 2d. Galena, which is sent

product from the revolving screen. 4th. Ore for stamping.

The material coming through the 16 mm. (0.63 inch) mesh is worked on a middle jigging machine, giving galena for the smelting works and ore for stamping. The 12 mm. (0.47 inch) size is worked on a middle jigging machine, re-

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Gold Bluffs and the Golden Beach of Humboldt.

[Written for the Press.]

It would be difficult to imagine the effect upon the minds and senses of E. Du Bertrand and companions, in 1850, as, when fleeing from the hot pursuit of the Indians, they rode in frantic haste along the beach at Gold Bluffs at low tide, and for miles found it streaked yellow with gold. According to the above named gentleman, they were more dazed by the extent of the shining yellow sand than they were frightened by the pursuing savages. They could not fully comprehend that it was gold, and one of the party managed to leap from his horse and gather up a pocketful of the stuff, which after their arrival in Trinidad, proved upon examination to be a fine quality of gold. Their story was regarded as a fiction, but the gold dust mingled with salty sand tempted some to believe, and an expedition was fitted out to work the fabulous Durado, but upon its arrival upon the ground a change of winds and tides had covered the golden deposit with gray sand, giving the whole thing the appearance of a grand hoax. But the individuals composing the party whose hasty flight had crossed the beach at just the right time when the black sand and gold had been laid bare by the action of the tides, knew what they had seen, and ere long the problem of the varying tides was unraveled, when commenced a long and successful period of beach mining at Gold Bluffs. Since that time it is estimated by those most familiar with the operations that some thing over \$3,000,000 has been extracted from the beach sand of Humboldt. But I have no desire to speak of this in an advertising way, but merely and practically as the evidence of a fact—the fact of a deposit of incalculable quantities of gold from which these golden beach sands have come.

Gold Bluffs are situated on the coast of Humboldt, between Trinidad and the mouth of the Klamath river, the upper edge being nine miles below the Klamath river, and the lower edge twenty-three miles above Trinidad, having a face of about seven miles on the ocean. There are several miles of abrupt, perpendicular bluff, three hundred feet high, composed of clean, gold-bearing gravel. This line of bluffs is the western end of a clearly defined and oblong territory of unbroken gold-bearing gravel, twenty miles long, and varying in width from two to five miles wide during its course, until near the coast, where it widens to the extent mentioned. What has been the source and action causing its formation, I do not attempt to describe technically, further than to surmise that it must have been a successive series of river channels formed by a gradual subsidence of a large river, from one beach to the next, as there is considerable difference in altitude between the northern and southern edges. Both at the beach and along the whole course of this gravel bed there is a problem in mining science which offers a broad field for operating mining capital and mining experimentalists. I see that numerous calculations are made, and notes are now being taken, having for their object the bringing of an ample volume of water on to the whole length of this gravel deposit. The chief operation, however, will be to wash the gravel at the bluffs and on the beach. That this deposit was made by a former trend of the Trinity river, making out independently to the ocean, is a plausible theory and easy of acceptance, and the known richness of the gold-bearing quartz, which is a marked characteristic of the Trinity watershed, at once solves the problem of this vast golden deposit.

But the acceptance of this proposition forces another query as to the former course of the Klamath proper. Here again is evidence of a former bed of the latter river, reaching also to the present coast line independently from the supposed former Trinity river channel, and has its terminus upon the coast about half way between the present mouth of the Klamath and Crescent City, also covering an extent of several miles along the beach. Like the Gold Bluff section, this deposit also extends in an unbroken line a little north of east, through a steep, mountainous country, abundantly supplied with good timber and water. Here, within 20 miles of each other, lie the auriferous gravel deposits of two large channels of former rivers or former channels of present rivers, as you please, cutting through and draining an exclusively gold-bearing quartz country—the quartz having undergone nature's milling process for ages, the dumps and concentrators having been suddenly arrested while in full action. The rivers have subsided to other beds; timber for every use has grown, and never-failing streams supply material and power to take up the process by human appliances for the collection of the disenchanted treasure. Neither of these fields bear upon valley districts, but have their existence and course entirely through steep mountains and canyons, finally terminating upon the Pacific Ocean from abrupt, beetling bluffs. Nature formed it for a mining country, placing rich treasure in the earth as the incentive, with

no conflicting values as an obstacle. I might say much more on special points, and some time, perhaps, I may, but these are general ideas which must come of any practical observation of this country, and such being the case, Mr. Editor of the MINING PRESS, why is it that almost invariably capital seeks some insecure, out-of-the-way place accessible only to "pack-trains" or "bull-teams," in which to make expensive mining experiments? Here can be secured U. S. patents to land containing gold, chrome, iron, magnesia, copper, etc., with timber and limitless water power to work them, coupled with great ledges of variegated talc from which could be obtained a building material in beauty and splendor anything that the present age knows, or has history, of, and all these lying within easy access of the great highway of nations—the Pacific Ocean. It is to my mind a question whether capital has that discernment with which it is usually credited. It is very like the poor wage laborer—likes to be humbugged by some mysterious golconda, where "distance lends enchantment to the view," instead of studiously, practically and laboriously analyzing the materials, advantages and opportunities lying at its feet.

WM. AYRES.

Gold Mining Reports.

It would be well if some of the managers of gold mines, says the *London Mining Journal*, were a little more explicit in their information as regards the operations at the mines, and the results therefrom, as the information often given is apt to be misleading to the initiated, and must be much more so to others. For instance the Oscar Gold Mining Company's report states that the clean-up from the last crushing averaged 8 dwts. 6 grs. of gold per ton of stuff treated, and the manager fully anticipates the next clean-up will average three-quarters of an ounce of gold per ton, and that the total expenses are covered by 10s. per ton, and it is stated the whole 50 head of stamps will be at work next Monday. Now what are the shareholders and the public to expect from this apparently glowing report? Has the manager got the mine so far opened out that he can keep a 50-head stamp mill at work on pay ore, averaging (say) from 8 dwts. to 15 dwts. per ton, if so the prospects must be bright. From the report given it would be naturally inferred such was the case, but if the clean-up, as reported, averaging 8 dwts. 6 grs. per ton, was only a small quantity of picked stuff, then the shareholders will be disappointed when it comes to the crushing of large quantities with poor results. It is no use dangling fond hopes before confiding shareholders instead of practical results. When giving the average result of a crushing it would be better to give the quantity at the same time—the amount of ore crushed, and whether fairly taken from the load or picked.

Men may be deceived for a time as to the prospects of a mine by the crushing of picked samples, but there can be no deception in the results of a 50-stamp mill when that is in operation and crushing, say 100 tons of ore per day, it will soon tell the true state of the value of the mine. The manager reports that 10s. per ton will pay all costs of working and management; if so, it is a low estimate for a London managed company. Assuming that to be correct, then all yields over that amount will be profit to the company, but if the yield be less, the more ore crushed the greater will be the weekly loss of working, besides the wear and tear of machinery and plant, and unless ore will pay for raising and crushing it is not good policy to work it merely for the sake of making a loss by doing a lot of work. When a mine is being opened up and development work going, it is, of course, desirable to run the stuff through the batteries of stampers, to test the ground as driven through, but if by development it is proved that there are large quantities of ore in different parts of the mine, some too poor to work, and other portions only payable, it is no use being deceived by the show of a large body of poor stone, while only a small quantity of payable ore can be profitably worked. There are many enthusiastic managers and directors of gold mines who hope to keep alive the excited imaginations of shareholders by reports which will not bear investigation by practical men, and when the tell-tale stampers are set in motion the visionary hopes are often rudely dispelled. No amount of persuasive oratory from a loquacious chairman will make up the deficiency between the real results and the fondly anticipated results of sanguine vendors and enthusiastic managers and directors. The hard-headed stamps have no mercy for visionary enthusiasts in gold mining, but often stamp out their hopes while crushing out the truthful results from the bulk of quartz operated on. In the operations of milling large quantities of ore, all exaggerated statements of inexperienced novices, and the wilful misstatements of so-called experts, get an awful crushing out of shape, in fact all paper misstatements get beaten into pulp that runs off with the slime. While it is pleasant to read the accounts of actual results from well-directed mining operations, it becomes monotonous to be so often reading reports of promises that are never fulfilled. It would be advisable that many of the managers and directors of gold mining companies were more cautious as to the information given, and that it should be so given as not to be misleading.

Determining the Strength of Explosives.

The following paper by S. Whinery, Somerset, Ky., was read before a recent meeting of the American Institute of Mining Engineers:

In these times of sharp rivalry, both as to price and quality, among the makers and vendors of engineering explosives, it is often desirable to be able to determine the relative energy or value of the various explosives offered for sale, in order to purchase intelligently, or, having contracted for a large amount of an explosive of a certain standard quality, to be able to ascertain if the manufacturer keeps his product up to the specified standard. The simple and inexpensive apparatus described below was devised by the writer while engaged on the improvement of the Tennessee river, at Muscle Shoals, under the direction of Major W. R. King, U. S. Engineers, in the summer of 1879. It answered the purpose so well that it is thought that a brief account of it may be of interest to other engineers. It consisted, essentially, of an old blacksmith's anvil and a common striking hammer, such as is used for driving rock-drills. The anvil was placed face downward on solid, level ground. In what was then the top of it, a vertical hole, one and one-fourth inch in diameter and about one and three-fourths inch deep, was made with a ratchet-drill. The surface of the anvil immediately around the drill-hole was made as true and smooth as possible with a file.

Next, a new striking-hammer, weighing nine pounds, with a turned and true face, was selected; and a handle 11 feet long and about one and a half inches in diameter, was fitted into it so that it projected about one foot beyond the hammer. The opposite or long end of the handle was mortised into a wooden axle about three feet long, turning on half-inch iron pivots, in posts set securely in the ground, in such a position as to bring the face of the hammer symmetrically over and covering the hole in the anvil, and so that when raised upward it revolved in a vertical plane perpendicular to the face of the anvil. Light horizontal wooden braces, extending from the ends of the axle to a point about half-way along the handle, secured the latter in position, and gave it additional stiffness. To further secure the hammer from lateral motion, the forward end of the handle, which projected beyond the hammer, had a vertical slit sawed nearly its full length, and was placed astride of a stout vertical wire secured tightly to arms projecting from an upright post; but this arrangement was probably unnecessary, and the friction between the wire and the wood doubtless detracted somewhat from the accuracy of the machine.

If, now, a small charge of any explosive be placed in the drill-hole, or firing-chamber, as it may be called, the hammer adjusted to its place covering closely the mouth of the hole, and the charge fired, the hammer will be thrown to a height proportional to the quantity and strength of the explosive used; and if equal charges of different explosives be successively fired, the heights to which the hammer is thrown will bear the same ratio to each other as the respective energies of the samples fired, and may be taken as a relative measure of the strength of each.

The essential parts of the apparatus were now complete, and it only remained to devise a ready means of firing the charges, and measuring the height to which the hammer was thrown. For firing the charge, an ordinary platinum fuse, exploded by a Ladin and Rand magnetomachine was used. Two spring-clips, made of tin and fastened to the upright post mentioned above, were connected by wires to the poles of the magneto. When the fuse and charge were in place and everything ready to fire, the bare ends of the fuse-wires were slipped into the spring-clips, and the circuit thus completed through the fuse. The wires of the fuse passed into the firing-chamber through a small notch or groove, filed into the face of the anvil, under the hammer.

To measure the height to which the hammer was thrown, a light index arm of wood about ten inches long was screwed to the top of the handle, just back of where it entered the hammer (the handle being left square at this point for the purpose), in such a manner as to allow it a slight horizontal motion. The outer end of this index arm was slit vertically with a saw, and passed astride of a fine vertical wire held in place by arms from an upright post. This wire carried, above the index arm, a small cork moving with just enough friction to hold it in whatever position it might be left. Lastly a rod, graduated into feet, tenths and hundredths, was fixed to the upright post so that its zero corresponded to the top of the cork when everything was in position for firing. When the charge was fired, the index arm carried the cork with it to the highest point reached, where it remained until its position was read off on the graduated rod.

A simple device for interposing a block of the wood between the anvil and the hammer, as the latter fell back after firing, to prevent the hattering of the face of the anvil, was also attached, but was probably unnecessary.

It was thought that by making the handle of the hammer so long, and using small charges of explosives, the path of the hammer might practically be considered a straight line, instead of a circle; but this did not prove to be the case. As the index-wire was tangent to the circular path of the hammer, the reading taken repre-

sented the tangent of the circular angle described by the hammer in its flight; but the true vertical height reached by the hammer was represented by the sine of that angle, and this sine and tangent were found to differ sufficiently to make it necessary to apply a correction to the index readings. This was easily done since, the radius being ten feet, the corrected readings could be taken directly from a table of sines and tangents.

It is evident that only the dynamical work done by the charge in exploding, is shown by this machine, and consequently its results would not correctly represent the relative value, for engineering purposes, of slow and rapid burning explosives, such, for instance, as blasting powder and dynamite. It should, therefore, only be used to compare explosives of the same general class.

The explosives experimented with at Muscle Shoals all belonged to the dynamite family. The charges used were generally ten grains of the number one class, or 20 grains of the number two class of dynamites. Each charge was weighed out as carefully as possible on a superior prescription balance (which turned readily with one-fourth grain), and wrapped in tissue-paper. Usually from 10 to 20 charges were prepared from each sample to be tested. When all was ready, a platinum fuse was placed in the firing-chamber, a charge dropped in with it, the hammer and index-cork adjusted to their places, the battery connected, and the charge fired. From 30 to 40 charges could be readily fired in an hour. It was, of course, necessary first to determine the average height to which a platinum fuse alone would throw the hammer, and this constant, when determined, was subtracted from the average height to which the hammer was thrown by the charge and fuse together.

The effects produced by equal charges of the same explosive were as uniform as could be expected from so crude an apparatus. In fact the records compare very favorably, in this respect, with those of the more careful experiments, made by General Abbott and others, with far more expensive and carefully made apparatus; and by taking the average of from ten to twenty tests, first throwing out such reading as were, from accident or other causes, manifestly wrong, the results doubtless represented fairly the relative value of the explosives thus tested.

THE REJUVENATION OF THE OLD MINING COUNTIES.—Not many years ago the old mining counties were considered worn-out, and fit to emigrate from; but one of the most encouraging of recent developments in the direction of fruit culture and grape-growing is in these same old mining regions. The settler finds good timber, free fire-wood, pure water, a glorious climate, soil which will grow the grains and fruits of the temperate, and often of the semi-tropical zones. Some men of energy have created for themselves fertile gardens on the hillsides, and there is room for thousands of others. According to the reports of the immigration societies, a steady stream of travel to the mining counties appears to have begun, and it is not hard to predict a great change there within a few more years. Shasta is receiving much new blood; the broad plains east of the Sacramento, at Redding, are dotted with cabins, and the red land foothills west of Anderson are nearly all occupied. Placer and Butte counties have become favorite spots for home-seekers and Nevada county is also attracting attention. Tuolumne, Calaveras, Mariposa, and the southern Sierra region are also coming into public notice. This very hillside where I sit would make an excellent place for an apple orchard, and the fruit would keep much later than that grown farther down the ridge, ten miles from here; and several thousand feet lower, peaches and grapes thrive. A slice of land a mile wide, and extending across this county, would be like a strip of territory from the Gulf to the Lakes, put into a condenser and reduced to thirty miles exactly. At one end there might be a date palm tree planted for a gate post, and at the other end an edelweiss from the Alps, for a warning that only lichens and snow-plants could grow beyond.—Paul Meredith in August Overland.

MINE LEASING.—The Silver City (N. M.) *Enterprise* says: The leasing of mines to parties who are willing to risk their labor on the property has been the means of building up many mining camps, and enlivening others that have been allowed to move along in a sleepy, sing-song manner. It is somewhat encouraging to see this means of developing claims being more and more looked to than ever before. During the present term of quietness in many of the districts it will no doubt prove beneficial to both miners and mine owners where such leases are given, and it will without a question be of greater value to the camp, district and county where such claims are being developed. There are many claims within a radius of 20 miles from this city that have good ore on the surface and no doubt it would pay handsomely were such properties to be worked intelligently. The closing down of several mines and the draft of men on several others has thrown a number of good men out of employment, and those who are unsuccessful in procuring work we would like to call their attention to the foregoing.

COIN is being counted at the Sub-Treasury at the rate of \$1,126,000 per day, and all in the vaults will be counted in a month. The disagreement about the method of counting has all been settled.

MECHANICAL PROGRESS.

The Work of Lubricants.

Very little of the amount of power that is required in textile manufactures ever reaches the working parts of the machinery. In spinning all the power that is needed at the spindles is the force that is sufficient to twist the slender film into thread at the speed of the spindle as fast as it is delivered by the front rollers. This force is barely perceptible and has lessened very much from the moving energy that appeared in the wheel-pit or engine room. It has paid tribute to every journal and lubricated surface, to every wearing part and moving piece of machinery, beside being fortified by the best of lubrication wherever a frictional resistance is found, making the cost of spinning energy very great. The power in its transmission must be divided equally among every spindle which occupies any portion of the spinning room; and as long as the supply of power can be measured in foot pounds, the cost of every pound in dollars and cents, and a fair estimate in the life of every journal, and the friction-reducing quality for every class of oil is known, it will be easy to determine the most economical basis to operate the machinery.

A lubricant that relieves the friction of a journal lessens the driving power, and if this can be done within the limits of its own cost, and this amount required, is all that is to be guarded against. An oil that the impurities will not work as much mischief in the destruction of the machinery, as all the power will bring in the coal pit, adds nothing to the running expense on the economical side of the account. There are mineral oils which have just got the grit-cutting qualities for bringing up the mill working machinery to a breakdown, that are noted for their lubricating properties. The lubricant that has respect for the life of the machine, and can lessen the wear as well as the power that is lost in the friction of the sliding parts, without adding resistance to the surface or a demand for a copious supply of the lubricant, is all that can be expected of any oil when its cost is considered, unless it has been in the care of an oiler who has little respect for quantity so long as the source of supply holds out. As it is, the different grades and their market value differ greatly in their lubricative worth in the cost of working energy, and must be selected with a view to its use a copious supply of the lightest oil for the high speeds and delicate bearings, and heavy lubricants for heavy bearings and where the pressures are great.

LOCATING LINE SHAFTING AND PULLEYS.—When a line of shafting is to be driven from another line in a room above or below, the placing of the shafts and pulleys is a matter of no small annoyance to some, and a few words to the point may be acceptable. One of the most important factors to be looked to in locating a pulley is the direction in which the pulley will deliver the belt. When a pulley once gets a fair hold it will "pull" for all it is worth, but in order to get a fair hold, the belt must be delivered in a proper manner from the other pulley. Bearing this in mind then, the main thing to look to in placing shafting for a "quarter turn" belt is the manner in which each pulley delivers the belt to its mate. The shafting must be perfectly level, and the pulleys, as near as can be, of the same size. Then if the center of the delivering faces of each of the two pulleys is brought to touch the same plumb line, the belt will "track" in good shape. The position of the pulleys may be slightly changed from the above to suit certain conditions, such as a short distance between centers of the two lines, or a great difference in diameter of pulleys; but if the shafting is placed with reference to the plumb-line, a very little adjustment will suit most any case. The best results, however, will be obtained when the pulleys are of the same size, and not greater in diameter than twice the width of belt, the distances (vertical) between centers of shafts being not less than three feet for every inch in width of belt. When the distance between centers comes within 18 inches for each inch of belt width it don't pay to use such a belt. It will not be out of place to remark that the two lines of shafting may be at any angle (horizontal) when the plumb-line principle is made use of, though with an acute angle the direction of revolution may be reversed.

MECHANICAL INDUSTRY, says a contemporary, is a characteristic feature of the present time, and its development has been so rapid that, by and with the instruments furnished, the laborers of to-day can accomplish four times as much work as did those who preceded us, 50 years ago. Mr. Gladstone once remarked that Great Britain was enabled, by her labor-saving machinery, to perform the work of 600,000,000 hand laborers, or as much as twice the hand labor of all the adult laboring population of the globe, unaided by machinery. With the rapid strides still making in improved mechanical appliances, we may look forward to the not very remote future when hand toil alone, so crushing and so wasteful, will be among the things of the past, and to the time when, by devoting only a portion of the day to manual labor we shall live in more comfort than now, and secure the leisure so necessary for study, culture and recreation. But as nothing can be accomplished without work, the inventors and manufactur-

ers who lighten its duties and shorten its hours are true benefactors, for they are always contributing something for the common benefit. The modern appliances which are continually being brought forward in this country, as labor-saving machines perform their work well. If they did not do this the manufacturers would soon find out that second and third rate work would amount to nothing more nor less than neglect of duty and waste of opportunity.

DRAWING WIRE FROM FLUID STEEL.—We have already made brief reference to the fact that wire is now drawn from fluid steel, instead of being produced in the ordinary way of wire drawing. The *Western Manufacturer* gives the following description of the way in which it is done. The process consists of an iron vessel, lined with refractory material, and provided with a manhole and a cover at the top, and securely closed. At the bottom, opposite the manhole, there is a cast-iron outlet pipe, through which passes a steel tube with water circulating around it exactly like a "tuyere," by which the steel pipe or die can be cooled. The inner end of the steel tube is lined with fine clay, where the very hot fluid steel mests it. The tube is plugged up by a steel stopper, and the liquid steel is filled into the vessel with liquid carbon oxide above it. The stopper being withdrawn the liquid steel is forced out by pressure of the carbon dioxide in a red hot rod or wire, which goes from the vessel into the rolling mill while still hot, and is there finished off. In connection with the above the *Manufacturer* says that a French engineer has recently made known a new process by which steel is produced direct from the ore. As briefly described, the ore, in a powdered condition, is submitted to the action of carbonic oxide gas at a high temperature in a cupola or blast furnace where it is reduced by the incandescent gas to pure iron or steel. This is all the information in regard to this process that has come under our notice.

THE "AGE OF STEEL," says the Cincinnati *Artisan*, is virtually "on," but is yet in its infancy. Even the most "scientific experts" do not know, absolutely, which is the better for many purposes, and until further and decisive tests and experiments are made, it is not best to assume that "steel" is preferable to "iron" for all articles heretofore made of the latter. The question has been raised, and is being considerably discussed, as to whether or not the loss of certain ocean vessels was due to explosions of their steel boilers. As the lost vessels have totally disappeared, leaving nothing to tell the story of their misfortunes, the cause of their destruction cannot be certainly known, but the matter alluded to has been brought forward in connection with the missing vessels. Bessemer steel is now used for a great many purposes for which crucible steel was heretofore considered necessary.

INDIA RUBBER OIL AS A RUST PROTECTOR.—An India rubber oil has been invented in Germany for protecting the surface of iron from rust. The rough oils, resulting from the distillation of brown coal, peat, or other bituminous substances, are subjected to further distillation, thinly-rolled India rubber, cut into small strips, is saturated with a four-fold quantity of this oil, and is allowed to stand for eight days; and the mass, thus composed, is subject to the action of vulcan oil, or a similar liquid, until a homogeneous, clear substance is formed. On the application of this substance—in as thin a form as possible—to a metal surface, it forms, after slow drying, a skin, which, as is alleged, insures absolute protection against atmospheric influences, the durability of the covering being another advantage in its favor.

WATER CIRCULATION IN A STEAM BOILER.—It is well known, says the *Mechanical Engineer*, that the modern marine boiler in general use has a sluggish circulation, owing to the large body of water underneath the furnaces removed from the direct influence of heat. To move this body of water, or to put it into circulation, an instrument called a hydrometer is used in many English steamers. This instrument is very similar in principle to the injector, being merely three nozzles, one inside the other, but all open at their bases. This is attached to the under part of the shell, near the bottom, with the nozzles directed downward, and around this shell, circumferentially. The result, when steam is admitted from an independent boiler, is to drive the water into rapid circulation.

SMALL STORAGE BATTERIES.—A New York company is now manufacturing practical electrical storage batteries of various sizes and prices. One of the smaller sizes, and which costs five dollars, is about as large as a powder flask, and weighs half a pound. Its power, when charged, is sufficient to run a four-candle lamp for four hours. To recharge costs 12 cents. Its chief use is for lighting very small lamps. The smallest made is about the size of a bean or the head of a shawl pin; such lamps are used by surgeons for examinations.

A COMBINED NAIL AND SCREW for attaching strips of wood to a backing has been patented by H. A. Schirmer, of Milwaukee, Wis. The device consists of a central hearing or nut from one face of which projects a nail, while from the other face projects a screw. The nail may be barbed or serrated if desired. The screw is forced into the backing, and then the strip or molding is forced over the nail. The entire device is made from one piece of metal.

SCIENTIFIC PROGRESS.

Color as an Aqueous Quality.

Has water a color? is a question, says the *Ice Trade Journal*, often asked, but not so easily answered. Perfectly pure water, when examined in small bulk, is colorless or so nearly so that its tint cannot be appreciated or designated. In large quantities it has color in the same sense, but not in the same degree, as wine or any other liquid has, and it varies greatly in different places. The ocean is blue where the water is deep, but in shoal water it is green. Lakes and rivers differ greatly in the color of their waters. Some lakes are blue like the ocean, others green, and some almost black. Lake Geneva, in Switzerland, is blue, whilst Constance and Lucerne are green. Brienze is a sort of yellow, whilst Thum, which is near by, is blue. In the State of New York there are lakes which appear blue, green, yellow and black. The Mediterranean, which is a salt water lake, is indigo.

Rivers differ still more widely in the tint of their waters. The Rhine, in France, for instance, is green, while the Danube and Rhone are a deep blue. In the famous Adirondack region of New York the streams present all the colors of the rainbow. Sacondago is yellowish. Fish creek is black or deep brown, while the Salmon and Mohawk rivers and Canada creek are without color. Black river is true to its name, while the Oswegatchie is white. The St. Regis is also black, while the famous Raquette is white. The St. Lawrence is blue. These tints and hues are not caused by mud or sediment, such as make the Mississippi coffee-colored, but belong to the waters and do not impair their transparency.

Now what is the cause of the difference in the color of the waters of these lakes and rivers? Are they real tints or optical illusions only? The subject has engaged the attention of the brightest minds of the day, including such students as Tyndall and Arago; but their theories are as different as the colors they explore, and fail to satisfy the intelligent student. The most plausible theory, we think, is that of Professor Spring, of the University of Liege, Belgium. According to him, pure water when seen in a deep mass, is blue, and that all the tints arise from the presence in the water of mineral salts in varying quantities, and of different degrees of solubility. Water which contains carbonate of lime in complete solution is blue, but if the solution is imperfect it will have a tinge of green, which will grow stronger as this point of precipitation is approached. This authority concludes that if lime is added to blue water, in which so much carbonate of lime is already dissolved, the water will become green. In proof of this he cites the fact that the water near the shores of lakes and seas, where it comes in contact with limestone, is generally of a greener tint than elsewhere.

We take the ground that absolutely pure water is colorless. Color in fluids is simply the presence of chemical and organic solutions which give both distinctive color and character to the fluids. These solutions exist in one quantity and quality in wine and another in beer, ginger ale, sarsaparilla, coffee, etc., the absolute extraction of which will leave any one of the fluids colorless.

Different bodies of water present their own distinctive colors, because of foreign soluble elements contained in them, as well as from the reflections of the sky, earth, and vegetation in their vicinity; but an entire ocean of absolutely pure water, if it could be lifted up in a flint glass vessel of sufficiently enormous proportion to contain it, would appear positively colorless.

How Sap Moves.

All plants obtain their nourishment in a liquid or gaseous form by imbibition through the cells of the younger roots or fibrils. The fluids and gases thus absorbed, probably mingling with other previously assimilated matter, are carried upward from cell to cell, through the albumen or sap-wood until it reaches the buds, leaves and smaller twigs, where it is exposed to the air and light, and converted into organizable matter. In this condition a part goes to aid in the prolongation of the branches, enlargement of the leaves, and formation of buds, flowers and fruit, and other portions are gradually spread over the entire surface of the wood, extending downwards to the extremities of the roots. We often speak of the downward flow of sap, and even of its circulation, but its movement in trees in no way corresponds with the circulation of blood in animals; neither does it follow any well-defined channels, for it will, when obstructed, move laterally as well as lengthwise, or with the grain of the wood. The old idea that the sap of trees descends into the roots in the fall, remaining there through the winter, is an error with no foundation whatever. As the wood and leaves ripen in the autumn, the roots almost cease to imbibe sap, and for a while the entire structure seems to part with moisture, and doubtless does so through the exhalation from the ripening leaves, buds and smaller twigs; but as warm weather again approaches, the temperature of the soil increases, the roots again commence to absorb crude sap and force it upward where it meets soluble organized matter, changing its color, taste and chemical properties. If this is not the case, we could not account for

the saccharine properties of the sap of the maple, or for the presence of various mucilaginous or resinous constituents of the sap of trees in early spring, because we find no trace of such substance in the liquids or crude sap as absorbed by them from the soil. The life of the tree, Mr. Fuller teaches, is all in the bark and sap-wood, the heart being dead, and serving the tree only to strengthen it mechanically, as shown in the fact that it may be removed entirely by decay, and still the tree grows on vigorously for centuries.—*Fuller*.

GROWTH OF COAL.—There is in the town of Phenixville to day an exemplification of the operations of nature as displayed in the formation of coal, where it can be found in actual process of transformation from vegetable matter to a soft soapy carbonic substance, and the latter gradually changing to lignite and then again into soft coal of the bituminous form. Go along the Pennsylvania Schuylkill Valley railroad, between the first passenger station of that system and the next one, and you will find a force of men cutting down the bank there, 18 or 20 feet high, and amid those rocks, perhaps 3 feet above the railroad track, you will observe a black seam. That black seam is a laboratory of nature. From above, before the Morgan house was removed and the surrounding bank, big trees sent their roots down through the soil and then through the crevices of the rocks till they reached the seam in question, which in time they filled with roots and fibers. The trees above died and the roots and fibers confined in the seam began to work, chemical changes took place, carbon was evolved, and coal was the result. The laboratory was opened by the building of the railroad before this slow process was fully completed so that you can find there to day the vegetables and carbonized matter and lignite and coal together, proving, indeed, that the popular thought that coal grows is true.

THE GREAT GLACIER OF ALASKA is said to be moving at the rate of a quarter of a mile per annum. The front presents a wall of ice 500 feet in thickness; its breadth varies from three to ten miles, and its length is about 150 miles. Almost every quarter of an hour hundreds of tons of ice in large blocks fall into the sea, which they agitate in the most violent manner. The waves are said to be such that toss about the largest vessels which approach this glacier as if they were small boats. This ice is extremely pure and dazzling to the eye; it has tints of the lightest blue as well as of the deepest indigo. The top is very rough and broken, forming small hills, and even chains of mountains in miniature. This immense mass of ice is said to be more than an average of a thousand feet thick, advances daily toward the sea.

SHAPE OF THE EARTH'S ORBIT.—Proctor remarks that a common error is the supposition that the earth moves in an obviously elliptical path, whereas it really appears to travel in a circle. Taking the earth's orbit when its eccentricity was very nearly at its greatest—850,000 years ago—the numbers 325 and 324 represent the actual proportion between the greatest and shortest axes of the figure described by our planet's motion around the sun. So that if a circle is drawn with a radius of three and one-fourth inches it nowhere departs more than the hundredth part of an inch from the ellipse which would represent with perfect accuracy the orbit of the earth 850,000 years ago, when it was so much more divergent from an exactly circular form than now.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The thirty-fourth meeting of the American Association for the Advancement of Science will be held at Ann Arbor, Michigan, from August 26th to September 1st. Bar Harbor, Maine, was the locality originally chosen, but as suitable accommodations could not be secured, it was changed by invitation to the University of Michigan. The absence of the students during the summer leaves their quarters available, and no difficulty will be experienced in obtaining ample accommodation. Reduced fares have been obtained.

PROF. HUXLEY, who has been ill for several months past, is about to retire on a well-earned pension from his duties at the South Kensington Museum. Mr. Huxley has seriously overtaxed himself, and his malady is nervous prostration, from which it is hoped by his friends that he may be speedily relieved. If the complete rest which he now consents to take should fail to restore his impaired health, he will also retire from the presidency of the Royal Society next November.

OLEOZE.—The German preparation called oleoze, so great a favorite in disguising unpleasant remedies and making most compounds pleasant to smell and taste, has the following composition: One part each of the oil of lavender, cloves, cinnamon, thyme, citron, mace and orange flowers, three parts balsam of Peru, and 240 parts of spirits.—*Am. Druggist*.

THE YIELD OF THE MAPLE SUGAR TREE.—A maple tree at Preston, Pa., made its 95th annual flow this season. It is on record in the annals of the family owning it that in 1790 sugar was made from the first sap it yielded and sent to Gen. Washington, who acknowledged its receipt in an autograph letter.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS:—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES: 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... .2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 22, 1885.

TABLE OF CONTENTS.

EDITORIALS.—A Staunch Jigging Machine: Co-operation, 129. Passing Events; The Tribute System; American Shipbuilding; Platinum; Stamps and Rolls, 132. Mariposa Gold; Idle Claims; Beet Sugar in California; Mechanics' Fair, 133.

ILLUSTRATIONS.—Staunch Jigging Machine; Side View of Concentrating Machine, 129. Beet Sugar Factory at Alvarado, Alameda county, Cal.; Twenty Thousand Tons of Sugar Beets at the Factory in Alvarado, 133.

CORRESPONDENCE.—Gold Bluffs and the Golden Beach of Humboldt, 130.

MECHANICAL PROGRESS.—The Work of Lubricants; Locating Line Shafts and Pulleys; Mechanical Industry; Drawing Wire from Fluid Steel; The Age of Steel; India Rubber Oil as a Rust Protector; Water Circulation in a Steam Boiler; Small Storage Batteries, 131.

SCIENTIFIC PROGRESS.—Color as an Aqueous Quality; How Sap Moves; Growth of Coal; The Great Glacier of Alaska; Snap of the Earth's Orbit; The American Association for the Advancement of Science; Oleozoe; The Yield of the Maple Sugar Tree, 131.

ENGINEERING NOTES.—Decay of an Iron Bridge; Reservoirs on the Upper Mississippi; The Canadian Ship Railway; A New Sleeping Car, 135. USEFUL INFORMATION.—Toronto, a New Dye Stuff; Oil from Soapstuds; Paper Bedclothes; Weighing a Hair; The Little Black Spots on Bananas; Where Anchors are Made; Don't Lick Your Stumps; Hay for Fuel; Lampblack from Natural Gas; Grindstones; A Good Copying Ink, 135.

GOOD HEALTH.—Comfort and Longevity; How to Cool a Room in Summer; Surgery of Dynamite; Soup; Hot Water for Sprains; Undine Perspiration of the Hands; The Blood, 135.

MISCELLANEOUS.—Gold Mining Reports; Determining the Strength of Explosives, 130. The Beet Sugar Industry, 134.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 136-37.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 140.

Passing Events.

They are having quite an ore boom in Salt Lake City, Utah, where the ore market is now very active indeed. Ore is coming in from all directions. It is all owing to the sharp competition between buyers and the rise in lead. The rise in lead has given a tremendous impetus to the mining industry in Utah. Mines in Ophir, Stockton and Dry Canyon that have been idle, and that have not been heard of for years, are shipping ore now. The samplers receive ten tons now where they received one before the rise in lead.

The closing down of the Bodie tunnel at Bodie, is another set-back for that camp, which is none too prosperous just now. The stoppage of work at the tunnel does not, however, affect the other mines.

The Mechanics' Institute Fair opens in this city next week. It promises to be the most successful of any ever held, many new features having been arranged.

A MINING DECISION.—In the case of Clary vs. Haslett et al., the Supreme Court has affirmed the judgment of the lower court in favor of defendants. The plaintiff had obtained a patent covering for a placer mining claim, on which the defendants afterward located a quartz lode. The court held that the provisions of the patent related only to the placer claim and excluded plaintiff from any claim to ownership of the lode.

The Tribute System.

In the year 1878, in the older workings of the Eureka mine, there was a very considerable amount of ore which had not been extracted from the ore chambers, either through oversight or improper mining. Many small ore bodies had also been passed over as too poor or insignificant to be worth removing, and there was reason to believe that undiscovered ore bodies of small size existed, as proved to be the case. In the year mentioned Mr. T. J. Read, superintendent of the mine, introduced the method of taking out ore on tribute, in order to utilize the large quantities of it known to exist in the earlier workings. The ground which was to be worked in this manner was divided up into blocks or "pitches," as they are called by the Cornish miner. These pitches were allotted to individuals or companies (which usually consisted of two men), and 10 per cent of the assay value in gold and silver of all ore above \$40 was paid to tributers. This rate was continued for about one year, when it was raised to 15 per cent. Then a new schedule of prices was arranged, based upon the assay value of the ore; \$6 per ton of 2,000 pounds was paid for \$40 ore and \$30 for \$100 ore, with proportional prices for intervening grades.

Finally, in 1881, still another schedule of prices was adopted: \$2.50 was paid for ore assaying \$30 per ton, and 50 per cent of all it assayed above \$30. Thus \$65 ore brought the tributer \$2.50 plus \$17.50, or \$20. These figures we take from Mr. Curtis's recently published monograph on Eureka district. The company furnishes tools, hoists the ore, and transports it to the smelting works. The tributer supplies his own candles, fuse, powder, etc., as well as timber, huying them from the company at or near cost, handles his own waste, and delivers his ore at the shaft.

When a tributer owns a prospecting drift and does not succeed in finding ore, it is not customary to charge him with powder, etc. In those cases where a tributer strikes a very large body of ore requiring timbering in large sets, the ground is taken away from him after he has been allowed to make remunerative wages. Such a fortunate strike, both for the tributer and the company has seldom occurred since the tribute system was introduced at Eureka. The system has been introduced at other mines in this district, and in other districts also.

In speaking of the advantages and disadvantages of the tribute system, Mr. Curtis states that the tributers sometimes fill up drifts and other workings that ought to be left open, and injure their mine generally, but this is the case only when they are not properly restricted and the foreman of the mine does not attend to his duty. Ground worked under the tribute system soon acquires an ill-kept, disorderly appearance, not calculated to impress visitors favorably. The approbation which orderly galleries excite in the mind of a mining man is not founded on love of neatness, however, but on the fact that it facilitates the operation of the mine. It must be remembered that the ground is not given over to tributers until it has been practically abandoned by the company, and that the ore which has been obtained in this manner is nearly clear gain; and since the ground left by the tributer is entirely valueless, there is no object in maintaining it in working order. In fact, extraction under the tribute system is analogous to cutting away the pillars of a coal seam rather than to move regular mining operations.

Although some tributers are fortunate and discover valuable deposits of ore, by far the greater number do not make miners' wages, but men generally, good miners in particular, prefer to run the risk of making nothing, if at the same time they have the chance of getting extraordinary remuneration for their labor. The difficulty of obtaining continuous employment at day's pay, also acts as an inducement to tributers. As the large ore bodies are worked out the demand for such labor decreases, and many miners are thrown out of employment who prefer to work on tribute to seeking their fortunes in new camps. As adopted in Eureka district, the tribute system has been very successful.

THE PRESS OF JANUARY 30.—We shall be glad to receive a number of copies of the MINING AND SCIENTIFIC PRESS of January 30, 1885, our supply of that issue being short. We will pay ten cents a copy for them.

American Shipbuilding.

It is pretty generally understood that there has been a very great decline in American shipping interests since the war. There is not now one ship carrying the American flag where there were ten, some 20 years ago. This fact has been greatly deplored by the people of this country, and many plans, more or less impracticable, have been suggested to remedy the matter. It has been considered in some measure a national disgrace that our foreign trade should be mainly carried on in foreign bottoms; and that with all the great steamship lines crossing the Atlantic not one should carry our flag. In fact, had it not been for the law which prevents foreign vessels engaging in coastwise trade in the United States, what few American ships there are would have little to do.

In discussing this subject, however, it is often forgotten that people do not go into business for patriotic reasons, and while it is all very nice to see our glorious old flag in every part of the world, the main question is, "will it pay?" As long as there was much money in the shipping business Americans went into it heartily, but when competition became great, and prices low, they dropped it.

It is conceded that ships can be built cheaper in England than here, interest is lower, wages are less, the captains will serve for half the salary Americans will, and the ship can be run for less money. Therefore, they can make money at freight rates which would entail loss on American ships. Gradually the old ship owners in this country sold out, seeing little future in the business. These men understood that business better than the general public, and it looks now as if they were wise, after all.

The shipping interests of the whole world are in a bad shape, and those of England, being the largest, are the worst. There are "miles of ships" laid up in English waters, with which their owners can do nothing. The largest steamship manager and owner in the north of England has announced to his co-owners that owing to the continued depression of the freight market he has determined to lay up the whole of the vessels of his fleet, as they arrive in England. In the American trade with England the competition has been so keen that money has simply been thrown into the sea by all the great lines, in the hope of cutting down their weaker rivals. The French and German subsidized shipping is a thorn in the side of even the English ship owners, who underbid ours, so there is no immediate prospect of improvement or increase in American bottoms.

Although, as stated, many people deplore the decline of American shipping interests, it is very probable that we are just now better off with few ships than we should be with many. An Englishman of prominence recently expatiated in glowing terms on the fact that the American flag had practically disappeared from the Atlantic trade; and no less an authority than the *British Trade Journal* rather compliments us by saying that "the circumstance is strong evidence of the innate sense of the Americans," as the business is hardly worth the doing. For several years past the grain trade between the port of San Francisco and Great Britain has been carried on at such rates that ships have made no money. There are some ships in this port now that have been here two and even three years waiting for a remunerative charter. The Americans have held on to the whaling business and are making money in it with their vessels, but outside of that they are just as well off, for the present at least, in having no ships.

The increase in freight rate on the railroad has temporarily driven the Colorado ore buyers from the Wood River market. The agent of the Pueblo Smelting Works says the rate to Omaha and Kansas City, he understood, remained at \$25, while the rate to Denver alone had increased from \$20 to \$25. This was, therefore, a discrimination against the Colorado smelters. It had come without notice, too, so that it caused some loss to both smelters and miners.

ATTENTION has been drawn to the new machinery for extracting the salt from the waters of Owens lake. A large number of vats have been prepared for evaporating the water, and will have the water turned into them as soon as the bottom of each has become sufficiently hard to prevent evaporation.

The condition of the Salt Lake ore market is just now very encouraging to mine owners and business men. It has not been so active for years.

Platinum.

Platinum occurs much more frequently and in larger quantities than is commonly supposed, as is also possibly the case with other metals of the same group, such as iridosmine, etc. Search is very seldom made for it, and it would be apt to escape the gold-saving appliances, most of which depend on amalgamation. It is found generally in small grains, associated with the black sand in the sluices.

Among the localities in California reported as showing the presence of platinum are the Spring Valley, Magalia and Morris Ravine mines, in Butte county; the Bunker Hill, Del Norte and Happy Camp mines, in Del Norte county; Weed's Point mine, Yuba county; Lincoln, Hart & Henry, Oak Grove, Fort Goff creek and Thompson creek mines, and in the placers of the south fork of the Salmon in Siskiyou county; the La Grange, in Stanislaus county; the Chapman & Fisher, the Gribble, Slatterly and Wiltshire mines, in Trinity county. In Colorado traces are found in the Cash creek placer, Chaffee county, and in the L. H. Arthur and Edward mines, Clear Creek county. In Oregon small quantities have been found in Grass creek and Evans creek, in Jackson county, and at Sunken creek, Josephine creek, Silver creek, Galice creek, Des-selles & Co.'s, and Blue Gravel mines, in Josephine county.

The quantities reported found are very small, being from a fraction of an ounce to a few ounces per clean-up, and in most cases are saved merely as a curiosity. In the absence of systematic tests, it would be premature to predict positively that the saving of platinum is likely to become an important adjunct to the gold placer-mining industry; but it seems reasonable to suppose that such a possibility exists, and that in some of the many localities where platinum is likely to occur future experiments may lead to economic results. With the improvement of appliances designed to save "rusty" gold by specific gravity alone—such, for instance, as a system based on retaining a large bulk of black sand and other heavy material in the sluices and undercurrents, and subjecting it to a second treatment by mechanical concentrators, probably larger quantities of platinum will be found.

Stamps and Rolls.

It is worthy of note, that in the great International Exhibition of Inventions, now open in South Kensington, where there is considerable mining machinery, the exhibits show that the practice of engineers leads to the substitution of rolls for stamps even in the reduction of gold and silver ores, for which the stamps have long been considered essential. It is said that this change of practice is in accordance with the experience gained in the case of flour milling.

The plan of using rolls for crushing ore is as "old as the hills," and there are many forms of them in use. The commonest one being known as the "Cornish roll." When they began to crush ore in this State these rolls were tried in many places, and even of late years they have occasionally been put in use. But when they came in competition with the California stamp mill they were never so economical or as rapid in work. In places where dry crushing was carried on they have done well, but most of our crushing in this country is done wet, so that the stamp has held its own.

There is one thing, however: there is not much room for improvement in stamps, so if any one wants to invent crushing appliances he goes to rolls, rollers, grinders, rockers, wheels, etc. And as this exhibition is one of inventions, perhaps it accounts for the preponderance of roll devices over stamps. In this country the stamp mill has been carried to perfection mechanically, and there are no patents on the general plans. Most of the quartz-crushing appliances invented even on this coast of late years have not been in the direction of stamps, but of revolving devices, and some of them have been doing very good work, but the stamp shows no signs of being generally displaced. It may be that the same thing has occurred abroad, and that inventors of quartz-crushing machinery have been compelled to get up various rotating devices in order to show anything new.

LEADVILLE smelters are still running less than half the capacity of the works.

Mariposa Gold.

We had a conversation this week with Capt. Diltz, of the Diltz mine, Mariposa county, who is visiting San Francisco. We were shown some very handsome quartz gold, washed from the decomposed strata which occur to the west of the main vein of the mine. Capt. Diltz has been working this mine alone for some 14 or 15 years, and has got it well developed. He has sunk small shafts, run drifts, stoped and washed

that this hill was the main source of the gold found in the rich gulches near by, which were washed in early days by placer miners. There is water power for a mill three and a half miles away, but there are no mills working near by. The old mills of the Fremont grant are about six miles distant. Capt. Diltz is getting along in years and is desirous of quitting active work, but having been so long developing his claim he wants to see a 100-stamp mill at work on the quartz from it before he retires. Some

Idle Claims.

It is a common habit among a certain class of prospectors to rush to a district and make locations as near the first bonanza as possible, then they scratch up the ground vigorously for a short time, but if they find nothing they are soon disheartened or unable, through poverty, to hold their claims without working, and under this stress sell out for a song, or hold on to their claims as long as the laws allow,

Beet Sugar in California.

California has now the only beet sugar factory in operation in the United States. This creditable fact is given due prominence in a very interesting special report by Prof. H. W. Wiley on "The Sugar Industry of the United States," which has just been issued by the Department of Agriculture at Washington. The engravings on this page are reproduced from Prof. Wiley's report, and will be viewed with much interest by our readers, for comparatively few of them have visited the establishment, which has been unobtrusively progressing for the last few years, demonstrating the fact that sweetness can be profitably drawn from California soil.

We present the engraving at this time to accompany a very interesting essay by John L. Beard on beet sugar on the Pacific Coast, which may be found on next page of this issue. Mr. Beard lives near the factory and has grown beets for its use, and may therefore claim to be personally familiar with the enterprise which he advocates. Certainly the subject is worthy of careful consideration. The Alvarado factory is owned by the Standard Sugar Company, which was incorporated in 1879. The Company consisted of A. E. Davis, O. F. Giffin, E. H. Dyer, Prescott, Scott & Co., J. P. Dyer and Robert N. Graves, with a capital of \$100,000. It was soon ascertained that more capital was needed and the company re-incorporated under the name of the Standard Sugar Refinery, with a capital stock of \$200,000. The officers are: O. F. Giffin, president; J. P. Dyer, vice-president; E. H. Dyer, gen. sup't; W. F. Ingalls, sec'y; trustee, O. F. Giffin, R. N. Graves, J. P. Dyer, G. H. Waggouer, and E. H. Dyer. This company has made a success of the business from the start. Mr. Beard's essay gives a sketch of some of the important features of the company's work. The factory itself is shown in the upper engraving, and the lower one will give some idea of the mass of material which passes through its processes. Unfortunately, so large a pile of beets is not a safe arrangement, for California seasons are peculiar. The unusual mildness of the last winter caused the beets in parts of the pile to heat and their sugar contents were interfered with. In ordinary winters no evil would have resulted. At the Eastern factories, which have had experimental existences, there have been losses from frozen beets; in California the beets may become too hot. California is famous for unusual things. Fortunately, it is very easy to put the beets in smaller piles and thus prevent their heating. Jack Frost is not so easily cheated of his victims. Prof. Wiley's report treats also of sorghum, cane and maple sugars. It is one of the most interesting which has been issued by the Department of Agriculture.

The Mechanics' Fair.

The Mechanics' Institute Fair will open in the Pavilion in this city on Tuesday, Aug. 25th. We stated last week that Mr. Bassett, one of the directors, who had taken a trip through the southern counties, found much interest in the display of country products and resources at the fair. More in detail, Mr. Bassett's report embraces the following items:

The people of San Luis Obispo county are manifesting considerable interest in the fair, and have appointed a committee to prepare an exhibit of fruit and wheat.

At Lompoc, Santa Barbara county, the committee, which made such a fine display of fruits and vegetables at the New Orleans Exposition, will endeavor to send an equally fine exhibit to San Francisco.

Ventura will make a complete display of all the products of the county excepting live stock. The exhibit will include in its variety everything produced in the county from coal oil to honey, and cereals will form no mean part of the display. Headquarters have been opened and are in charge of the ladies, who will receive and arrange the exhibits. Mr. Thorp, their agent, has secured a space 30 feet square in the Pavilion, and Mr. Blackstock, another agent, will arrive here on the 21st. The citizens of the county have published a large pamphlet showing the resources of the county, and will distribute 15,000 of them at the fair. A special display of dried and preserved fruits will be made.

Fresno county has also appointed a committee, which is zealously at work preparing an exhibit of fruits from the different colonies settled in the county.

What is being done by these counties should stimulate others to exhibit. There is time enough remaining, if the effort be made at once, as the fair holds for five weeks.

There will be many features of the fair which will interest visitors, and of them we shall give an account at another time.



BEET SUGAR FACTORY AT ALVARADO, ALAMEDA COUNTY, CAL.

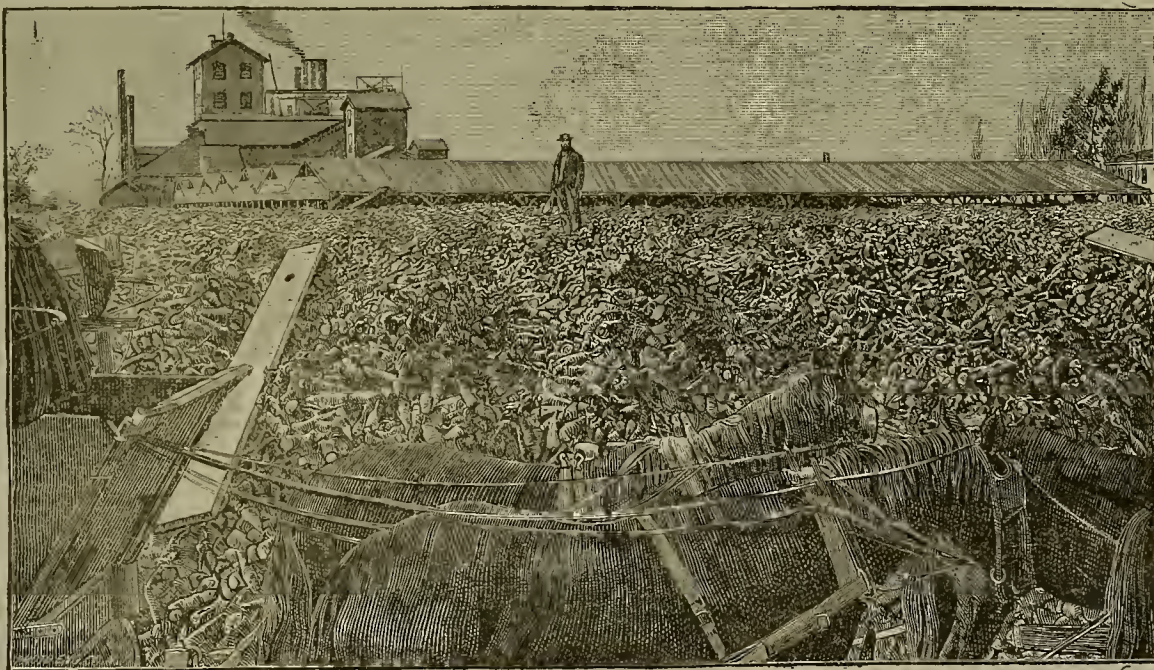
away decomposed material, working by himself, and now has the mine in such a shape that he can tell pretty well what there is in it.

At the south end of the ledge is an open cut 110 feet wide, exposing a large mass of decomposed material. The quartz is broken down, and broken up on the floor with a sledge, and water allowed to run over it and through a flume. All the small nuggets are collected and

very large nuggets have been found in this mine, one of them weighing 106 ounces. The gold now sluiced out is very coarse, indeed, showing no signs of "wash" as it comes directly from the quartz. The mine is a very peculiar one, indeed.

The Granite Mountain mine, at Philipsburg, Montana, shows the following good record for

hoping for a change for the better, for they are as hopeful as Micawber. They may be skilled miners, but as a general thing this class of prospectors are not industrious. They demand quick returns, and have no capital to expend in deep mining. One may induce some capitalist to furnish the funds required for a share in the claim; but this is oftener done in surface work; as for mining on a large



TWENTY THOUSAND TONS OF SUGAR BEETS AT THE FACTORY IN ALVARADO.

the quartz laid aside for stamping. The fine quartz is also kept, and some of this is very rich indeed. Capt. Diltz has some 1000 tons of rock now ready for milling, but he has no mill.

The main vein or fissure stands at an angle of some 60 degrees, and a large number of small veins lie flat against the foot wall of the main one. The fissure is from a few inches to 14 feet in width. Capt. Diltz purposes to run a tunnel for 1700 feet from the north to the south end of the mine, giving a raise or lift at the highest point of about 500 feet. The mine shows not only on the surface a large amount of auriferous quartz and vein matter, but also indications

the past six months: Bullion shipped during June, 1885, amounted to \$111,499.53, and for the six months ended with June 30th, \$508,543.53. The net product of the 20-stamp mill since December 1, 1884, to July 22, \$718,927.63. Total dividends paid since April 8, 1885, \$260,006.

For the last quarter the Paradise Valley Mining Company paid out \$35,992.56, and its gross yield was \$48,306.78, leaving a net profit subject to taxation of \$12,314.22, the tax on which amounts to \$320.17. As under the Act of the late Legislature only the net profits of mines are taxed, several companies escape taxation altogether.

scale, more perfect organization and more hands are required. The capitalist will not make advances unless he controls their expenditure, and the prospector dislikes to let the control of his claim pass out of his hands, fearing that he may be cheated out of what he has left. Hence claims in many camps have laid unproductive from year to year, because their owners were too poor to work, unwilling to sell, and unable to organize a company on a satisfactory basis. The risks and expenses of silver mining are so great that only men of large wealth can afford to incur them, and it is natural that the control of such mines should pass into their hands. No laws can be devised to prevent this condition of things, even if such laws were desirable.

The Beet Sugar Industry.

Special Adaptions of the Pacific Coast.

The following extracts are from a paper recently read before the Chit-Chat Club by John L. Beard, of Centerville, Alameda county, and furnished for publication in the PRESS.

The manufacture of sugar from the sugar beet root was unknown at the commencement of this century. It was the outgrowth of necessity. The continued wars of France with England made the importation of sugar into France very hazardous and some means had to be devised to make France independent in that respect of the rest of the world. Under the patronage of the great Napoleon Bonaparte the beet sugar manufacture first came into importance, and like all enterprises to which he turned his attention it immediately came forth as from the touch of magic. The premiums he offered for the best methods for its manipulation brought into service the best chemical talent as well as the best mechanical genius of France. Under the empire, France manufactured all her sugar, but with the downfall of Napoleon and restoration of peace, the free re-admission of West India sugar nearly destroyed the production of beet sugar, and it became necessary to protect it by high duties. From that time it rapidly increased in importance, amounting in 1838 to 42,000 tons, in 1858 to 150,000 tons and in 1884 to 507,509 tons. From France the manufacture of beet sugar was introduced into Belgium, Holland, Germany, Austria and Russia and other countries, till now, so rapid has been its growth it nearly equals the production of cane sugar. The sugar production of the world is about 7,000,000 tons; of that 3,000,000 tons is beet sugar. The German Empire at present takes the lead in the working of sugar beets, and what they have succeeded in should be an example and incentive for our imitation on the Pacific Coast.

In this country sugar is our greatest import. Its annual consumption in the United States is now about 3,000,000,000 pounds, and if the beet sugar industries were established this demand could be met by California, Oregon and Washington Territory. All business would be stimulated, and a most important problem solved. The German Empire contains 133,000,000 acres of land. California, Oregon and Washington Territory have 226,000,000 acres or 93,000,000 acres more than the whole Prussian Empire. In the Prussian Empire there are \$250,000,000 invested in beet sugar factories. To produce beets for these factories requires the cultivation of 700,000 acres of land. To work this land and convert the sugar requires the labor of over 300,000 hands, besides millions of dollars invested in horses, mules, implements, etc.

There was over 1,200,000 tons of beet sugar produced in the German Empire in 1884, or equal to the entire amount of sugar consumed in the United States. If Germany, with 93,000,000 acres less of land than is contained in California, Oregon and Washington Territory, can produce that amount of sugar, why cannot the Pacific Coast, with better soil and climate, produce the 1,200,000 tons of sugar consumed in the United States? All that is required to do this is the necessary amount of capital and skill.

We can produce sugar as cheaply here as it can be done in Europe. Immediately upon the ratification of the reciprocity treaty with Hawaii, capital rushed there and invested in every acre of land fit for the production of cane, while here at our very doors lie millions of acres that will produce more sugar to the acre, and at less cost per pound, than the average lands of those islands—the production of Hawaii being about 60,000 tons. New York imported more beet sugar last year from Europe than all the cane sugar raised in Hawaiian Islands. The raw sugar consumed in the United States amounts to \$120,000,000 annually. There is no reason, except lack of enterprise, capital and technical skill, why we on the Pacific Coast should not produce it all, and \$120,000,000 distributed among us would make very lively times.

Beet Sugar in California.

It may be urged against the industry that it has been tried and failed on several occasions, but each failure, first in the old factory at Alvarado, second the one in Soquel, and the third at Isleton on the Sacramento, can be explained in such a way as to more clearly demonstrate the sure success of factories suitably located and properly managed. The success of the industry in California has been demonstrated beyond all question by the Standard Sugar Company at Alvarado. That factory has made this year 1,250 tons of refined sugar, about four times the production of all the sorghum mills in the country, and that, too, without the aid of the \$100,000 Government bonus.

The Yield in This State.

The sugar beet in California yields over 10 per cent sugar, and produces more sugar per acre than the average cane lands, being from 3,000 to 6,000 pounds per acre according to the yield of beets, which in the last season has run from 15 to 30 tons per acre. We see by this showing that the ordinary yield of sugar in California exceeds that of Louisiana's best yield by one-third; and our best yield is more than three times as great, and equal to the best cane lands of Cuba. In the cultivation of wheat one-

ton per acre is considered a splendid crop, and two tons is most extraordinary; yet in the past season one ton and a half of sugar per acre was the lowest average; and one ton of sugar, even at the present low prices, is worth four or five tons of wheat.

Beet Growing and Fertility.

It is sometimes urged that beets may do well for two or three years and after that the land will be exhausted, but actual experience at Alvarado has demonstrated that beet cultivation is not near so exhausting to the soil as that of sorghum, or as the cane in Louisiana and in Hawaii has been. In fact, I doubt whether there is any crop annually produced and gathered from the same land that is less exhausting than beets or that can be more successfully followed one crop after the other. Potatoes, we know, exhaust the land after three crops. Wheat lands require a rest or change after the fourth crop; but the yield of beets seems to increase with succeeding years and the finer cultivation that is required. One tract of land, by way of illustration, the first year, being on barley stubble, yielded 14 tons to the acre; the second year 19 tons; third year 23 tons, and fourth year 39 tons. Of course this does not apply to all lands, as it is an extra fertility that will make a return of 39 tons, but the same rule is observable in other lands. The yield so far has invariably increased where beet crops have followed each other, showing conclusively that the crop is not so exhausting as many others. One reason of the improvement in the productiveness of succeeding crops is on account of the deep and thorough cultivation.

Methods of Beet Growing.

In the raising of beets the land should be plowed the first time from 12 to 14 inches deep and barrowed fine; then later in the season, about two weeks before planting, it must be plowed again, not over five or six inches deep, and thoroughly pulverized, harrowed and rolled. The seed is planted about 15 pounds per acre, drilled in rows about 15 inches apart; as soon as possible after the plant appears, the rows must be thinned out, leaving the beets about four inches apart. The work of thinning out, hoeing, as well as digging up the beets, cutting off the tops and sacking the beets in open sack, and loading them on wagons to be delivered to the mill, is done generally by contract with Chinamen, who do the work for \$1.30 to \$1.50 per ton.

The seed is sown from March to the middle of May dry grounds, of course, sown earlier than damp bottom lands. The harvest time often commences by the middle of August and continues through November and must depend on the maturity of the crop, which can be determined by analysis of the beet.

Testing Beets.

The saccharometer cannot be depended upon, as it indicates the amount of solid matter in the juice. The percentage of sugar is determined by the polariscope, but as the salts held in the juice enter into the manufacture of the sugar, the percentage of the saccharometer has to be taken in account with the percentage indicated by the polariscope. Thus, if the saccharometer shows 15 per cent and the polariscope 12 per cent, then 12 divided by 15, carried out will show what is known as the "purity co-efficient," eighty per cent. Beets with a quotient less than 75 per cent and eight per cent of sugar will not pay to work. It is on this account that I consider the working of sorghum unprofitable, because its purity co-efficient is often at 70, and never up to 80. Some beets may contain a high percentage of sugar and also show high percentage on the saccharometer, and still cannot be worked profitably. Suppose a case where beets contain 20 per cent of sugar by the polariscope and 30 per cent by the saccharometer: the sugar quotient would show but 66 per cent, which would be too low for working; while, on the other hand, beets that would only show eight per cent of sugar and 10 per cent on the saccharometer would work more profitably. The alkali and salts neutralize the crystallization of the sugar. We have a somewhat analogous example in the working of gold mines: some quartz assays hundreds of dollars per ton, but cannot be milled profitably, owing to sulphurets and rebellious metals which prevent the collecting of the gold.

Profits of Beet Growing.

A farmer, in raising beets at \$4.50 per ton for a factory, where he raises twenty tons per acre can easily clear \$2.50 per ton, or \$50 per acre. If the yield is under twenty tons, his profits will be proportionately a little less; and above twenty tons his profits will be more in proportion. On a thirty-ton yield his profits would be \$78 per acre, which is about as profitable a crop as can be raised, taking one year with another and the chances of an uncertain market. Besides the beet crop comes on when other work is disposed of. The planting of the beets comes when the grain sowing is over and before the haying season; then the beet harvest comes just after the grain harvest and just before the plowing season. It makes a fine change for the land, and the rotation from beets to grain or onions and potatoes is better than a year's rest to the soil. No summer fallow is necessary where beets have been raised.

Sketch of the Manufacture.

I will speak briefly of the manufacture of the sugar. As the sugar is contained in little sacks like cells, it is generally conceded that the beet, after passing through the washer, should be sliced into V-shaped strips about one-quarter of an inch wide; this cuts the cells in

two and leaves them open; whereas, a grater would lacerate the fiber and close some of the cells. It is next passed through a series of diffusion batteries, where it is subjected to the action of hot water, which takes up the sugar in solution. Lime (two or three per cent), is then added, and carbonic acid is admitted and the temperature raised. The lime enters into combination with any free acids in the juice, combines with gum and forms the fatty substances into insoluble lime soap. The salts, soda, potash and magnesia, which were combined with acids, are liberated, while the excess of lime combines with sugar, forming sucrate of lime, which is decomposed by carbonic acid, liberating the sugar and forming the lime into carbonate of lime. This last process is carried on in the defecation pans from which the juice passes through the carbonization pans and then passes through the filter press of clothes which separates the scum from the clear juice. Then the juice is passed through long filters filled with animal charcoal which purifies it, as far as practical, of remaining impurities. It is then boiled in the vacuum boiler to the proper consistency, when it is drawn off and cooled. It is then ground up to a soft, pulpy consistency, when it is placed in centrifugals, which are cylinders lined with fine brass gauze. They revolve from 1,000 to 1,200 times a minute, throwing off all the syrup and water, leaving nothing but the white crystallized sugar in the pan.

The Alvarado Enterprise.

What facts I have gathered on this subject have come from the Standard Sugar Factory, of Alvarado, and I have not the least doubt of their accuracy, as the company has now been in active operation for more than six years and has successfully passed through six campaigns. In that time it has paid to the farmers in the neighborhood from \$60,000 to \$90,000 a year for beets. The farmers have never done so well, and blacksmiths, carpenters, teams and laborers are all kept busy and the factory has earned in profits in four campaigns \$104,000 on an invested capital of \$125,000. Since its commencement it has made altogether 9,500,000 pounds of refined sugar. The first year it did not declare any dividend and this last year, owing to the low price of sugar, the directors of the company have thought best to hold their stock in store and not sell till they can realize more, although they could sell what they have at the present price, and still realize a profit on the year's run; notwithstanding a loss, in addition to low prices, of over 2,000 tons of beets, for which they paid out \$10,000, and which, on account of the warm, dry winter, did not retain convertible sugar and had to be abandoned. The mill at Alvarado has a capacity of 80 tons of beets per day and sugar can be turned out for 5½ cents per pound; with a mill of 200 tons capacity it is thought that refined sugar can be made for four cents per pound.

The refuse pulp from the factory makes a fine feed for dairy cows, or, in addition with grain, is good for fattening beef cattle, and where the business is carried on extensively it will be no small factor in the question of beef supply.

Alameda county alone could supply all the sugar that at present is consumed in California, and it would so diversify her agriculture that there would be a local home market for all the rest of her products. What would apply to Alameda county applies to at least one-third of the other counties in the State. There is only a certain part of the United States suitable to the cultivation of the sugar beet, and that includes California, Oregon and Washington Territory, and a small strip of country along our northern boundary. The sugar beet thrives without irrigation, and in our dry years, as the present one, the beet crop turns out better than most any other. In fact, the crop this year, where wheat is almost a failure, beets promise fully as well, if not better, than they did last year, when the rainfall was a great deal more. Our dry, late summers are peculiarly favorable to the development of sugar. Many persons erroneously believe that beet sugar is less sweet than cane. The two sugars are, however, chemically identical, and in every respect the same. There is no doubt that with a wise policy of permanent national protection, a great industry can be built up on the Pacific Coast that will give employment, prosperity and wealth to thousands of our citizens. If capital can only be induced to take hold of this enterprise, and a wise protection thrown over it, it will not be long before we shall manufacture all the sugar we consume, then the home competition will cause a reduction in the price. In the meantime wages become high and employment continuous, and every working man becomes a larger purchaser. While this industry is being built up, there will be increasing demand for every possible article produced by this nation. The result will be that instead of benefiting one individual, or only a few, as some contend that protection does, a stimulus will be given to every branch of industry, and our surplus wealth will remain with our own people instead of going into the pockets of sugar producers of foreign countries.

It is said that more happiness is found in pursuit than in possession. This may in some degree account for the tenacity with which the aged prospector clings to his wandering life, instead of settling down, when once he has acquired a competence, as nearly all have done at some time of their life.

THE MESQUITE PLACERS.—Boh Leatherwood intends to return to the Mesquite placers, in Yuma county, as soon as the weather gets cooler. His partner has gone East to get some smaller dry washers made, the one they have being too heavy, requiring the constant services of four men, two at a time. The Mesquite placers, which have been worked on and off for many years, are situated about 50 miles north-east of Yuma. The country is very dry and covered on the surface to a depth of several inches with a deposit of burnt rock or lava, from which the heat steams up in the afternoon like a mist. The thermometer during the day, at this time of year, averages 116 in the shade. The nearest water is at Yuma—50 miles off—whence the party had it shipped by the railroad to Mesquite station, 10 miles from the placers. Water for camp purposes cost the party \$10 a day. The dirt averages \$2 a ton, although far richer dirt has been found here and there in pockets. With lighter machines, Mr. Leatherwood believes the dirt can be worked for \$1 a ton, leaving \$1 a ton profit. During the hot months men cannot work more than five hours a day. At a distance of 20 miles from the placers is the Cargo Muchacho, a very rich and large gold mine, which has recently been bonded by the bonanza firm for \$90,000. At a depth of 80 feet in this mine, an inexhaustible supply of water was struck.—*Tucson Tailings.*

A NEW KIND OF MINING.—Walter Hodgman and Jabez Chase have purchased a two-thirds interest in the Ceresus mine, situated in Croly gulch and are treating the ore as follows: They run their ore through their concentrator, saving the iron, which they sell to the Philadelphia smelter for flux. These concentrates contain eight ounces in silver and one and a half ounces gold per ton. This pays them \$30 and upwards per ton. Two tons of ore from the mine will make one of concentrates. They will mill the tailings, which is the quartz contained in the ore as it comes from the mills. These tailings will ten ounces silver, and one and a half ounces gold per ton. This makes the ore as it comes from the mine worth upwards of \$35 per ton, and as they have quite a large body of ore and can work it cheaply it bids fair to be a very remunerative business. The proprietors of the concentrator at the mouth of Indian creek have shut down the mill for a few days, but will start it up again on Scorpion ore. They have bonded the Scorpion, and will proceed to develop it.—*Idaho News-Miner.*

ALLEN H. CASWELL, who shot and killed himself in this city last week, was a blacksmith by occupation, and a prospector and miner by instinct and preference. He was well known in Virginia City, Bodie, and elsewhere. Some years since he went to Mexico in the employ of an Eastern mining company. The mine proving a failure, he was left stranded in Mazatlan, where he found employment at his trade at large wages, being an expert workman. While so occupied he formed a company of six men, who successfully prospected and opened a silver mine in Sinaloa. Caswell gave up his employment in Mazatlan and joined his partners at the mine, where he worked for a year or more. About three months ago he came to this city to purchase mining machinery for his company. He was well provided with funds on his arrival. His suicide is attributed to despondency, though no special reason is known. He was a remarkably genial and social man, and his suicide is a surprise to his many friends.

MINERS' WAGES.—A report says that last week about forty men went to work in the Holmes mine at Candelaria, at \$3 a day. The next day, however, a meeting was called and they were notified not to work for less than \$3.50. This resulted in closing the mine, which has not yet resumed operations. The men at last accounts were debating the question, but nothing definite is known except that the mine will not be re-opened until the wages are fixed at \$3 a day. If in a country where the ores are of high grade, and when a miner has to huy water by the gallon and live on scorching hot air and fly-blown grub at \$10 per week, they cannot afford to pay \$4 per day for miners, the works ought to be shut down, and stay shut down forever.—*Bodie Free Press.*

SHIPPING ORES TO SALT LAKE.—Gallatin & Folsom, forwarding merchants at Reno, give the *Gazette* the exact figures on a carload of ores which they have had worked at Salt Lake. The ore weighed 19,000 pounds, and assayed \$52.55 per ton. Freight charges amounted to \$138.10, sampling \$29.55, assaying \$6, working at Salt Lake \$175, leaving on the whole carload for the miner at Steamboat \$123.35 for his work. While the cost of shipping ores from Austin to Salt Lake is less by several dollars per ton than from Reno, yet these figures show that a miner can make nothing by shipping low grade ore from Nevada to Mormondom.

The newspaper in a mining camp may have only a small circulation, but its influence does not end with its subscribers. Articles from its columns are copied by the leading papers of the State, and by this means the advantages of the camp and district it represents are brought to the notice of thousands. A due appreciation of these facts would result in a more appreciable patronage of the newspaper by miners and prospectors.—*San Miguel Journal.*

ENGINEERING NOTES.

Decay of an Iron Bridge.

A phenomenon has been observed in the Callowhill street bridge, in Philadelphia, which is of great interest to architects and engineers, although the taxpayers of Philadelphia probably take no satisfaction in it. A few days ago men were sent to repaint the girders of the bridge, and began, as a preliminary process, to scrape off the rust. The attention of the foreman was soon attracted to the unusual size and weight of the scales of rust which fell upon the railroad below, and, on picking some of them up, found that they were solid masses from one-quarter to three-eighths of an inch in thickness. It is needless to say that plate-iron girders which had lost their substance by rust to such an extent as this, would have little strength remaining, and the vibration of the bridge under the movement of a horse-car or loaded cart, which was so great as to compel the painters sitting on their swinging stage to elude to the ropes or the braces of the bridge to avoid being shaken off, indicated still further the necessity for immediate inspection of the whole structure.

The first examination was an informal one, made by persons living in this neighborhood, who found not only that some of the iron work had been nearly eaten through by rust, but that the whole bridge, which is built on a rising grade, had moved downhill so far as to tear out the top courses of the upper abutments, and to buckle the struts of the intermediate supports; while the movements of the roadway framework had cracked the asphalt over them and forced out the paving blocks between the horse railway tracks. The bridge includes one span of 340 feet, and, as there can be no trifling with girders of this length, extensive repairs will probably be necessary. This structure was only completed in 1875, so that ten years of neglect have sufficed to bring it nearly to destruction, and those who have to design important iron roofs or bridges will do well to notice by this example how short is the life of such works if not properly cared for. In the case of the Callowhill street bridge, says the *American Architect*, the corrosion was probably hastened by the action of the smoke from the locomotives which passed under it; but there are hundreds of bridges exposed to the same action, and the iron roofs of railway stations and manufactories are often subjected to similar or more dangerous influences.

Reservoirs on the Upper Mississippi.

A fact of much importance is the announcement made by the government engineers in charge of the reservoir system at the head of the Mississippi. Low waters have always interfered with navigation during the latter part of summer and early fall to such an extent that the carrying of freight to the Northwest by the water route has been tedious and expensive. Some years ago a system of dams to hold water in three different lakes in Minnesota was commenced, and the result has recently been announced. Not only has the usual amount of water been retained in these lakes, but by means of the dams their ordinary depth has been raised in some cases as high as twelve feet, one lake having an area of 90 square miles having been raised that high; another lake having an area of 200 square miles has been raised four feet, and still another lake has been added to materially by the same means. These engineers estimate that by this system they have accumulated an amount of water equal to 24,000,000,000 cubic feet. This they announce is ready and can be thrown into the Mississippi at any time and in such quantities as may be desired. They state that with this amount of water at command they can raise the river from three to five feet, and by that means afford comfortable navigation at all times of the year. If the statement made by the engineers does not fall short of what they claim they can do, this is indeed a valuable work. There is an immense coal trade in the Northwest, which, with good stage of water, might be cheaply brought to market. At present a large share of bituminous coal sold in Minneapolis and St. Paul comes from the mines of central and southern Ohio, being transported to Toledo and Cleveland by rail, thence by lake to Duluth, and from there bailed to the cities named.

THE CANADIAN SHIP RAILWAY.—It is said that the construction of a ship railway to connect the Bay of Fundy with the Gulf of St. Lawrence has been finally decided on. Ships of 1,000 tons and under will thus be able to reach St. John from Montreal, Quebec, and other parts of the St. Lawrence without having to encircle the dangerous Nova Scotia coast, a saving of 600 miles. The ship railway, which is to be seventeen miles long, will, it is expected, be supported by a subsidy of £60,000 per year for twenty years from the Canadian Government.

A NEW SLEEPING CAR.—Railway papers report the introduction of a new sleeping car, of different designs and patents from the Pullman Cars. It is called the Monarch Parlor Sleeping Car, and a company has been organized with a capital of \$5,000,000, which will construct and run cars. They are said to be superior to anything now in use; six cars have already been placed in service.

USEFUL INFORMATION.

Toronto, a New Dye Stuff.

M. Reimann describes in his *Faber Zeitung*, a new coloring material which has been forwarded to him from Lower California. It comes from a shrub, known by the name of "Toronto," upon which the archil lichen (*arilla tinctoria*) is found, and which belongs to the family of papilionacea, with feathery foliage, similar to that of "Robinia" (*Acacia*). The grey colored bark gives a dark brown decoction containing a modification of tannic acid, which is not precipitated by antimony (tartar emetic); but an abundant precipitate is obtained by a solution of glus. The bark is among the Indians used for tanning, giving the leather a handsome red brown color. By the addition of antimony the decoction becomes red brown and darker; it becomes lighter and troubled by hydrochloric, or sulphuric acid. Alumina produces a precipitate of a dark drab color; acetate of iron gives a black precipitate; chromate of potash has no effect upon the decoction. Chromic acid, however, and a mixture of chromate of potash and sulphuric acid, give a dark coloring.

The dyestuff is easy to fix upon cotton, wool, and silk. With alumina mordant it gives a good drab, capable of considerable shading. For cotton, acetate of alumina was used; for wool, alum and tartar, each 3 per cent. of the weight of wool; for silk, simply alum and addition of soap to the dyebath.

Iron gives with the toroto a dark grey color. The cotton was mordanted with copperas and chalk, wool with copperas and tartar, 3 per cent. each of the weight of wool, and this decoction added to this bath. Reimann is of opinion that the material will be valuable, if obtainable at a reasonable price, particularly for black upon cotton and wool, because it gives a very dark grey, which, with a little logwood would probably give a good black. On account of its high percentage of tannin it would be likely to replace nutgalls and myrobolans in dyeing mixed woolsens, particularly such which are fulled, doubles, etc.

OIL FROM SOAPSUDS.—The saving arising from extracting oil from soapsuds is so great that no wool washer ought to allow his suds to run into the sewer in the form they leave the bowls. Tanks are prepared to receive the suds and when a tank is full, a certain quantity of vitriol is poured into it. This causes the suds to curd or crack, and the grease and all solid matters fall to the bottom, leaving the water comparatively clean. The water is then run off down this drain, and the thicker portion at the bottom is afterwards run into a filter bed of sand and gravel, through which the rest of the water gradually filters, leaving the solid and greasy matter behind. This is laid in cloths and called "puddings," which are pressed in hydraulic or steam presses till all the oil is squeezed out. From what is left potash and other ingredients can be extracted, and the refuse used as manure. The oil must be purified, and can be used with great advantage for soap making or lubricating.

PAPER BEDCLOTHES.—A paper-making firm in New Jersey has for sometime been turning out counterpanes and pillow cases of paper. No. 1 Manila paper is used, two large sheets being held together by a slender twine at intervals of three or four inches; the twine is gummed so as to hold the sheets firmly together where it lies. A hem is placed on the counterpane to keep it from tearing; the safety edge is composed of twine. Ornamental designs are stamped in the outer surfaces of the covers and cases, giving them a neat, attractive appearance. When these counterpanes and pillow cases become wrinkled from use they can easily be smoothed out with a hot flatiron. This counterpane can be left on the bed when it is occupied, and in cold weather it will be found a warm covering, paper preventing the escape of heat. The new paper bedclothes are seventy-five cents per set, and will probably become very popular.

WEIGHING A HAIR.—"To number the hairs of your head is not a very difficult task," the refiner of the assay office said. "A very close approximation can be made by weighing the entire amount of hair on a man's head and then weighing a single hair. The weight of the former divided by that of the latter will, of course, give the desired number. If you will pluck out a hair of your beard I can show you." A long and straggly one was accordingly detached, the refiner putting it on a scale, which was enclosed in a glass case, and graduated with extreme accuracy. With little weights of aluminum he piled up one arm until an equilibrium was reached. The hair weighed three milligrammes. "If you reduce this to figures," he said, "it would require 8,000 hairs to weigh an ounce, and supposing you have six ounces, you have 48,000 hairs."

THE LITTLE BLACK SPOTS ON BANANAS.—"Nearly everybody," says the *Chicago Herald*, "thinks the small black spots on bananas the beginning of decay," remarked a South Water-street commission merchant to a *Herald* reporter, "but that is a mistake. Nine out of ten bananas that have these black spots on their skin are sound and wholesome. What

causes the spots? Salt water. Our bananas, you know, come mostly from the West Indies, Southern Mexico and Central America. They are shipped to New Orleans in sailing vessels, and are usually sent on board right from the plantations along the coast. As the vessel cannot reach the shore in many places the fruit is carried out in luggers, and in stormy weather salt water spray gets upon the bananas. Wherever salt water strikes it leaves a black spot."

WHERE ANCHORS ARE MADE.—The stately ships of Bath, Thomaston and other Maine ports all look to a little town on Penobscot bay—Camden—for something they could not well do without, and that is their anchors. More anchors are forged here than at any other place in the United States, strange as it may seem. Many sturdy smiths swing big hammers day after day, summer and winter, in the long, low shops, and big hot forges seeth and blaze, while huge tripammers send music ringing away out over the bay. Hundreds of tons of old iron are bought, the long pieces cut up into short lengths by powerful shears. These small pieces are tied up in bundles, melted and pounded into shafts, flukes, palms or rings by the tripammers, and the various parts are welded into the complete emblem of hope by the forgers. Anchors of from 50,000 to 75,000 pounds weight are made here.

DON'T LICK YOUR STAMPS.—The *London Lancet*, speaking of this practice of licking adhesive stamps and envelopes, says: "This is a perilous practice against which the public needs to be put on its guard. We have seen bad consequences ensue from this habit, which is a very common one. Those who are frequently thus moistening the gum on adhesive surfaces suffer from local irritation, sore tongues and the like, while every now and again we hear of special propagation of disease by the habit. It is very easy to avoid the practice. The danger only needs to be pointed out." Lick the envelope instead of this stamp.

HAY FOR FUEL.—The flour and other mills using steam power in Dakota have substituted hay for fuel, on account of the difficulty in procuring coal. There are coal mines in the Black Hills, but it is expensive, because there are few railroads in the Territory and their freight charges are excessive. The hay gives a good, steady heat, and raises steam very quickly. It is more economical than coal, and the money paid for the hay is distributed among the farmers of the neighborhood.

LAMPBLACK FROM NATURAL GAS.—About seven miles south of Mt. Vernon, Ohio, there has been a lampblack factory for years. The owner began in a small way, and employed the usual mode of manufacture, but has now the largest factory in the world. The black is now made from natural gas, 90,000 jets being in use. The black thus made is of superior quality and commands a high price in the market.

GRINDSTONES.—The use of grindstones by the farmers in the United States is no small item in the trade. Each year they take about 12,000 tons of small grindstones, varying in weight from 40 to 150 pounds besides some 30,000 mounted on frames ready for use. All of the latter are made in Cleveland and Berea, Ohio.

A GOOD COPYING INK is made by dissolving one-half ounce of gum and 20 grains of Spanish liquorice in 13 drachms of water, and adding to it a drachm of lamp-black previously mixed with a teaspoonful of sherry. If the lamp-black is greasy, it should be heated to redness in a covered crucible.

RUG KNITTING has superseded stocking knitting with middle class English old ladies of industrial habits. The rugs are of no particular design, and are called Oriental.

A MACHINE has been invented which wraps up oranges in tissue paper more neatly and rapidly than it can be done by hand.

GOOD HEALTH.

Comfort and Longevity.

Under the above title *Science* publishes the following article, based on a recent German work: Josef Korosi is the director of the Bureau of Statistics in Buda-Pesth, and he has apparently brought to his work a mind well adapted to the difficult task of bandling figures in bulk. This essay which he presents to us under the above title was read in September last before the Association of Hygiene in Berlin, and in it he has confined himself to a few points only. He has endeavored to determine the influence which the varying pecuniary conditions of life, with their attendant privileges and privations, have upon the longevity of the people of his city. For convenience he recognizes four classes, according to their endowment in worldly goods; those who are very rich at one end of the category and those who suffer from abject poverty at the other. Between these extremes lie the great mass of the people, whom he divides into the middle class and the ordinary poor.

He does not claim that his figures possess an absolute mathematical value, because he could not determine the number of living individuals in each category; but by excluding children under five years of age, and taking the average age

of those dying during a period of eight years, he found that:

The rich class averages.....52 years of life.
The middle class averages.....46 years 1.1 months of life.
The poor class averages.....41 years 7 months of life.

From this it is obvious that the possession of wealth, and the resultant exemption from privation, lengthen the average life nearly 10 years.

HOW TO COOL A ROOM IN SUMMER.—The composing room of the New Orleans *Picayune* is situated in the upper story of its publication house, just under the roof, and in summer is extremely hot. An inspiration seemed to have come to one of the oppressed occupants, and in accordance with it a vertical box was constructed in the corner of the room, with openings at the floor and ceiling, and furnished with a pipe for supplying water at the top, and a pan and drain at the bottom for receiving the flow and carrying it safely away. The supply-pipe was bent over the upper end of the shaft, and fitted with a cross like that of a watering-pot, so as to deliver a shower of spray instead of a solid stream. On connecting it with a service pipe the movement of the water was found to cause an active circulation of the air in that part of the room, which was drawn in at the upper opening of the shaft and issued again, cool and fresh at the floor level. The most surprising thing about the experiment seems to have been the effect of the water in cooling the air to a degree much below its temperature. With this Mississippi water, which, when drawn from the service-pipe, indicated a temperature of 84°, the air of the room, at which the thermometer at the beginning of the trial stood at 96°, was cooled in passing through the length of the shaft to 74°, or about 20° below the temperature at which it entered, and 10° below that of the water which was used to cool it.

SURGERY OF DYNAMITE.—The medical faculty have recently given some little attention to what they are pleased to call "Surgery of Dynamite," by which is meant the effect of dynamite explosions upon those in their immediate vicinity. It is interesting to learn from these discussions that the jar or shock which the system receives differs altogether from that which is the result of a blow upon the head or body, or resulting from railway collisions. These latter follow comparatively well-localized and gross form of violence, whereas the shock coming from a dynamite explosion is diffused and divided. In the case of the two young women who were injured by the recent explosions in the Tower of London, neither suffered from contusions, nor did they bear any marks of wounds save a few scratches received from falling upon a pile of rubbish. The sensation they experienced was not that of being violently knocked down but of being "pushed back." Both suffered from severe pain along the right inferior dental and auriculo-temporal nerves, and a profuse catarrh showed the meatus had been injured. Cols, the policeman, suffered from no complication through a fracture of his ribs, but, as in the case of the young women, his chief ailment came from a general enfeebling of nerve function, which caused a depression in the heart's action, and a temporary loss of sight and hearing.

SOUP.—Have soup for dinner by all means. No doubt, in many families, the prejudice against soup has arisen from the fact that it is usually prepared and served in large quantities, instead of, as at the table of the rich, in small portions, though many kinds would furnish in themselves a substantial meal for a growing child. At any rate, the advantages of commencing dinner with soup are manifest in the saving of the meat, bills, and economy practiced in utilizing scraps of all kinds for the making of the soups, and the comfortable sensation experienced after a little has been taken; for, let any person who feels, as the saying goes, "too hungry to eat," swallow a few spoonfuls of soup, and the feeling of exhaustion will soon pass away. Indeed, a well-known authority has said that nothing tends more to restore the tone of the stomach and make easy digestion than a little soup.

HOT WATER FOR SPRAINS.—Many working-men meet with little casualties, sprains being very common. Hot water is the best thing that can be used to heal a sprain or bruise. The wounded part should be placed in water as hot as can be borne for 15 or 20 minutes, and in all ordinary cases this pain will gradually disappear. Hot water applied by means of cloths is a sovereign remedy for neuralgia and pleurisy pains. For burns or scalds apply cloths well saturated with cool alum water, keeping the injured parts covered from the air.

UNDUE PERSPIRATION OF THE HANDS.—A mixture which is said to be a cure for undue perspiration of the hands, is made of a quarter of an ounce of powdered alum, the whites of one egg, and enough bran to make a thick paste. After washing the hands apply this; let it remain on the hands two or three minutes, and then wipe off with a dry, soft towel. Luke-warm water is better than hot or cold, if the skin is tender or inclined to chafe.

THE BLOOD.—There is less blood in cold-blooded than in warm-blooded animals. The larger the animal the greater is the proportion of blood to the body. Man has about a gallon and a half of blood, equal to one-thirteenth of his weight.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

WETZLAR.—Amador Ledger, Aug. 15: This quartz mine, situated in Hunt's gulch, just east of the Mammoth, has been worked lately by N. T. Littlefield and George Thomas, Henry Peek representing the former at the mine. One day last week a gold pocket was struck. A couple of candle-boxes of rich ore were brought to Jackson. The extent of the pocket is yet unknown, as since the discovery the men have been employed in laying a track in the tunnel, and will not explore further until this track is completed. We are told that there is a three-foot vein of good looking ore in the face of the tunnel, with 60 tons of milling rock on the dump, which cannot be crushed, however, on account of lack of water to start the Kelly mill near by.

VOLCANO NOTES.—At the Gillick mine, near Volcano, the tunnel is in about 90 feet; the mine shows better than ever. A slab of quartz was shown in Volcano a few days ago literally covered with free gold. Such ore would yield at least \$500 to the ton. Mr. Hoffman, president of the Volcano tunnel Co., while in Volcano last week, located the extension of the Gillick mine, and has men at work prospecting it. The Tellurium has been started up under the management of Captain Roberts. Several men are engaged in clearing the shaft of debris, caused by caving. Lumber is being hauled on the ground preparatory to putting up a building.

MISCELLANEOUS.—The ten-stamp mill of the Mammoth is kept running steadily, with plenty of ore in sight to last for an indefinite period. The Shugert mill is running only at brief intervals, as the water supply will permit. A clean-up has been made, the result of which we are unable to give, beyond that it reached a paying figure. A few men are employed at the mine, but there is no prospect of much being done until the supply of water is sufficient to run the mill steadily to its full capacity. It seems to be generally conceded that this is destined to turn out a permanent paying property. The Carlyle Company, operating the Kittridge claim two miles west of Jackson, have secured the old Martell ditch along Jackson creek, and are cleaning it out for the purpose of carrying water on to the mine. They will use refuse water from the Zeile. A quantity of ore is ready for crushing, and there is a two-stamp mill on the ground, which the owners are anxious to get in motion so as to determine the actual milling quality of the rock.

RICH ROCK.—Amador Sentinel, Aug. 12: At the Shumake mine, Irishtown, a five-foot ledge of very rich rock has been struck. Sinking is still being pushed at the Hadley mine, Volcano. Gold and silver can both be seen in the rock. Sinking on the New York mine will be commenced in a couple of weeks. The determination is expressed to develop this mine in a systematic manner for all its worth. We are informed that the taking of water out of the Kennedy mine will soon be commenced and that it is the intention to this time thoroughly open the mine. This is good news for Jackson, as it will give employment to many more men. Sinking is progressing in the Reed mine at Irishtown with very favorable prospects. A depth of 40 feet has been reached. The mill belonging to the same parties on the Kendall grade is being taken down and put upon the Irishtown property.

Calaveras.

ANGELS CAMP.—Cor. Calaveras Chronicle, Aug. 14: The mines are all giving good satisfaction to the owners, the mills being kept running day and night at their full capacity with good results. They have a large body of good milling ore in the Bechtel and Nevils claim. The lower level of the mine has been run through fifteen feet of good rock and the foot wall has not yet been reached. I am told that it is the intention of the company to erect a new forty stamp mill and use the present one for hoisting purposes. Mr. Lane is about to erect machinery in order to run his mill by steam power when the water fails. A portion of the machinery is now on the ground. The new hoisting works on the Coleman mine are about completed.

CLOSED.—Mountain Echo, Aug. 14: The Cherokee mill has closed down for the present and no work is going on in the mine. It is said, however, that work will be resumed in a short time. Mr. Stevenot is grading and putting in the track and rock platform at his mill near Carson. He expects soon to commence crushing ore from the Santa Cruz mine. He has developed a lead in the mine 4 feet in width which has been thoroughly tested and will yield over twenty dollars per ton. The Santa Cruz bids fair to be a paying mine. The water has been pumped out of the Bechtel mine to the lower level, a depth of about 300 feet, and a crosscut run which developed a solid vein of rich ore over fifteen feet wide. It is the intention of the company to erect a forty-stamp mill on the east side of the hill from where the old mill now stands. A tunnel will be run through the hill, tapping the main shaft below the surface some distance, the object of which is to open a way by which the ore can be transmitted from the mine to the new mill. This mine is rapidly appreciating in value.

Inyo.

DEFIANCE.—Inyo Independent, Aug. 15: During his visit to Darwin a few days ago, Mr. Reddy made a careful examination of the Defiance mine. He is very confident that the future of the mine will be satisfactory. A contract was let last Monday to sink the shaft 50 feet deeper, and work is already begun. The shaft for a depth of 105 feet is all in one, and the additional depth is expected to continue in ore that will contain 37 per cent lead and the usual amount of silver. At the bottom of the shaft neither wall of the ledge appears at a width of 10 feet. In that district valuable ore bodies have always been found in large deposits, and everything now indicates that one of these big bodies has been found in the Defiance. Mr. Reddy believes the ore is there, and will work to find it.

CASEY MINE.—The owners of the Casey mine, four miles above Bishop Station, are now making experiments that will determine what shall be done with the mine in future. A great deal of exploration has been done, and there is much ore in sight and

the experiments being tried are to determine the value of the ore, and the process by which it must be worked. One vein of ore, in the mine is 16 feet wide, another is four feet and there are several smaller veins. The two large veins are low grade ore; the smaller veins are very rich, some of the ore running away up in the thousands of dollars per ton. If the experiments shall prove satisfactory it is understood that a mill will be built immediately.

FOUND.—For six years past Neal S. Thompson has been working to develop a mine at Darwin. A tunnel run by him 150 feet has struck a vein of ore three feet wide. A drift has already been run on the vein 40 feet, and it continues uniform in size and character that distance; the vein in the face of the drift is as good as any passed through. The indications all favor the expectation that the ledge will get wider as it goes down. Good judges are confident that Mr. Thompson has enough in sight to pay him fairly for his six years' work. The ore is of the average quality found at Darwin.

MINETTA.—The Minetta mine at White Hill has been leased to Billy Hedge. Recently the mine has been showing up in a most encouraging way; in that and the adjoining claim of Downs and Welch the ledge has been explored the entire length of both claims, 3,000 feet, and good ore found all the way. Billy is one of the locators of the Minetta; the other two locators are otherwise engaged, and have leased to him their interest in the claim; he will at once proceed to work the mine, and has a very good prospect.

CERRO GORDO.—From their leased ground in the Union mine, Locket, Casey and Basto this week made a shipment of 20 tons of ore. They intend to have about 20 men at work in the mine about the beginning of next month. From the same mine T. C. Boland has shipped about 60 tons of ore the present week.

DARWIN.—Frank Silva recently made a shipment of ore from Darwin to San Francisco. The exact quantity shipped has not been reported, but the more important fact is certain that the ore paid very well. The following are the returns: Silver, 8½ ounces per ton, gold, \$9.04 per ton; lead, 50 per cent. From Pine mountain at the end of last week, S. P. Roberts shipped a carload of ore to San Francisco.

Mariposa.

NEW MINING ENTERPRISE.—Herald, Aug. 14: Messrs. Rogers & Bates have sold the Francis mine on Mariposa creek to A. E. Chodko, formerly superintendent of the Quartz Mining Company in Fresno county, and work will be started up right away. John Mitchell, Joe Spagnoli, and Fred Schilling have come over from Quartz mountain and are now engaged in moving the boiler and engine and ten stamps from the old Washington mine over to the Francis mine. One load of material has already been hauled over. The company intend building a road to the Bridgeport road. We understand that the underground operations in the mine will be under the able management of John Mitchell, who is well known in this county as an experienced miner.

Mono.

STANDARD CON.—Bodie Free Press, Aug. 7: The 300-level north drift advanced 18 feet. The ore bodies continue to average well, with indication of further improvement on the 400-level. Prospecting in various parts of the mine is being steadily continued. Total number employed, 67. Ore sent to mill, 441 tons, with six days' run of tramway. Mill running steadily.

BODIE CON.—East drift from north drift between 300 and 400-levels is in 25 feet. South drift from joint east crosscut 400 (Mono) level is in 18 feet. Twenty-five men employed.

MONO.—Winze No. 2, 550 (Lent shaft) level 400 feet from the Bodie line is down 70 feet. South drift on same level is in 31 feet. South drift from joint east crosscut 400 (Mono) level is in 18 feet. Seven men employed.

THE BODIE TUNNEL.—On Saturday last all work was stopped in the Bodie tunnel. Superintendent Colcord had so economized and systematized the work that a force of only thirty men was required to run the mine and mill, but it appears that the ores of the ledge on the 400-level will not so far as at present exploited pay a profit on extracting and milling. Doubtless chimneys of pay ore can be found should the company elect to prospect for them, more especially in the upraise from the 200-level. This may be decided upon, but hardly at present. The principal stockholder is Robert Sherwood, of San Francisco, with whom rests the matter; as also whether the tendered resignation of Superintendent Colcord will be accepted. The mill is running to clear the dumps and make a thorough clean-up. Of course the knocking off from work of about thirty men will be noticeable in town along about pay-days, but among outside investors it will not affect the value of Bodie properties generally.

Nevada.

EUREKA TOWNSHIP.—Nevada Transcript, Aug. 15: One of the most prominent and interesting mining properties in the close vicinity of Graniteville, is an extensive drift mine known as Chaparral Hill. This is an ancient river channel, covered many feet in depth with an overflow of lava. Several small tunnels have been run in a short distance and encouraging prospects found. Some of the owners not having capital to push the work, it is at present lying idle. The owners are J. T. Cline, Cruse and Euler, and the ground is covered by a U. S. patent. Passing the Mohawk and some smaller mines virtually abandoned we come to the Sweet mine. A small amount of work was done on this mine some twenty years ago and it paid immensely. Through mismanagement and litigation the capital was squandered and it has laid idle about ever since. It is patented. Thence south-east about a hundred rods is the Iowa. This mine paid well to water level, yielding \$40 per ton, the ledge holding out well to the bottom of the tunnel and offering a good chance to find a valuable mine. Adjoining this comes the Birchville mining property with improvements consisting of a five-stamp steam mill and steam hoisting and pumping machinery. The owners of this property (Maybanks and Parsons) not having the capital to develop it, offer liberal inducements to capital. The Commercial, a contiguous ledge owned by the same parties, has a tunnel in 400 feet on the line of the ledge which is well defined. There is 80 tons of rock on the dump, showing fine gold and an abundance of sulphurets.

Southeast a quarter of a mile is the Mulligan ledge, undoubtedly a valuable mining property. It has no improvements. The owner is Patrick Mulligan. Leaving to the south-east the Jim, the old California, Baltic, Star, Norway, Centennial, Golden Fountain and others, we next come to the New California which is a fair example of what persistent effort will accomplish. This mine has lain idle many years and like many others was supposed to be "worked out" when really the owners or managers were "worked out." Mr. Bobbannan, merchant of Graniteville and owner, offered liberal inducements to Messrs. Millerick, Foley and Haddock to prospect a little, which they did with a good will. Their labors after a few months have been crowned by a rich reward, they having brought down recently, after a short run, about as much clean gold as a man would want to carry. A fine ten-stamp mill is on the mine. The Erie and the Ancho mines (patented) are idle. So is the Amazon. Mr. Shepp is working his mine, taking out rock that pays \$35 a ton. This I know, having milled the rock for him. This also is one of the "worked out" mines. The Old Rocky Glen, owned by John Hippert, will make these mountains echo with the music of a large stamp mill. This mine has already given to commerce \$400,000 in gold. It is now being prospected by capitalists from San Francisco. The Eureka Lake, North Bloomfield, Milton and Miners Ditches can supply water power to run 100 mills, and return the water to follow on down the Ridge to work the other mines. We have plenty of timber, good sawmill, daily mail and express, a commodious first class hotel and lively stable, accommodating stage line from Nevada City daily. There is no more inviting field for the prospector, the tourist, the invalid and the lover of the beautiful.

THE MARYLAND MINE.—Foothill Tidings, Aug. 12: The contractors at the Maryland mine are doing good work, having the shaft down now about 300 feet. The appearances are very favorable, every indication going to show that the main ledge is but a short distance away. Everything at the present depth has the same appearance as did the famous Idaho when that mine was but 300 feet deep. There is but a very little water to handle in the Maryland, the present machinery being ample to sink to a good depth yet. From the way work is progressing it is thought that the ledge will be reached in a little while. The Maryland adjoins the Idaho on the east.

CONSTITUTION MINE.—Transcript, Aug. 12: Mr. Roberts, who recently bonded the Constitution mine, in Willow valley, from Maltman & Myers, is finding some good ore. Water for running the hoisting and pumping works is obtained from the Snow Mountain ditch, from which a fall of 240 feet is had. Only about six inches of water is used, making the expense of motive power for the machinery but \$1.20 a day.

Siskiyou.

ARASTRA.—Yreka Union, Aug. 13: Messrs. Kilmer & Shaw, on Methodist creek, in this county, have just completed a large arastra, and anticipate reaping a golden harvest from their mine. Messrs. White & Clark have about completed another arastra and expect good returns for their work. Lieutenant Governor Daggett, at Black Bear, has struck some very good quartz, both at the Yellow Jacket and the B. B. The ledges are from three to four feet wide. The mill will be started up by steam as soon as some little repairs are made in the chutes and dumps.

Shasta.

ANOTHER BIG STRIKE.—Butte Record, Aug. 12: From a gentleman who came down from Shasta yesterday, we are informed that a gold bearing quartz ledge has recently been discovered on Hazel creek, about twenty miles north of Delta, that excels in richness anything heretofore found in California or Nevada. Two old miners who have been working in the Comstock mines about nineteen years, went to Shasta county a few weeks ago to prospect for quartz mines. A few days ago they made this discovery, and they immediately telegraphed to their partner in Nevada to come at once, as they had discovered and located a ledge of black quartz, 100 feet wide. They sunk down on it and took out some rock and sent it to San Francisco. It was assayed and yielded \$1,760 to the ton. It is black quartz, and exactly like the rock taken out of the Shearer & Rattler mine near Redding.

A NEW STRIKE.—J. C. Hoar and Thos. Koons, two Arizona miners, recently made a rich strike in the Old Diggins district. The ore at thirty feet in depth resembles the tellurium on Salt creek and assays up in the hundreds. The lucky finders believe it is the mother lode of this country, basing their belief upon the formation, strength and course. It runs in a northeasterly and southwesterly direction.

FRENCH GULCH.—Shasta County Democrat, Aug. 12: Tom Green, of French Gulch, was in town Monday, feeling poorly in health. He says that he will clean up a few thousand out of his mine this summer for the rainy days. Tom deserves it all. In the event that the new owners in the Lost Confidence mine build a road to Copley that place will immediately become a live camp. Already we hear of parties preparing to start in business there. Three prospectors lately struck a rich quartz prospect on Breslau's land. About a mile west of town Geo. Bassett and N. Slater are sinking on a well-defined vein of blue, heavily sulphuretted quartz, greatly resembling Schearbr's tellurium, which we are told assays up in the hundreds. Budd Crume and a couple of prospectors have struck a rich find on Middle creek about 100 yards above the bridge. It is said to be tellurium. A couple of San Francisco men were so struck with the find that they jumped it at a livelier rate than they jumped on. It certainly has the outlook of making a fine mine. Hon. Rueben Clark, of Colusa, arrived here last Thursday with the first shipment of his quartz mill machinery, and has been hard at work since putting the apparatus in place on the mine he lately purchased of Tom Harrison. All the machinery has now arrived, which consists of a Dow steam pump, portable 18 horse-power engine, and a ten-stamp mill of the Hammond pattern. There are quite a number of Arizona miners in the county, and last week several arrived from Calico district, San Bernardino county. They gave it as their opinion that we have the best mining field they have found on the coast. In fact, they are bewildered with the surface evidence of so much precious minerals, and naturally they write their conclusions to their friends.

One gentleman who has been here for about three weeks and seen much of our county, tells us that before winter sets in fully 500 miners will come here from Calico district alone.

Sierra.

A BIG CLEAN-UP AT FOREST CITY.—Sierra Tribune, Aug. 16: The regular weekly clean-up of the Bald Mountain Extension Company, at Forest City, Sunday, amounted to one hundred and forty seven ounces of gold. The company is still working wholly in the South Fork ground, but they expect to get through on their own ground inside of a couple of weeks.

Tuolumne.

LOOKING WELL.—Tuolumne Independent, Aug. 15: The Nery mine at Italian Bar, continues to look well. The mill is being refitted, and a handsome clean-up will be made after the next run. The mill, at Summit Pass, keeps pounding away, night and day, yielding the owners good returns. A short time ago the Richards boys struck a \$200 chispa, in the Joint Stock Gravel mine, near Springfield. Work in the General Hatch's mine, in Table Mountain, is being rapidly pushed forward. Mr. McTarnahan, the superintendent, is the right man in the right place.

Trinity.

BULLYCHOOP.—Journal, Aug. 14: From this flourishing quartz mining camp we learn that Messrs. Titus and Grant have struck the ledge in the Central mine, five feet in width and it will average \$20 rock. Part of their Huntington Mill has arrived at the end of the wagon-road and a sled-road is being built that it may be taken to their mill-site. Davis Bros. have struck the lode in their tunnel on the Pound Cake mine and it looks remarkably well. The Hoskins Bros. continue to strike good ore from the Little Gem. Bullychoop is just now getting into shape to show what it really is.

NEW RIVER.—Yreka Union, Aug. 13: An esteemed friend at Black Bear sends the following interesting mining news: "Mr. Clemmens and another gentleman from New River stopped at this place over Sunday night. They report the mines looking considerably better than a short time ago. They counted the names on the payroll Saturday evening, and report 170 men in and around the camp, all of whom are busy at work. Messrs. Clemmens & Ladd are about to sell out the Ridgeway and Hard Tack mines to a company of twenty men at Eureka for sixty thousand dollars. Mr. Clemmens says that he has every reason to believe that the sale will take place."

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Aug. 15: The deep winze below the 3,000 level was down 150 feet last evening, well timbered throughout, and its bottom or face still in the ore vein, which has stayed with it continuously thus far. The ore is somewhat inclined to be in bunches, showing best on the east side, and giving good assays. Eighteen feet further will carry it to the 3,100 level, making a distance of 127 feet, following the dip or incline, or the length to the winze from the 3,000 to the 3,100 level. No water has been thus far encountered. At the 3,100 level a station is to be opened for a drift, to connect with the Combination shaft. This drift or crosscut will be run in a southeasterly direction, as the winze lies about northwest from the shaft. Necessarily, it will have to cut through the ore vein, which is considered to lie east of the winze, and will be a very important drift in that connection. In fact, should the anticipated good ore body be met with at that point, extraction and milling would naturally follow, constituting that as the 3,100 level of the mine. The north lateral drift from crosscut No. 2, on the 3,000 level has been stopped, it not being deemed advisable to run any risk of tapping water in that direction just at present, or until the new pump is fully and practically at work, ready to receive all the water that may be found in any direction.

THE GOLD HILL GROUP.—The main incline of the Imperial mine is being repaired above the 1,500 level, where a cave occurred recently. It connects with the 1,300 level of the Yellow Jacket and is needed as an airway for ventilation purposes in the ore producing sections of that mine. The Kentucky mine is yielding forty-five or fifty tons of ore per day at present, which is hauled by teams to the Rock Point mill on the Carson river for reduction. The Crown Point and Belcher mines are doing nothing beyond a little prospecting at present, but when milling facilities shall allow of ore production being resumed, something pretty good may be looked for in the way of ore development on the 1,700 level of Belcher, a point we have alluded to occasionally heretofore.

CHOLLAR.—All operations in this mine continue in suspense, pending the completion of the hydraulic pump in the Combination shaft. The new section is all in place, the connections were being made last evening, and the whole is expected to be completed to-day, ready to start into practical operation tomorrow, or on Monday at the furthest. The first of next week, or as soon as the hydraulic pump is all right, the station will be opened from the 3,100 level of the Combination shaft to run to connect with the deep winze of the Hale and Norcross at that level. This drift will run northwest toward the winze to connect with the drift to be run from it. The total distance will be about 180 feet, and it will take five or six weeks.

SIERRA NEVADA.—On the 520 level the main lateral drift northward, or rather to the northwest, after skirting along and into the eastern borders of the ore vein for a distance of 1,001 feet, twelve feet of which was made during the past week, is stopped, and a crosscut west at that point, 1,000 feet north of the shaft, has been started. This is now in 43 feet, with its face in vein matter. It is a very important drift, and will be continued through to the west wall, which may be 500 or 1,000 feet distant, as the main Comstock ore vein in Cedar Hill is of great and practically undefined width.

BEST AND BELCHER.—West crosscut No. 1 on the 1,000 level, near the Consolidated Virginia line, has been extended 35 feet, making a total of 391 feet, and stopped, further progress in that direction not being deemed advisable at present, no favorable indications being met with. A crosscut, designated as No. 2, west, has been started 100 feet south of it. It is now in about ten feet, and making good progress in favorable working ground.

COS. CALIFORNIA AND VIRGINIA.—The daily shipments of ore from this mine are about 170 tons, which come from the 1,750 level, worked on company account, and from the Jones lease section above the 1,550 level, the latter section furnishing about one-third of the ore taken from the mine. The old Consolidated Virginia shaft is being repaired between the 1,200 and 1,400 levels, and is to be used for ore hoisting purposes shortly, or as soon as in proper order.

ALTA.—Owing to the heat and lack of ventilation, work has been discontinued in the upraise above the 600 level, and a drift west is started from the main north lateral drift on the 700 level. This cross-drift is now in 43 feet, running in firm blasting rock, and has about 450 feet to go in order to reach the ore prospects developed in the upraise above the 900 level.

OVERMAN.—Still exploring on and above the 225 level. No high grade ore bodies are met with, but a small force of men is kept at work, following up the best indications and taking out a little fair grade ore which is saved for milling.

GOULD AND CURRY.—On the 1,000 level, west cross-cut No. 1, near the Savage line, has been extended 100 feet; total length 152 feet. The face is in favorable working ground, with nothing of interest to note.

BILLION.—Some very good looking streaks of vein matter, strongly mineralized, have been encountered during the past week, indicating closer proximity to the anticipated ore deposit.

MONTICELLO.—The new shaft is now down 67 feet, well and substantially timbered throughout, and the gallow frame is in place, also the steam engine to do the hoisting.

Cortez District.

LIVELY CAMP.—A note from Cortez to the *Silver State* says times are quite lively there. The mines are looking well, and S. Wenham is budding new reduction works.

Columbus District.

LANDLARI.—Inyo county *Reporter*, Aug. 13: The trouble at Landlari is on account of the reduction of miners' wages from \$1 to \$3 a day. Miners (all that can get away) are leaving daily. It is thought by some that after the old hands have left, a new set of miners will be put on, which may come about in a month or six weeks. Mr. Shoenck, superintendent of the Monte Diablo, is now in San Francisco in the interest of the company. We are assured that the mines are looking better than ever before. The lower mill at Belleville is working on Victor ore; after its reduction, it is presumed the mine will close down temporarily for the reduction of wages, as in the others. It is pleasing to know that it is not because the mines have petered out that the camp is prostrated, a condition due alone to the wages question. It is yet, but for that, the banner mining camp in the State. The weather is said to be very hot; this week the thermometer got up to 105° there in the shade.

Como District.

A COMO MINE.—Dayton *Times*, Aug. 8: The North Rapid mine, at Como, in which Senator Westfield, George W. Keith, William Maxwell and others are interested, is looking very well. Rock is being taken out, and a shipment of thirty or forty tons will be made to the Rock Point mill at this place some time next week, it is thought. Assays made from some of the rock are very encouraging to the owners as well as those who were beginning to lose faith in the camp.

Central District.

AT WORK.—*Silver State*, Aug. 16: S. W. Hammond, of Central district is in town. He says several prospectors are at work in the district. He has been developing the Mollie lead, recently discovered by him, and has taken out about 25 tons of ore, which assays well in silver and carries about 33 per cent of lead. Frank Clark's mill, on the Humboldt, is running steadily on ore from Central and Dun Glen, and is doing good work. It is a five-stamp mill run by water power.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Aug. 15: Notwithstanding many of the miners throughout the district are holding back considerable ore in anticipation of better prices, the shipments to the two furnaces in town during the past week have been very good. To the Richmond furnaces the Dead Broke sent down 6 tons; the Silver Lick, 9 tons; Silver Connor, 58; Lord Byron, 7; Home Ticket, 6; Enterprise, 4, and the Prospect Mountain Tunnel, 1½. The Irish Imbassador and Excelsior mines also made shipments. To the same furnaces there was brought in from the 1 into some ten tons, and from the Uncle Sam at Newark 2 tons. Five tons of very rich ore were shipped in from Northumberland near Belmont. To the Eureka Con. furnace the Dead Broke mine on Prospect mountain shipped 15 tons, and the Jackson mine on Ruby hill sent down 23½ tons. The following named mines in Revereille District, Nye county, sent in ore to the same furnace during the week: The Fisherman, Ohio, Perseco, Osecola and Liard.

A BETTER OUTLOOK.—The *Sentinel* is reliably informed that the Eureka Con. Company will at once commence excavating for the construction of another furnace alongside of the one now in successful operation. The furnace will be almost a facsimile of the present one, and will have the same working capacity. We are also informed that it is more possible now than it has been in many months that a mutual arrangement will soon be arrived at by the company named and the Richmond people for the starting up of the former's large pumps and draining the lower levels of the two mines. If this is done, a better future is certainly ahead for Eureka, as it appears to be a foregone conclusion among practical and scientific mining men who have visited these properties that larger and richer ore bodies will be found in the lower levels than have ever been found in the upper. We trust our information will prove correct, and that good work will commence at a very early day. The Eureka Con. mine is looking and yielding well, especially the Williams ore body on the seventh level, which has produced many hundred tons, and which is evidently capable yet of producing many thousands. Altogether, the outlook is good.

Emeralda District.

AURORA.—Walker Lake *Bulletin*, Aug. 12: It has been understood for some time that the sale of the Humboldt mines, at Aurora, was finished, but

owing to the delays necessarily incident to large transactions of that nature, work has not yet been begun. Arrangements are, however, being made for a complete remodeling of the mill. Instead of 20 stamps, as at present, 30 will be worked. All the old machinery will be replaced by new and an entire change will be made in the general plan of mechanical work. It is not likely that anything will be done until some time in September, but work on a large scale will, without doubt, be carried on before the end of this year.

Frleberg District.

EXAMINING A MINE.—*Eureka Sentinel*, Aug. 14: Hink Donnelly and Con Riley are expected daily to arrive from San Francisco. While below recently P. N. Hansen arranged with them to come up and go with him to look at Joe Williams' mine in Frleberg district, about 100 miles south of Eureka. The mine is said to be a very promising property. If it suits them the parties named will organize a syndicate to purchase it. The mine carries smelting ore in large quantities. There was considerable work done on the Frleberg mines in about the year 1872. Judge Goodwin, now of the Salt Lake *Tribune*, commenced the construction of a furnace there, built roads and did much outside work, but had to abandon the enterprise for the lack of capital. Most of those who had mines there left at about the same time. J. T. Williams, of Hot Creek, and the Ernst brothers, however, have been doing something at intervals on their mines down to the present time. They now have their property pretty well developed and it makes a very fine showing. There is a strong probability that the proposed visit will lead to a sale. Mr. Hansen only awaits the coming of the San Francisco parties. They will go by the way of Hot Creek and expect to remain a week at the mines.

Lewis District.

HUNTINGTON MILLS.—*Central Nevada*, Aug. 8: The Pittsburg Consolidated is running two Huntington mills steadily on fair ore. The shipments of gold bars during the month of July amounted to more than \$6,000 with only one mill running. Now the bullion yield will be doubled, for although they are only working a few men in the mines, they are piling up the ore pretty lively. The Pittsburg is a wonderful mine, and has paid well from the start. The Morning Star, run by Bothwell & Morgan, is being pumped out from the timbering shaft, preparatory to starting the mill, which, when running, will add considerably to the bullion production of Pittsburg.

Ophir District.

MAY RESUME.—*Belmont Courier*, Aug. 8: Active operations may soon be expected to be resumed in the mines of Ophir canyon. The ores are of a high grade, and have always left a handsome profit after paying all working expenses. Properly handled, Ophir ought to be with its mines, one of the most permanent and best camps in the State.

Reese River District.

MANHATTAN.—*Cor. Central Nevada*, Aug. 8: The present management of this vast property is entitled to great credit for the manner in which they have handled the mines. Coming into possession of what was formerly the Oregon Mill and Mining Company's property, and organizing what is now the Manhattan Company, with Allen A. Curtis at its head, they have carefully developed mines that could never have been worked but for the business tact of Mr. Curtis and those whom his foresight has called around him. John Frost, who located the first mine ever discovered in Austin, and who worked the whole property on the hill as general manager, under the supervision of Allen A. Curtis up to 1877, when the present managing superintendent, Captain Melville Curtis, took charge, is now the general manager of all the machinery of the company, both on the surface and underground, and the labor-saving improvements which he has put in operation, with the aid of Mr. Johnson, foreman of the machine shops, would surprise some of the old Constockers who pride themselves on their ability in this direction. The whole property is managed with but little friction. Captain Melville Curtis, as general superintendent, looks after this vast property with a graceful ease that proves him the right man in the right place.

Rebel Creek District.

WILLOW CREEK MINES.—*Silver State*, Aug. 15: The Wild Deer mine, at Willow Creek, owned by McColely and McEran, bids fair to be one of the best properties in Northern Nevada. It is prospected by shafts and tunnels to a considerable depth, and the lead is strong and carries rich ore in the lower works. From one-fourth to one-third of the assay value of the ore is gold and the balance silver, and it is remarkably free from base metals. Occasionally streaks of very rich ore are found in the lead, specimens of which assay as high as \$2,100 in gold and \$9,500 in silver to the ton, but the average battery assay is about \$80 to the ton. The owners of the Wild Deer had to encounter the usual difficulties of opening mines experienced by men of limited means. Considerable work had to be done and much money expended before anything was realized from the ore, and were it not for the energy and perseverance of H. H. McColely, the Wild Deer, instead of being valuable property to-day, would be nothing but a prospect. As it is, considerable money has to be expended in building a road from the mine to the mill, and in opening tunnels to the lead to save the expense of hoisting ore through a shaft, but as the lead has every indication of permanency and the ore is rich, the owners are warranted in making the outlay, as it will reduce expenses materially. The Willow Creek mines, as they are usually called, are in Rebel Creek district, and were first brought into prominence by the discovery of the Ohio lead. This was purchased by J. J. O'Toole, of Salt Lake City, a mining man of much experience, and it is now owned by the Ohio M. & M. Co. The rich ore extracted in opening up this mine is shipped to Salt Lake City for reduction, and the proceeds are said to be sufficient to pay all expenses. The second-class ore is piled on the dump, to be worked when the company build a mill, as they contemplate doing shortly. The custom in many parts of Nevada has been to build a mill first and find a mine afterwards, but the Ohio company is not conducting business by this rule, as they are developing their mine before they build a mill. There are numerous mining locations in Rebel Creek district, many of which show rich croppings, but like the Wild Deer, it requires considerable capital to develop them, and as that is a thing which their own-

ers lack, the mines are undeveloped and will be until capital is attracted to the district.

ARIZONA.

CATARACT CREEK MINES.—*Prescott Courier*, Aug. 14: The Ash Fork correspondent of the *Flagstaff Champion*, gives the following information concerning the above-named mines, situated in the northern part of this county. Messrs. Sullivan and Humphrey came in from their mines in Cataract Canyon, Monday, and report their property as looking well. They brought in a few specimens of a recent strike made in their property that beats anything yet discovered in the whole Cataract district. It is a hard, gray carbonate ore, containing fully eighty per cent of lead, and when a piece of it is freshly broken its surface shows up completely covered with small particles of horn silver and scales of chlorides, which fully demonstrates the fact that the ore is extensively rich. Mr. Sullivan says that they will soon have a large force of miners at work breaking down ore, for shipment to San Francisco. The Stone Consolidated Mining Company's property lies just above the Grand Canyon of the Colorado. They have several men at work developing the immense ore bodies and already have several tons of rich ore on the dump ready for shipment. The Sherman Company, of Sacramento, California, are pushing developments upon the Hidden Treasure. They have a tunnel in about seventy-two feet and it has been in a solid breast of ore from the starting and it is their boast that there has never been one wheelbarrow full of waste rock since the commencement. Their whole dump is one glittering pile of rich ore. The different companies operating in the district have each put an equal number of men at work in Beaver Canyon, constructing a wagon road into the Cataract. When completed burro trains will be dispatched with, and as there are quite a number of them, it will in consequence throw a large number of packers out of employment, and burros will be cheap.

MORE RICH ORE.—*Prescott Courier*, Aug. 17: News of another rich find in Turkey Creek district was brought here yesterday. It is a large deposit of rich horn silver ore, near the Pine Spring mine. Men are sacking the ore. A great many locations have been made, and there is a stampede to the place.

STERLING.—*Prescott Courier*, Aug. 14: The Sterling mill, which consists of an engine, ten stamps, pans, etc., and four concentrators, will shortly make its trial run on ore from the Sterling mine. The mine is situated in the mountains, about five miles south of Prescott. The mill is on Groom creek, a little further south. Both properties belong to the Rescued Mining Company, of which P. A. Cruique and Townsend Cox, Jr., are the resident officials. Mr. Francis, an old and well known Nevada miner, is foreman at the mine. He it was who made the Desoris mine a great bullion producer. W. T. Brown has superintended the erection of the mill and machinery. Ed Morey will act as millman. Our people look to the Sterling mine and mill for good results. The mine is pretty well prospected. It produces gold bearing sulphurets in great quantity. Success at the Sterling will mean successes in many other places in this part of Arizona.

FLORENCE FACTS.—*Enterprise*, Aug. 8: The Bonanza firm sent their expert down to examine the Keymer mine. His report was favorable and the company offered \$150,000 cash for the property, but the owner would not sell. Five or six bars of bullion from Globe passed through here this week. That camp is improving. The hills surrounding it are full of chlorides, who are having their ore converted into bullion at the various mills in that district. The Old Dominion is expected to start up soon, and that will lend additional life and furnish a large amount of business to the camp. The owners of the Mammoth mine and mill find that their ore is rebellious, and they are now having it thoroughly tested to ascertain what change will be required in their machinery to insure success in extracting the gold. It carries about 20 per cent lead, we understand. Their ore bodies are large and average about \$15 per ton gold. If it can be successfully treated it will pay handsomely.

COLORADO.

ORE.—*San Miguel Journal*, Aug. 15: During the past week no changes worthy of note have occurred in the mining industry about Telluride. All the leading mines are adding to their forces, and ore is being taken out faster than it can be disposed of. The Pandora, Nellie and Gold King mills are running to their utmost capacity and the Wann mill opposite town will soon start up also, having ore enough ahead to last three months. Contracts are being let on new properties, and though we shall not from week to week dish up a constant rehash of mining items that have been stereotyped since the discovery of the San Juan, yet we assure our readers that never in the history of Telluride has general business been better; our mines are in excellent condition, and everything indicates for Telluride one of the most prosperous seasons by far, that any San Juan camp has ever known.

THE WANN CONCENTRATOR TO START UP AT ONCE.—The difficulties among the owners of the Wann concentrator have at last been adjusted and the mill will start up at once, and will be run night and day from now on. Mr. Wann has secured a contract of 2,000 tons from the Sheridan, and will also treat the entire output of the Smuggler and Mendota. He will put in three extra vanners and will give employment to 300 more burros than are now at work in the camp.

IDAHO.

FROM LAVA DISTRICT.—*Keystone*, Aug. 12: Jerome F. Jacobs returned from a visit to the town of Lava, Lava district, Thursday, riding over a distance of seventy-seven miles from four o'clock in the morning to six in the evening, horseback. Jerome says every indication points to its being a good camp in the near future. He visited the Martin mine and reports it the biggest mine in the country. However, Mr. Martin had bonded the mine to Salt Lake parties for \$55,000 and they were to have taken the mine yesterday. It has been reported frequently that Martin has refused \$150,000 and \$250,000, etc., but Jerome informs us that he saw the bond and it was

for just \$55,000—no more or no less. The receipt of the news of the decision of the Salt Lake parties to take the mine caused lots in the town of Lava to advance from 100 to 200 per cent in price. It is the intention of the purchasers to put up large mills and work the mine for all it is worth. There are many other good prospects in the vicinity but nothing has been done in the way of development—all waiting for the new mill to be built so that ores can be worked at home. There is estimated to be \$100,000 in sight on the surface, in the Martin mine alone. Lava will undoubtedly be a good lively camp in the near future. The town of Lava is located at the mouth of a shallow canyon, eighteen miles from Arco station on the Challis and Blackfoot road, twenty-two miles from Houston, and one mile from the Martin mine. There are nine business houses in the town, and buildings in the course of construction for the same purposes. Five miles from Lava is Antelope district. San Francisco parties are looking out a site in Antelope district to put up a mill. The ore in that section is principally milling, but some small lots of lead ores have been found.

SMOKEY ORE.—*Wood River Times*, Aug. 14: The first lot of ore brought to Hailey over the new Smoky road has just been sampled. It consists of 25,000 pounds, of which 15,000 was first-class ore, carrying 123 ounces silver per ton. This lot comes from McClintock's King of the West. The Galore and other claims have ore ready to ship, but none in here. The Alma will make its first shipment about the end of this month.

THE HORN SILVER MINE.—A letter received here yesterday states that the Horn Silver mine, Lava district, better known as Martin's was positively sold, last Saturday, to the Salt Lake parties who have been examining it. The new owners were to take charge this morning, with the intention of working the property for all it is worth. The price paid is stated to be \$275,000. This sale will have a very beneficial effect, as it is the result of a critical examination by competent experts, and will draw the attention of capitalists to this new portion of Altnas county.

PHILADELPHIA SMELTERS.—*Ketchum Keystone*, Aug. 14: The Philadelphia smelters have been nicely cleaned up and put in excellent trim for the resumption of work in a few days. A long and prosperous run is again foreshadowed from the fact that ores, fluxing material, etc., are accumulating at the works in great quantities. Five cars of iron ore and two of coke, aggregating one hundred tons, were received Monday alone, and the ore receipts for a week past have averaged fifty tons per day, with much larger averages promised for the immediate future. The last run of the two fifty-ton stacks was one of eight weeks continuous, and then only shut off by failure of the bosses to supply fluxing iron contracted for. But the compulsory blowing out has enabled the management to clean up as stated, and the run about to commence will no doubt last all fall, while there is every probability of operations continuing right along through the winter. A drive of three thousand cords of wood is now in the river at the smelting grounds in charge of F. R. Gooding, charcoal contractor, and with a full supply of all material there is no reason why these smelters may not operate all winter. Their water power never fails as the warm springs are turned into the ditch as soon as cold weather sets in, which prevents freezing in the most severe cold spells. They ran up to February for the past two winters without trouble or inconvenience—until the ore supply gave out. With the present and promised augmented production we believe the continuous run of the smelters through the year is now assured. And the future of our town most promising in consequence.

MONTANA.

A 125-TON CONCENTRATOR TO BE ERECTED.—*Inter-Mountain*, Aug. 12: From Mr. Lee W. Foster, one of the owners of the Liquidator copper mine, it is learned that a concentrator having a capacity of 125 tons per day is to be erected on that very productive property. The machinery was telegraphed for yesterday, and excavating for the building commenced this morning on Silver Bow creek, near the Clark works. Concerning the capacity of the Liquidator to supply 125 tons of ore per day there can be no doubt. The property is well developed by a shaft 300 feet deep and crosscuts show the ledge to be forty feet between walls. All last year the output averaged 100 tons per day. The first and second class product was sold under contract to the Montana Copper Company while the third class or concentrating ore was left on the dump which now contains fully 15,000 tons available for reduction. The Liquidator is the extension of the Clark Colusa, which has lately become so prominent as a heavy contributor to the copper output of the camp, and is fully as extensive as that property. It is the intention of the company to concentrate the Liquidator ore from about 17 per cent, its average value, to 36 per cent, throwing about two tons into one. The concentrates will either be sold to the custom smelters or shipped East. The development of the mine will continue under the supervision of William McDermott, and the working force will be increased in a few days.

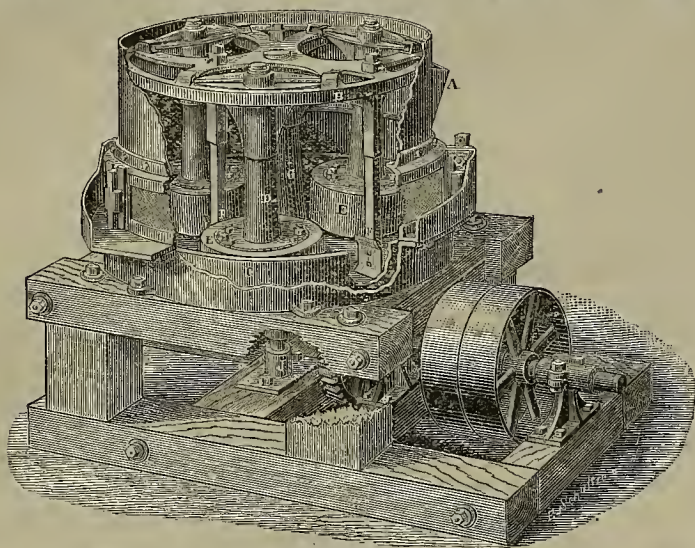
OREGON.

AT WORK.—*Jacksonville Times*, Aug. 12: Keaton, Klippel & Howard have completed the windmill in Applegate and are now at work in the bed of that stream. J. T. Layton is still engaged in cleaning up at his mines on Steamboat, though water is very scarce and progress necessarily slow. Prospectors are numerous throughout this section, and no doubt the finding of some valuable mines will be the result of their labors. W. J. Stanley of Woodville, came up yesterday and brought with him some quartz which is said to be rich in silver taken from a ledge which he has recently discovered.

UTAH.

PARK NOTES.—*Park Record*, Aug. 15: The Anchor Mining Company now have everything in readiness, and will begin sinking on Monday next. The Daly is steadily marching forward, improving at every step, and promises in time to successfully rival the Ontario. An election for a mining recorder for this district was held here on Tuesday last and the present incumbent, Pat Brennan, unanimously elected.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

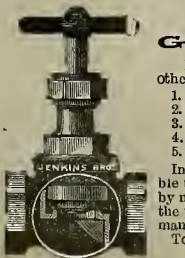
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



JENKINS PATENT VALVES. Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be discarded and replaced by a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'fg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

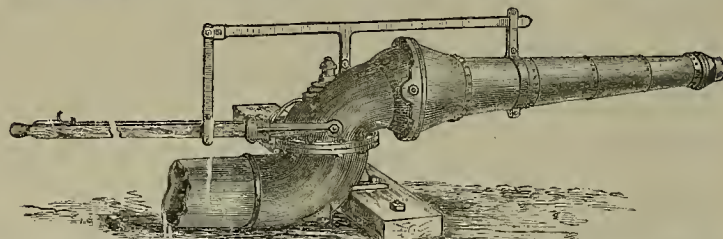
Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

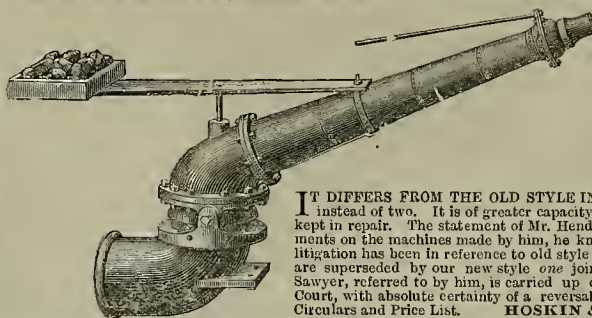
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



THIS CUT REPRESENTS OUR

**IMPROVED
HYDRAULIC
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

DEWEY & CO.'S

Scientific Press



Patent Agency.

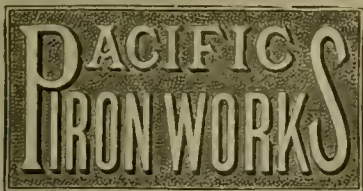
[ESTABLISHED 1860.]

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. E. EWER.

GEO. H. STRONG.



RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING and REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

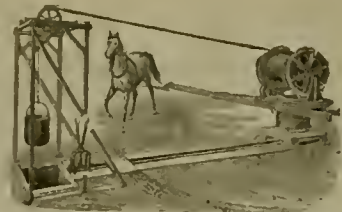
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER OF INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



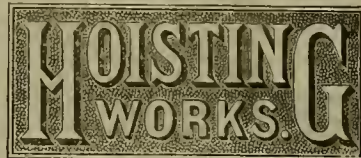
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY OF CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FINE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

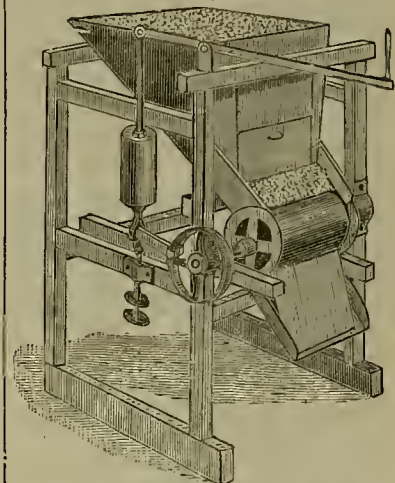
TRAMWAYS.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



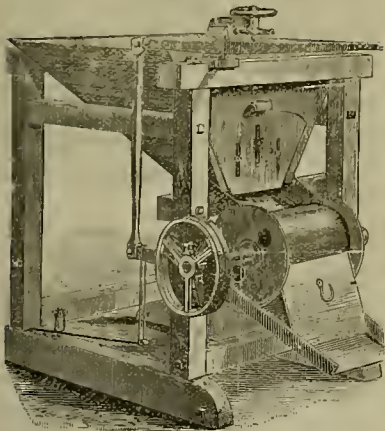
This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required. In the Banker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacture, 327 First Street, SAN FRANCISCO, CAL.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ore; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ore.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco.

This paper is printed with Ink Manufactured by Charles Enou Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 629 Commercial St. S. F.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market. SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,
218 California Street, San Francisco, Cal.



THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more around, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

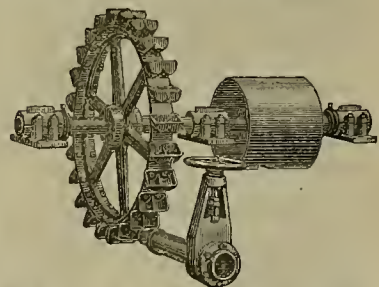
BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

DEWEY & CO. { 262 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distating all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.
AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.



FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

Engraving. Superior Wood and Metal Engraving, Electrotyping, and Stereotyping done at the office of the MINING AND SCIENTIFIC PRESS, S. F., at favorable rates.

Reasonable Mine Owners.

EDITORS PRESS:—The strictures in your last issue of your correspondent, "Experience," seem to me to be, in many respects, unfair and incorrect. His views must have been derived, not from contact with miners, but with those land-sharks known as "middlemen." He claims that miners ought not to ask so much for their mines, ought not to insist on cash, and ought to be content with "bonding" their claims, without any certainty of ever getting a cent for them.

As to asking too much, this is a matter of opinion. Every "prospect" has a speculative as well as an "intrinsic value," and the speculative value is that which always rules every market, in both personal and real property. To attempt to change this is simply absurd. As to cash payments the same business rule prevails in mining sales as in other cases. He that buys should pay cash down unless otherwise stipulated. If he has not got means, he has no business pretending to operate mines. As to the so-called "bonding" of mines, it has proved a delusion and a snare, that in most cases results in the mining claim being "gouged" by parties who content themselves with shallow work and pocket hunting—thus ruining the reputation of the mine and never fairly showing what it could do.

This style of "bonding" mines has proved, in most cases, a fraud on either the mine owner or the real purchaser. The person who takes the bond is generally some broken-down speculator, or self-styled expert. The price that he pretends to hold his "bond" for, is generally four times the actual contract price. If he forms a company to operate the mine, he makes them pay for it four times the price the mine owner gets. (My card will show you I ought to know what I am speaking about.) By a series of tricks the capitalists are humbugged by these middlemen, and the result is, the wrong impressions of mine owners, such as are set forth in the letter of "Experience."

The observations of "Experience," if made through the medium of these middlemen, or brokers, are correct, perhaps, if made from direct contact with mine owners, they are for the most part incorrect. Let those who desire to invest in mines deal directly with the mine owners. If so, they will find them very reasonable in price, easy in terms and honest and fair in their dealings. Such, at least in this Queen City of Quartz, is their general character.

Grass Valley, Aug. 15, 1885. INDEX.

Mining Share Market.

The crosscutting on the 520 level, west of the Sierra Nevada is a very interesting point for stock dealers to watch. Being in virgin ground, hitherto unexplored, with a long distance to run to find the west wall, and with all surface and other indications in favor of finding good ore deposits, speculative public attention is naturally drawn in that direction.

The Hale and Norcross deep winze still continues in ore and will soon be down to the 300 level, where it is to be connected with the Combination shaft by a drift, which will virtually and practically constitute the 300 level of the mine. The station set for it at the shaft is already in, and the station will be opened the first of next week, or as soon as the big pump gets into full substantial operation.

At the south or Gold Hill end very little ore is being produced, owing to the lack of milling facilities consequent upon the drying up of Carson river. The Brunswick mill, however, will start up with steam power on the first of next month, when ore production from the Yellow Jacket mine will be resumed under favorable auspices.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, department 10, San Francisco.

PENN M. CO., August 19.—Location, Quijotoa, Arizona. Capital Stock, \$50,000,000. Directors—A. B. Hull, of Oakland, George H. Rice, George Phillips, Thomas Cole, L. M. Pearlman, of San Francisco.

LIVERMORE OIL CO., August 19.—Objects: To carry on all business, including buying and selling lands, prospecting and boring, laying pipe lines, etc., with headquarters at San Francisco. Capital Stock, \$1,000,000. Directors—B. J. Triest, John F. Mc. Gauby, Edward Klein, L. Matson and W. H. Hanage.

Bullion Shipments.

Banner district, Idaho, 14, \$7,916; Wild Deer, 12, \$3,290; Queen of the Hills, 11, \$4,600; Crescent, 12, \$4,000; Hueneme, 12, \$6,545; Germania, 12, \$9,253; 14, \$7,963; 13, \$6,326; Queen of the Hills, 13, \$3,500; Christy, 14, \$1,439; Germania, 14, \$3,034; 16, \$4,409; Ontario, 15, \$27,225; Stormont, 15, \$2,990; Crescent, 15, \$3,559; Queen of the Hills, 15, \$1,900; Germania, 17, \$4,934; Queen of the Hills, 16, \$1,800.

The banks of Salt Lake report the receipt for the week ending August 12th, inclusive, of \$46,290.48 in bullion and \$25,545 in ore, a total of \$71,835.48.

MINING SHAREHOLDERS' DIRECTORY:

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOC.	N. NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Argenta M Co.	Nevada.	18.	10.	July 29.	Sept 1.	Sept 24.	E. M. Hall.	327 Pine St
Alaska M and M Co.	Alaska.	11.	40.	June 30.	Aug 6.	Aug 22.	T. J. Hay.	306 Pine St
Blue Bluff G M Co.	California.	11.	21.	July 10.	Aug 21.	Sept 12.	L. S. Adfield.	419 California St
Bullion M Co.	Nevada.	29.	25.	July 21.	Aug 20.	Sept 4.	J. M. Brazel.	323 Montgomery St
Crocker M Co.	California.	17.	50.	July 23.	Aug 27.	Sept 7.	C. E. Elliott.	309 Montgomery St
Copper Mt Con M Co.	California.	2.	01.	June 17.	Aug 13.	Sept 17.	A. L. Perkins.	310 Pine St
Cheva Santa M Co.	Mexico.	6.	25.	Aug 5.	Sept 11.	Sept 20.	W. L. Oliver.	323 Montgomery St
Equitable Tunnel M Co.	Utah.	32.	10.	Aug 3.	Sept 15.	Oct 7.	O. J. Collins.	512 Montgomery St
Elmtracht Gravel M Co.	California.	19.	05.	Aug 11.	Sept 16.	Oct 5.	H. Kuntz.	239 Sansome St
Giant M Co.	New Mexico.	1.	02.	Aug 11.	Sept 18.	Oct 19.	S. P. Middleton.	116 Montgomery St
Holmes M Co.	Nevada.	9.	1.00.	Aug 3.	Sept 7.	Sept 27.	C. T. Bridge.	224 California St
Hale & Norcross M Co.	Nevada.	86.	50.	Aug 4.	Sept 8.	Sept 21.	J. F. Lightner.	309 Montgomery St
Justice M Co.	Nevada.	42.	15.	July 13.	Aug 17.	Sept 5.	R. E. Kelly.	419 California St
Johnson Gravel M Co.	California.	1.	05.	July 1.	Aug 5.	Aug 25.	G. White.	315 Front St
Murchie M Co.	California.	9.	10.	June 24.	Aug 7.	Aug 31.	W. L. Oliver.	328 Montgomery St
North Star M Co.	California.	1.	20.	July 28.	Sept 1.	Sept 22.	D. A. Jennings.	401 California St
Peer M Co.	Arizona.	30.	30.	July 31.	Sept 2.	Sept 29.	A. Waterman.	309 Montgomery St
Potosi M Co.	Nevada.	19.	50.	July 14.	Aug 19.	Sept 10.	C. E. Elliott.	323 Montgomery St
Savage M Co.	Nevada.	63.	50.	July 11.	Aug 4.	Aug 24.	E. B. Holmes.	309 Montgomery St
Silver Hill M Co.	Nevada.	2.	10.	July 11.	Aug 4.	Aug 24.	E. B. Holmes.	309 Montgomery St
Scorpion M Co.	California.	2.	25.	June 24.	Aug 1.	Sept 1.	H. B. Mitchell.	125 Kearny St
Summers Con M Co.	California.	4.	05.	July 18.	Aug 31.	Sept 21.	F. E. Luty.	330 Pine St
Willow Creek M Co.	Nevada.	1.	1.00.	July 23.	Sept 7.	Oct 12.	R. Elliott.	310 Pine St
Young America M Co.	Nevada.	2.	10.	Aug 5.	Sept 8.	Sept 30.	E. M. Hall.	327 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Arnold S M Co.	California.	A. Judson.	329 Sansome St.	Annual.	Sept 1
Alaska M Co.	Alaska.	A. Judson.	329 Sansome St.	Annual.	Sept 31
Golconda M Co.	California.	J. M. Buffington.	309 California St.	Annual.	Aug 24
Mountain Tunnel Gravel Co.	California.	A. B. Paul Jr.	328 Montgomery St.	Annual.	Sept 1

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	06.	March 16
Mt Diablo M Co.	Nevada.	R. W. Heath.	318 Pine St.	20.	July 30
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	25.	Feb 13
Plymouth Con G M Co.	Nevada.	W. Van Norden, Pres.	23 Nassau St, N. Y.	50.	Aug 6
Silver King M Co.	Nevada.	J. Nash.	323 Montgomery St.	25.	July 15
Syndicate M Co.	Nevada.	J. Standfield Jr.	419 California St.	10.	May 5

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			San Francisco.			Los Angeles.			San Diego.		
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.
Aug. 12-19																		
Thursday	.00	60 S	Cy.	.00	94 NE	Cl.	.00	78 NW	Cl.	.00	62 SW	Cl.	.00	88 W	Fr.	.00	78 W	Cl.
Friday	.00	74 NW	Cl.	.00	101 NW	Cl.	.00	88 NW	Cl.	.00	74 NW	Cl.	.00	94 W	Cl.	.00	80 W	Cl.
Saturday	.00	80 NW	Sy.	.00	103 SW	Cl.	.00	95 SW	Fr.	.00	66 W	Cl.	.00	94 W	Cl.	.00	78 NW	Fr.
Sunday	.00	82 NW	Sy.	.00	102 N	Cl.	.00	90 NE	Cl.	.00	63 W	Cl.	.00	95 W	Fr.	.00	81 W	Cl.
Monday	.00	74 NW	Sy.	.00	104 SE	Hy.	.00	98 NW	Cl.	.00	67 W	Cl.	.00	95 W	Cl.	.00	83 NW	Cl.
Tuesday	.00	74 NW	Sy.	.00	104 N	Fr.	.00	95 S	Cl.	.00	64 W	Cl.	.00	99 W	Cl.	.00	84 W	Cl.
Wednesday	.00	70 NW	Sy.	.00	100 S	Cl.	.00	91 S	Cl.	.00	62 W	Fr.	.00	101 W	Fr.	.00	84 S	Fr.
Totals	.00			.00			.00			.00			.00			.00		

EXPLANATION.—Cl. for clear; Cy., cloudy; Fr., fair; Fy., foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time). Amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 30.	WEEK ENDING Aug. 6.	WEEK ENDING Aug. 13.	WEEK ENDING Aug. 20.
Alpha	.90	.95	.90	.80
Alta	.35	.40	.35	.40
Andes	.20	.25	.25	.20
Argenta	.50	.55	.50	.50
Belcher	.20	.25	.25	.20
Belling	.20	.25	.25	.20
Best & Belcher	2.00	2.30	2.05	2.40
Bullion	.15	.10	.15	.10
Bonanza King	.15	.10	.15	.10
Belle Isle	.15	.10	.15	.10
Bodie Con.	1.80	1.90	1.60	1.75
Beuton	.10	.10	.10	.10
Bodie Tunnel	.15	.15	.15	.15
Bulwer	.15	.15	.15	.15
California	1.65	1.90	1.80	2.20
Challenge	.15	.15	.15	.15
Champion	.15	.15	.15	.15
Chollar	1.15	1.30	1.00	1.25
Coudenberg	.35	.35	.35	.35
Con. Imperial	.10	.10	.10	.10
Con. Virginia	1.65	1.90	1.80	2.20
Con. Pacific	.10	.10	.10	.10
Crown Point	1.10	1.25	1.15	1.20
Day	.10	.10	.10	.10
Eureka Con.	.50	.50	.50	.50
Eureka Tunnel	.15	.15	.15	.15
Exchequer	.15	.15	.15	.15
Grand Prize	.15	.15	.15	.15
Gould & Curry	1.25	1.50	1.30	1.60
Goodshaw	.15	.15	.15	.15
Hale & Norcross	6.25	7.12	6.50	6.37
Holmes	3.50	2.25	3.50	3.00
Independence	.10	.10	.10	.10
Julia	.10	.10	.10	.10
Justice	.05	.05	.05	.05
Martin White	.10	.10	.10	.10
Mono	1.20	1.30	1.15	1.50
Mexican	.75	.85	.80	.80
Mt. Diablo	1.85	2.00	1.80	2.00
Northern Belle	.95	1.05	.90	.95
North Belle Isle	.10	.10	.10	.10
Oberlin	1.05	1.15	1.15	1.35
Overman	.40	.30	.35	.40
Potosi	.35	.40	.30	.35
Pinal Con.	.25	.25	.25	.25
Savage	2.05	2.25	1.75	2.65
Seg. Belcher	.15	.15	.15	.15
Sierra Nevada	1.25	1.40	1.30	1.65
Silver Hill	.15	.15	.15	.15
Silver King	.10	.10	.10	.10
Scorpion	.10	.10	.10	.10
Syndicate	.15	.15	.15	.15
Tloga	.10	.10	.10	.10
Union Con.	.80	.80	.80	.80
Ute	.15	.15	.15	.15
Yellow Jacket	1.55	1.70	1.60	1.70

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug. 20.	100 Mexican.	85c
200 Alpha	85c	1.30
400 B. & Belcher	2.20	2.25
300 Bodie Con.	1.50	1.35
50 Bullion	.40c	.40c
770 Chollar	1.30	1.35
450 Con. Va. & Cal.	2.05	1.60
110 Gould & Curry	1.45	1.60
100 Hale & Nor.	8.25	1.70
200 Mono	1.30	1.30
190 Navajo	.75c	.75c
100 Oberlin	.80c	.80c
100 Overman	.35c	.35c
200 Savage	2.60	2.60
90 Sierra Nevada	1.60	1.60
200 Union	.90c	.90c
40 Yellow Jacket	1.70	1.70

The Young Men and Young Women.

All young men and girls should prepare themselves for usefulness in business if they wish to "step up higher." We have for sale, on easy and favorable terms, a scholarship in one of the best business colleges in the U. S. Address this office.

POSITIVE fact! Muller is the leading optician, 135 Montgomery St., near Bush.

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 262 Market St., S. F.]

FOR WEEK ENDING AUGUST 11, 1885.

- 324,004.—BILLIARD TABLE—E. Brunswick, S. F.
324,007.—BOILER TUBE EXPANDER—M. Cashin, S. F.
324,094.—VALVE GEAR—W. H. Donaldson, S. F.
324,096.—PISTON ROD PACKING—J. W. Dudley, Portland, Or.
324,022.—TAILORS' MEASURING DEVICE—J. S. Hand, S. F.
324,023.—HORSE COLLAR APPARATUS—Thos. Harris, Sacramento, Cal.
324,031.—COUPLING FOR CONNECTING PIPES—J. J. Lacey, S. F.
324,035.—CIGARETTE MACHINE—J. W. McCoy, S. F.
324,036.—FRUIT JAR—W. C. Moody, Oakland, Cal.
324,039.—NAPKIN SUPPORTER—W. C. Nelson, Santa Rosa, Cal.
323,961.—HEADER AND THRASHER—Thomas Powell, Stockton, Cal.
324,163.—PAINT BREMER—Thos. Poyser, S. F.
324,275.—FLAXSEED CLEANER—Thomas R. Rosier, San Jose, Cal.
324,284.—WINDMILL—R. F. Wilson, Stockton, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

NAPKIN SUPPORTER.—Wm. C. Nelson, Santa Rosa, No. 324,039. Dated, Aug. 11, 1885. This is a novel device for holding the napkin around the neck of the user; and it consists of an elastic wire having its central portion bent backward and forward upon itself into coils, while its ends are curved backward from these coils so as to be easily placed around the neck of the wearer to hold it up, while the napkin is held by the elasticity of the coils which are at the front.

APPARATUS FOR FORMING HORSE COLLARS.—Thos. Harris, Sacramento, assignor to A. A. Van Voorhis & Co., of same place. No. 324,023. Dated Aug. 11, 1885. The apparatus relates to that class of apparatus for forming horse collars, in which expanding and separable blocks or jaws receive and form the collar and hold it for the roping operation. The invention consists of a two-part expanding block or jaw for the top or neck of the collar, saddle-plates adapted to fit over the filling in plates, between the parts of the expanding blocks or jaws, both at the top and bottom of the collar, said saddle-plate being curved to continue the curvature of the periphery of blocks, adjustable washer-plates fitted in the sides of the dove-tailed slides or tracks, by which the blocks are steadiad and the wear taken up, and a scale to denote the sizes of the collars.

CIGARETTE MACHINE.—Juan W. McCoy, assignor to "Wood Tip Cigarette Co., of California." No. 324,035. Dated August 11, 1885. This invention relates to that class of machines for manufacturing cigarettes in which the finely cut tobacco is, by a succession of operations, first fed and distributed upon a continuous moving belt or former; secondly, compacted and formed into a continuous roll; thirdly, wrapped and inclosed in the envelope or strip of paper, the edges of which are then overlapped and secured by paste; and lastly, the continuous roll severed at intervals into cigarettes of the desired length. The improvements relate not only to the different parts of the machine by which these successive operations are accomplished, but also to the general arrangement of the parts composing the machine, resulting in a more compact and greatly improved machine for this purpose.

ELECTRO-MAGNETIC SPEED REGISTER FOR SHIPS' LOGS.—Bernard Faymonville, of S. F., Cal., No. 323,134. Dated July 28, 1885.—This invention consists of a peculiar speed register drawn through the water, a registering mechanism on the ship and an electric connection between them by which the movements of the former are recorded by the latter. The speed register in the water consists of an outer drum or cylinder having propeller-like wings, by which, on account of the forward movement through the water, the cylinder is rotated. Inside is an inner drum or cylinder, acting as a journal for the outer cylinder, and adapted to rotate upon a central axis. Gearing connects the two cylinders in such a manner that the inner one is driven by the outer one, but at a much less rate of speed. The cylinders and central axis are made of non-conducting material, but upon the inner cylinder is a metallic plate, which, at each revolution comes into contact with a metallic plate on the central axis. Insulated wires pass through the axis and connect with its metallic plate. The other or inboard ends of the wires are in a battery circuit including an electric magnet, which acts intermittently through an armature, as the circuit is opened and closed by the rotating inner drum, to operate a panel or ratchet mechanism which, through a system of gears and shafts operate the registering device on the ship.

COAL MINING BY ELECTRICITY.—An important and interesting experiment was recently carried on at Streator, Illinois. The object was to apply electricity as a motor in operating coal-cutting machinery, a branch of mechanics which has hitherto resisted the genius of inventors, and has only lately yielded to the extent of allowing machinery to be introduced at a very small margin of profit. This, as far as we know, is the first attempt in this direction, and, the mining engineers present at the experiment are reported to have been quite enthusiastic over the result, and to be sanguine of ultimate success. It is thought probable that in the near future an electric plant may be placed in the center of a section of land, and the coal under it be mined, conveyed to four hoisting shafts, hoisted to the surface, and the entire mine be lighted, all from the power furnished by the one central plant. The new mining machine does is cutting by a chisel shaped pick fastened at the end of a piston which is propelled by a direct and reciprocal motion from an electric current. Most electrical machines have hitherto been operated by rotary motion, and the establishment of a direct reciprocal motion is regarded as important on account of the great economy of power secured.—Iron.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.
 Known as "Cargo" prices are at present as follows:
 Rough, merchantable, 2 M ft., \$13.00; Rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 Rustic, No. 1, \$22.00; 1x8, tongued and grooved, \$21.00; 1x4, tongued and grooved, beaded, \$23.00; 1x3, Battens (board measure), \$30.00; Shingles, 2 M, \$1.05.

Plum—Rough, \$15.00; No. 2, \$12.00; do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$18.00; do 50 to 60 ft, \$17.00; T and G Flooring, 1x6, \$26.00; do 1x8, \$25.00; do 1x10, \$24.00; do 1x12, \$23.00; No. 2, \$21.00; Vertical Grain T and G Flooring, 1x6, \$30.00; do 1x8, \$29.00; do 1x10, \$28.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., 1 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:	
Plum, Rough, 2 M ft.	\$15.00
" " No. 2, 2 M ft.	12.00
" " 2 1/2 lengths.	13.00
" " 40 to 50 feet lengths.	16.00
" " 50 " 60 "	17.00
T. & G. Flooring 1 x 6.	26.00
" " 1 x 8.	25.00
" " 1 x 10.	24.00
" " No. 2.	21.00
Vertical Grain T. & G. Flooring, 1 x 6.	30.00
" " 1 x 8.	29.00
" " 1 x 10.	28.00
Stepping.	37.50
Furring, 1 x 2, per lineal foot.	1 c.
Redwood, Rough.	17.00
" " No. 2.	13.00
" " Surfaced.	30.00
" " 1 x 6.	28.00
" " 1 x 8.	26.00
" " T & G. 6 in. 12 ft. and over.	28.00
" " " 7 to 12 ft.	25.00
" " " under 7 ft.	20.00
" " Rustic.	30.00
" " No. 2.	25.00
" " T. & G. Beaded 12 ft. and over.	30.00
" " " 7 to 11 ft.	25.00
" " " under 7 ft.	20.00
" " Siding, 1 in.	22.50
" " Rough Pointed.	25.00
" " Square.	14.00
Battens, 1 x 3 per lineal ft.	07
Shingles.	2.00
Laths, 1 1/2.	3.25
" 1.	3.75
Damage Boards less 5, delivered.	16.00

Nails.

We give the price list of the Pacific Iron and Nail Company.

SALES.	SLATING.
10d to 10d.	5d.
10d to 10d.	25d.
10d to 10d.	50d.
10d to 10d.	75d.
10d to 10d.	100d.
10d to 10d.	125d.
10d to 10d.	150d.
10d to 10d.	175d.
10d to 10d.	200d.
10d to 10d.	225d.
10d to 10d.	250d.
10d to 10d.	275d.
10d to 10d.	300d.
10d to 10d.	325d.
10d to 10d.	350d.
10d to 10d.	375d.
10d to 10d.	400d.
10d to 10d.	425d.
10d to 10d.	450d.
10d to 10d.	475d.
10d to 10d.	500d.
10d to 10d.	525d.
10d to 10d.	550d.
10d to 10d.	575d.
10d to 10d.	600d.
10d to 10d.	625d.
10d to 10d.	650d.
10d to 10d.	675d.
10d to 10d.	700d.
10d to 10d.	725d.
10d to 10d.	750d.
10d to 10d.	775d.
10d to 10d.	800d.
10d to 10d.	825d.
10d to 10d.	850d.
10d to 10d.	875d.
10d to 10d.	900d.
10d to 10d.	925d.
10d to 10d.	950d.
10d to 10d.	975d.
10d to 10d.	1000d.

Each half keg 10 cents extra.
 TERMS.—Note or acceptance at 60 days with current rate of Exchange on S. F., or a discount of 2 per cent for cash, if remitted within 10 days from date of invoice.
 All accounts when due subject to slight draft without notice.
 An abatement of 10 cents per keg will be allowed upon orders of 200 kegs or over.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Aug. 20, 1885.

ANTIMONY—Per pound.	12 @
Bismuth.	13 @
Copper—Refined.	7 @ 7 1/2
Iron—Glengarnock ton.	25 00 @
Eglington, ton.	23 50 @
American Soft, 800.	25 00 @
Oregon Pig, ton.	— @
Clippert Gap, Nos. 1 & 4.	25 00 @ 30 00
Clay Lane White.	26 00 @
St. Louis, No. 1.	25 50 @
STEEL—English B. & S.	16 @ 25
Black Diamond, ordinary sizes.	13 @
Flow.	— @ 5
Machinery.	8 @ 10
Sanderson Bros.	13 @
COPPER—	
Brass sizes.	20 @ 22
Fire-box sheets.	20 @
Bolt.	20 @
Yellow Metal.	12 @ 13
LEAD—Pig.	4 @ 4 1/2
Bar.	5 @
Pipe.	7 @
Sheet.	7 @
Shot, discount 10% on 500 bag Prop. 8 bag.	1 85 @
Buck, 8 bag.	2 05 @
Chilled, do.	2 25 @
TINPLATE—Coke.	5 25 @ 6 50
Charcoal.	6 75 @ 7 25
ZINC—German.	7 10 @ 7 25
Sheet, 73 1/2 ft. 7 to 10 lb. less the cask.	9 @ 10
QUICKSILVER—By the flask.	33 50 @
Flasks, new.	1 05 @
Stank, old.	85 @
NEW YORK PRICES.	
California Borax, refined.	7 1/2 @ 8
Pig Iron, American.	16 00 @ 18 00
Quicksilver.	4 15 @ 4 25
Lead.	— @ 4 25
Copper.	11 @
Tin.	20 @
Bar Silver.	1 05 @

Look for Your Subscription Credit.

Subscribers on paying for this paper should look at the date of the printed labels on their papers, and if the same is not credited, in due time, up to the date paid for, be sure to write us without delay. If an agent or clerk receiving the money should inadvertently or intentionally omit credit, it is important to the subscriber and ourselves that we be informed of it immediately, that we may act accordingly. Subscribers will please notify us of all errors which they may notice of any kind on our mail list. Be sure to write us if the paper comes after you wish it discontinued.

Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examination ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemburg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly experienced.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

Our long experience in obtaining patents for inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street. Elevator, 12 Front St., S. F.

BOOKS ON WORKING ORES.

BY GUIDO KUSTEL, M. E.

CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arc-furnaces, and Gold and Silver Ores generally, with 120 Lithographic Diagrams.

This work is unequalled by any other published embracing the subjects treated. Its author is highly esteemed and regarded by its readers; containing, as it does, much essential information to the Miner, Metallurgist, and other professional workers in ore and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 120 diagrams, illustrating machinery, etc., which alone are of the greatest value. Price, \$7.50.

BOARDING OF GOLD AND SILVER ORES (Second Edition) and the EXTRACTION of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

This rare book on the treatment of gold and silver ore, without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and the why and wherefore. It contains 150 pages, embracing illustrations of furnaces, supplements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. Price, \$3.00, postage free.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARRO C. HOAG—California.
 J. J. BARTELL—California.
 A. C. KNOX—Ventura and Los Angeles Co's.
 O. W. KNOX—Arizona.
 E. L. RICHARDS—San Diego Co.
 W. B. TURNER—Oregon.
 G. R. McDOWELL—Fresno and Tulare Co's.
 J. W. DUTCH—Sacramento.
 J. DE PER, Yolo Co.

MECHANICAL INSTITUTE

Opens August 25th,
 Closes Sept. 26th.

With a most Comprehensive display of
 MANUFACTURES, NATURAL
 PRODUCTS AND ART.

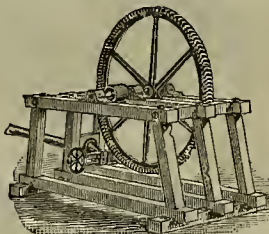
Grand Instrumental Concert Each Day and Evening.

SPECIAL FLORAL DAYS
 Each Week. Over \$1200 offered as premiums floral work.

ADMISSION:
 Double Season Tickets..... \$5 00
 Single Season..... 3 00
 Apprentices' Season..... 1 50
 Child's Season..... 1 50

Single admission, 50c; Child's 25c.
 Season Tickets to Members of the Institute at half rates.
 P. B. CORNWALL, President.
 W. P. STOUT, Secretary.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!
 All Estimates Guaranteed.
 SEND FOR CIRCULAR.

EDWARD A RIX & CO.,
 Sole Agent,
 18 and 20 Fremont Street, San Francisco

RICHARD C. REMMEY, Agent,
 Philadelphia Chemical Stoneware Manufactory,
 1100 East Cumberland St., PHILADELPHIA, PA.



TO LET.

A Large Room on Third Floor
 of 252 Market St.

INQUIRE OF
 DIXON, BORGESON & CO.,
 37 Market St., S. F.

HEAD'S BUSINESS COLLEGE,
 24 Post St. S. F.
 Send for Circular.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for
 GOLD, SILVER and LEAD ORES
 AND SULPHURETS.

...MANUFACTURERS OF...
 BLUESTONE,
 LEAD PIPE,
 SHEET LEAD,
 SHOT, Etc., Etc.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,
 MINE AND MILL SUPPLIES,
 CHEMICAL APPARATUS AND CHEMICALS, DRUG
 GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scoffers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON, ASSAYER AND ANALYTICAL CHEMIST.

118 Leideedorf Street,
 Bet. California and Sacramento Sts., SAN FRANCISCO
 ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
 Near First and Market Streets, S. F.
 C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process,
 Ores Sampled.
 Assaying in all its Branches.
 Analyses of Ores, Minerals, Waters, etc.
 Working Tests (practical) Made.
 Plans and Specifications furnished for the most suitable Process for Working Ores.
 Special attention paid to Examinations Mines; Plans and Reports furnished.
 C. A. LUCKHARDT & CO.,
 (Formerly Huhn & Luckhardt),
 Mining Engineers and Metallurgists.

METALLURGICAL WORKS, STRONG & CO., 10 Stevenson Street, S. F. ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. H. KUSTEL.
 METALLURGICAL WORKS,
 318 Pine St. (Basement),
 Corner of Leideedorf Street, - SAN FRANCISCO

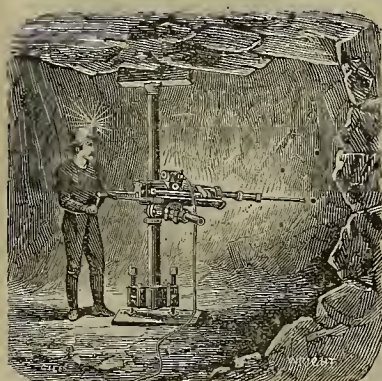
Ores Sampled and Assayed, and Tests made by my Process.
 Assaying and Analysis of Ores, Minerals and Waters.
 Mines Examined and Reported on.
 Practical Instruction given in Treating Ores by improved processes.
 G. KUSTEL & CO.,
 Mining Engineers and Metallurgists.

THOMAS PRICE, Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
 524 SACRAMENTO STREET,
 SAN FRANCISCO, - CALIFORNIA.

THE HARMON SEMINARY, Berkeley, Cal.

A BOARDING AND DAY SCHOOL FOR
 YOUNG LADIES.
 Pupils taken at any time.
 For Catalogue or other information, address:
 THE MISSES HARMON, Berkeley, Cal.
 Or E. J. WICKSON, 414 Clay St., S. F.



INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING AND SHEARING

MACHINERY.

F. A. ROBBINS,

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco
7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting and Domestic use.

NATIONAL VACUUM DREDGE CO., for River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

Room 5, First Floor,
BOSTON, MASS.

"ACME" DRAWING PAPERS QUEEN & CO'S

CELEBRATED

PROFILE AND CROSS SECTION PAPERS



Extra Fine
Swiss
Instruments

QUEEN & CO'S Improved TRANSITS and LEVELS, TAPES, CHAINS, RODS, RULES, and Drawing Materials of every description. List and description of our Ten Catalogues sent on application.

JAMES W. QUEEN & CO.,
924 Chestnut St., Philadelphia.

San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast,

Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high pressures. Freedom from scaling. Equally adapted for power and heating purposes. Especially adapted for mills, factories, hotels, stores or any place where safety is a necessity. Will work well with muddy water and any kind of fuel.

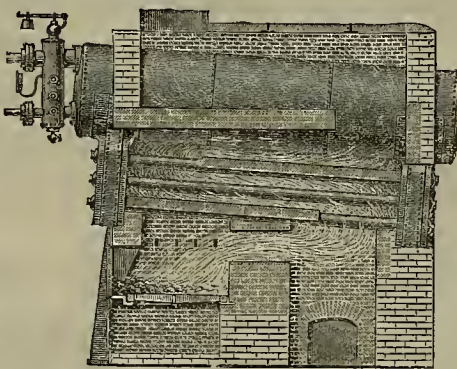
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

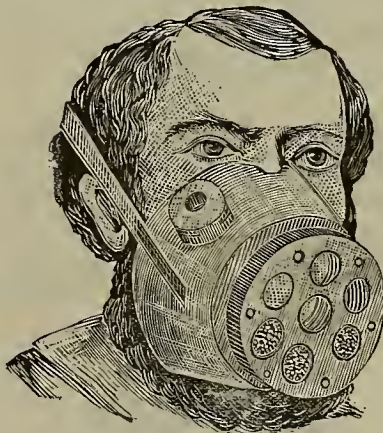
Risdon Iron and Locomotive Works—Gentlemen: We have had one of your Heine Patent Safety Boilers in use for four months at our Borax Works, in Alameda. It does good work and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear Sirs: I am using one of your Heine Patent Safety Boilers in my Candy Factory on Twenty-Third street, near Valencia. For economy of fuel, safety and efficiency I have never seen its equal. Very truly yours,
(Signed) W. S. TOWNSEND.



Send for Circular and Prices.



PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

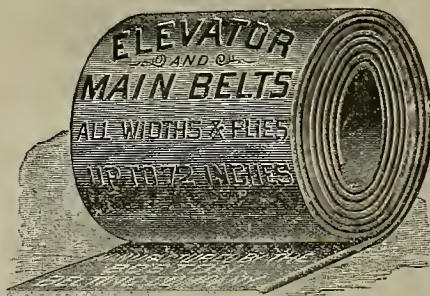
In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.



Chicago Prices Beaten!

ESTABLISHED 1860

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed.

DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS.
Elevator, 12 Front.

Iron and Machine Works.

UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,
MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kind of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Congers of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch.
PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF—
Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machine

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henriksen's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

Smith's Patent Belt Fasteners.



Are positively unequalled for fastening Leather, Rubber, or Cotton Belting. THE ONLY FASTENER that will run under tighteners, on patent rolls in flour mills, and Electric Light machines. Easier to apply than Lacing and far more Economical.

Patented Sept. 20, 1881; Aug. 15, 1882; June 16, 1884.

PRICE LIST.

No. 1—For large drive belts, per box of 100 \$2 00
No. 2—For Cotton drive belts, per box of 100 1 75
No. 3—For Rubber drive belts, per box of 100 1 50
No. 4—For single Leather belts, per box 1 25
Combination Punch with guides and nippers 1 25
Reamers for taking fasteners out 35
TRY THEM! They will save you loss of Time, TEMPER and MONEY. Manufactured by

H. D. EDWARDS & CO.,

Nos. 16, 18 and 20 Woodward Ave., DETROIT, MICH.

Manufacturers of Oak Leather Belting, Agents for J. B. Hoyt & Co., N. Y. Belting and Packing Co., Eureka Fire Hose Co., Cotton Belting Mill Supplies. FOR SALE BY Dunham, Carrigan & Co., San Francisco, Cal.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

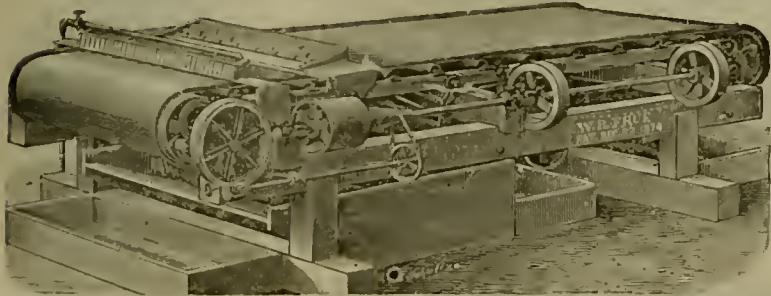
CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

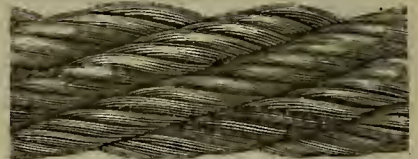
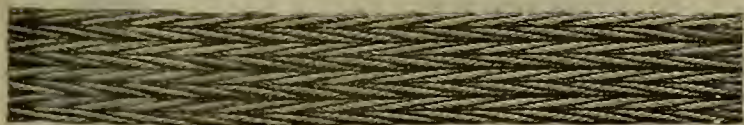
**ADAMS & CARTER, Agents Frue Vanning Machine Co.,
Room 7—No. 109 California Street, — — — SAN FRANCISCO, CAL.**

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



Barbed Wire.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the **CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.**

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel, Machinery and Special Shape Steel to size and length. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
1883 —
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

22 Fremont Street,
SAN FRANCISCO.



INVENTORS. MODEL MAKER,

258 Market St., N. E. cor Front, up-stairs, S. F. Experiment
al machinery and all kinds of models, tin, copper and brass

L. PETERSON,

"CLAYTON" IMPROVED

AIR COMPRESSORS

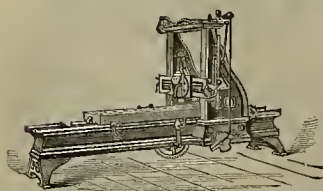
For CATALOGUES, ESTIMATES, Etc., Address:
Clayton Compressor Works,
near Brooklyn Bridge, **BROOKLYN, N. Y.**

PATENTS. Thousands of Inventors throughout the Pacific Coast can and will willingly attest to the promptness, reliability and success of Dwyer & Co.'s U. S. and Foreign Patent Agents. No. 252 Market St., Elevator 12 Front St., S. F.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



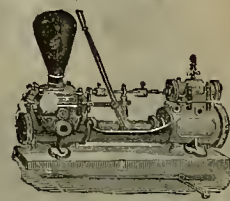
Putnam Planer.

PARKE & LACY.

IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

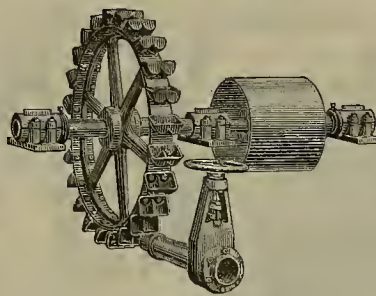
Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.

SEND FOR CIRCULARS.

**PELTON**
HURDY-GURDY WATER WHEEL.

SOLE AGENTS FOR

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.

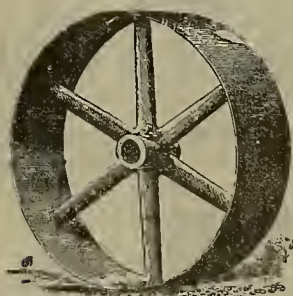


JOSHUA HENDY MACHINE WORKS,

Nos. 49 and 51 Fremont Street, - - - - - San Francisco, Cal.

— DEALERS IN —

NEW AND SECOND HAND BOILERS, ENGINES, AND MACHINERY
OF EVERY VARIETY.



PULLEY.

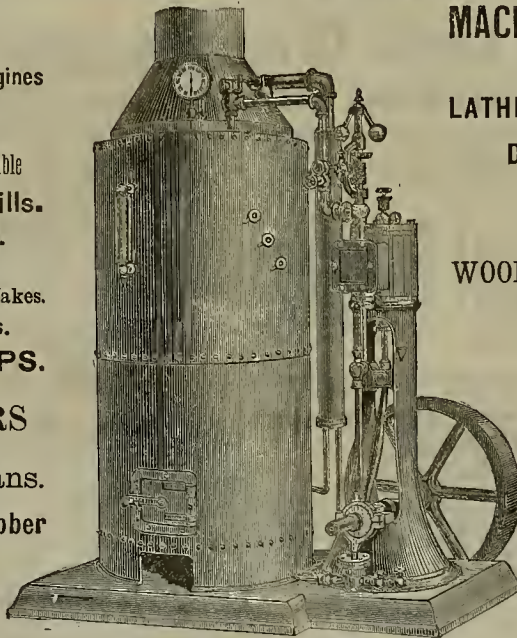
Stationary,
Portable, and
Hoisting Engines
and Boilers.

Improved Single and Double
Circular Sawmills.
SHINGLE MILLS.

Steam Pumps of all Makes.
Centrifugal Pumps.
MINING PUMPS.

BLOWERS
— AND —
Exhaust Fans.
Leather and Rubber

BELTING.



UPRIGHT ENGINE AND BOILER.

MACHINISTS' TOOLS

— COMPRISING —

LATHES,

DRILL PRESSES,
PLANERS, Etc.

WOODWORKING
MACHINERY

— COMPRISING —

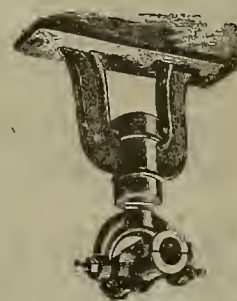
Band-Saws,

Stickers,

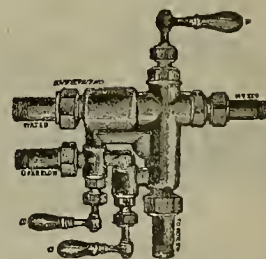
Planers,

Shapers,

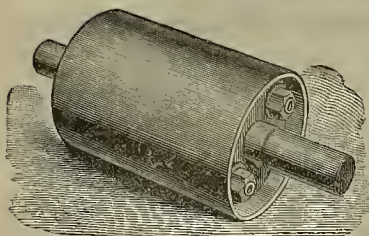
Etc., Etc.



HANGER.



DUPLEX INJECTOR.



PATENT COUPLING.

MINING, QUARTZ, AND SAWMILL MACHINERY.

AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.

— AGENTS FOR THE SALE OF —

Baker Rotary Pressure Blowers, Akron (Ohio) Hot-Polished Shafting,

Wilbraham Rotary Piston Pumps, Blaisdell & Co.'s Machinists' Tools.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron. Only One Seam. No Corners to Catch. Runs with Least Power.

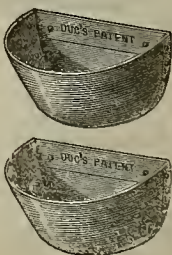
BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,

22 Cliff Street, New York.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 29, 1885.

VOLUME LI
Number 9.

Triumph Ore Concentrators.

Our attention has been directed to a circular recently issued by the Joshua Hendy Machine Works of Nos. 39 to 51 Fremont street, this city, giving a full description of the above form of concentrators, with directions for setting up and operating them, and we note that several important improvements have been introduced into their construction which must necessarily greatly increase their durability and efficiency. Notably among these improvements is a stiffening of the frame by heavier cross-pieces near the head of the machine, and placed directly under the main crank or eccentric shaft with dripping receptacles on each end for the catchment of any oil escaping from the main shaft boxes.

The main crank shaft has been made heavier being now two inches in diameter, which tends to impart greater steadiness of motion to the shaking frame and its increased size gives, of course, increased durability to the shaft itself.

By the introduction of this cross-piece and certain changes in the shaft, its bearings are brought together on the one independent piece by which their true position in line is secured under all conditions of change.

The riddle table which was formerly bolted to the feed and amalgam bowl has been discarded, and a riddle and distributing table of wood substituted, which is supported upon standards which are bolted to the shaking frame in front of the bowl and set with a slight pitch from the bowl towards the surface of the endless traveling belt. This change is an important improvement, as it will readily be observed that the motion of the table is now reciprocal with the longitudinal movement of the shaking frame and belt. The form of the upper portion of the pulp and amalgam bowl has been altered, by which the pulp is distributed not only at the center, as formerly, but at both ends as well, whereby a better distribution of the pulp is had in the bowl and a more perfect separation of the metallic particles, amalgam and quicksilver, effected by the action of the stirrers or fingers fixed on the shaft running through the bowl, and these pulp entrances being located back of the stirrer shaft it is kept clear of pulp and all splashing is prevented. Several other improvements of perhaps minor value have been devised, which now make this concentrator complete in efficiency of its operation and durability.

Profitable Lead Mining.

Some of the English companies which are mining on this coast have done very well, though many of them have paid exorbitant prices for their properties. As to profitable mines, a case in point is that of the Richmond Consolidated, of Eureka, Nevada. The capital of the company is £270,000, or 54,000 shares of £5 each. The total dividends paid aggregate £808,517. The profit last year was £35,667 against £30,146 the previous year. Out of this sum of £35,667 3s. 6d. and the sum of £17,093 13s. 5d. brought forward from last year's account the directors have paid dividends during the year amounting to £13,500 and £8,337 17s. 4d. for expenses of defending mine, law costs,

ing, purchased ore, renewals and repairs and all other working and general expenses at Eureka being £126,506 1s. 10d., the profit for the year on mining, smelting and refining is, with £97 1s. 2d. received for sundries, £43,158 13s. 6d. The ore smelted this year has been of about the same quality as last year, the average being \$57.32 as against \$56.01 last year, and the yield per ton of ore has been this year \$51.77 as against \$52 13. The expenses of mining have been reduced from \$15.83 to \$11.75 per ton of ore; this is principally on account of the small quantity of deadwork done. The smelting expenses per ton have also been reduced from \$11.72 to \$10.39. The amount paid for purchased ore has again been very large—£48,181 for 8940 tons as compared with £48,357

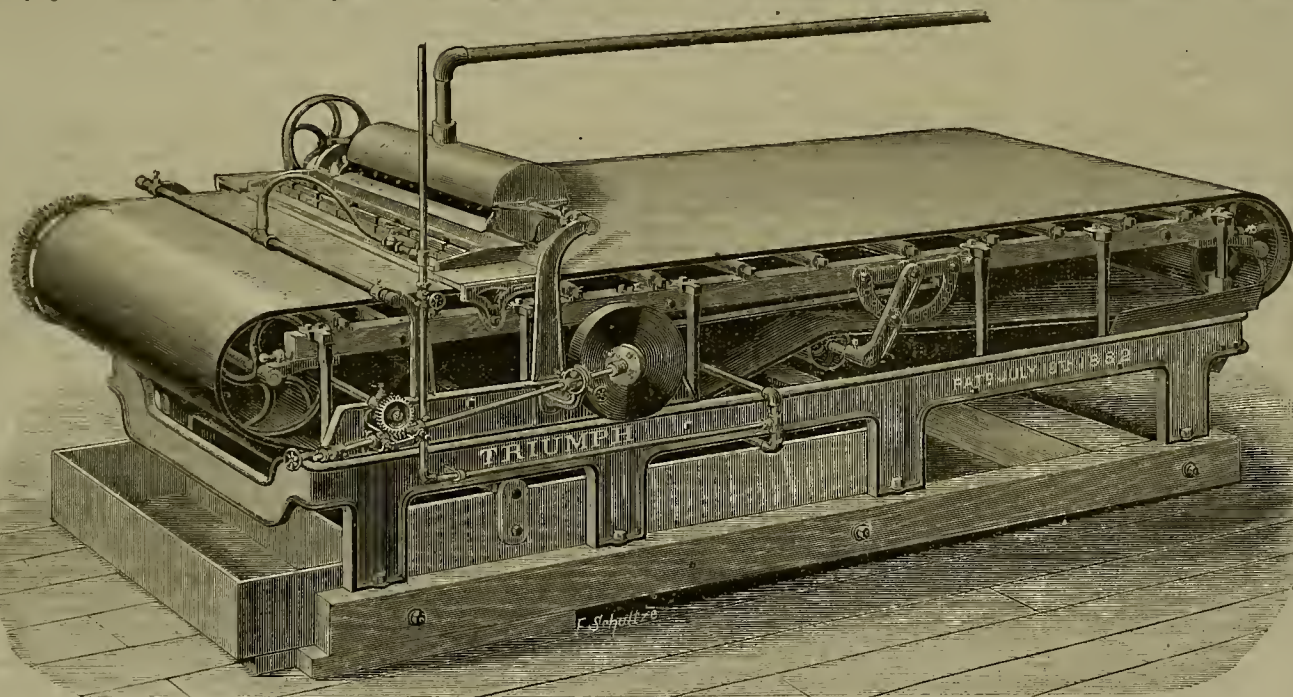
Deep Mining for Gold.

Although gold mining in Victoria, N. S. W., is an industry which is comparatively depressed just now, there are some features which are not only encouraging there, but also to gold miners in other parts of the world. The Mining Registrar for the central division of the Ballarat district, reports the Band of Hope and Albion Consols Company, on the Redan line of reef, struck a solid body of stone two feet six inches in thickness in a cross-cut at a depth of 1000 feet, the greatest depth yet attained on that reef. "This opportune discovery of payable quartz at the deeper levels," writes the Mining Registrar, "cannot fail to give a great impetus to mining operations in this district and to this line in particular."

They believe in deep mining for gold in that region as may be seen from the following list of the ten deepest shafts in Victoria—(1) Magdala Company, at Stawell, 2409 feet; (2) Lancel's 180 mine, Sandhurst, 2041 feet; (3) Victoria and Pandora Company, Sandhurst, 2000 feet; (4) Newington Company, Pleasant Creek, 1940 feet; (5) Prince Patrick Company, Pleasant

Creek, 1830 feet; (6) Crown Cross United Company, Pleasant Creek, 1815 feet; (7) Prince Alfred Company, Pleasant Creek, 1770 feet; (8) North Old Chum Company, Sandhurst, 1684 feet; (9) Oriental Company, Pleasant Creek, 1676 feet; (10) New Chum and Victoria Company, Sandhurst, 1625 feet. Only two of these shafts were deepened during the quarter, viz., that of the Victory and Pandora Company by 60 feet, and that of the North Old Chum Company by 20 feet.

The mining population of the colony is estimated by the Mining Registrars at 27,632. In quartz mining 12,409 miners are engaged, and 15,223 in alluvial mining. Of the total mining population 5258 are Chinese. The value of the machinery employed in the gold fields is £1,879,316. The Registrars' reports show that in many localities mining suffered during the quarter through want of sufficient water for sluicing and crushing purposes. The total quantity of gold raised during the three months ended 31st March was 192,438 ozs. 11 dwts. 15 grs., and its value, at £4 per oz., is £769,754 6s. 6d. The area of auriferous ground actually worked upon is returned as 315 square miles, being about $\frac{1}{4}$ square miles in excess of the area worked upon during the previous quarter.



IMPROVED TRIUMPH ORE CONCENTRATOR, SHOWING NEW RIFFLE TABLE.

etc., they have also written off £3,931 14s. 3d., the balance of outlay on Williamsburg mine, leaving a balance to the credit of revenue of £26,971 5s. 4d. to be carried forward to next year.

From the report of the directors, just issued, it is seen that during the past year 6297 tons of Richmond ore and 6523 tons of purchased ore have been smelted by the general furnace, and 840 of low grade Richmond and 2416 tons of purchased ore have been smelted by the No. 4 furnace, working in connection with the refinery. The production for the year, including the returns from the speiss, is 18,811 ozs. of gold, 495,909 ozs. of silver, and 2130 tons of lead. The amount received during the year on sales of gold, silver and lead is £187,414 16s. 9d. and the estimated net value of the bullion in transit and at the works unrealized, after allowing for all unpaid refining and marketing expenses, is £137,209 19s., together £324,624 16s. 9d., from which deducting the value of the bullion in hand on February 29, 1884—£135,249 11s. 5d. and £19,807 10s. 2d. paid for marketing expenses, refining, freights, commission, brokerage, etc.—leaves £169,567 14s. 2d. as the net value of the bullion produced in the year. The cost of mining, deadwork, smelt-

ing, purchased ore, renewals and repairs and all other working and general expenses at Eureka being £126,506 1s. 10d., the profit for the year on mining, smelting and refining is, with £97 1s. 2d. received for sundries, £43,158 13s. 6d. The ore smelted this year has been of about the same quality as last year, the average being \$57.32 as against \$56.01 last year, and the yield per ton of ore has been this year \$51.77 as against \$52 13. The expenses of mining have been reduced from \$15.83 to \$11.75 per ton of ore; this is principally on account of the small quantity of deadwork done. The smelting expenses per ton have also been reduced from \$11.72 to \$10.39. The amount paid for purchased ore has again been very large—£48,181 for 8940 tons as compared with £48,357

for 9762 tons last year. The exploratory work done in the mine during the year has been very small, consisting of only 279 ft. of drifts. The cost of this deadwork (£484 3s. 7d.) has been included in the working expenses of mining. These explorations have been attended with very good results. Several small bodies of good ore have been developed on the 300 and 400 levels, about 2000 tons of ore being already exposed, and there is every probability of these small bodies connecting and further developing. Explorations will now be vigorously carried on.

It is stated that the first clean-up of the 120-stamp gold quartz mill at Douglas Island, Alaska, in a run of only 23 days, yielded 1200 pounds of amalgam, valued at between \$90,000 and \$100,000. This is exclusive of sulphurets, which are said to be not only very rich, but to average six per cent of the ore. At this rate, it is estimated that a full month's run, including sulphurets, will yield at least \$170,000.

Mr. THOMAS SEALE, who has been superintendent of the California Street Cable road, since its inception, having resigned his position, has been presented by the employees with a fine gold watch and chain.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos.

The Russell Leaching Process.

EDITORS PRESS:—Touching the above-named process, as described by Mr. Stetefeldt in his article on treatment of dry and base silver ores, I have a couple of remarks to make which I hope will not be misconstrued, as I have no wish to disparage either Mr. Russell or his process.

The fact that lead can be precipitated from its solution in a hyposulphite by sodium carbonate, leaving silver still dissolved, was known, if not before Mr. Russell's discovery, at least before any public announcement of it. In the spring of 1882, Mr. G. F. Beardsley made the direct experiment at my request, and I have made no secret of the fact. In the same year I mentioned the circumstances to the then superintendent of the Silver King mine, in connection with the leaching of his ore, but for good reasons it was not considered desirable to apply the method.

In regard to the action of a copper salt in conjunction with a hyposulphite, I tried it and many other things, 15 years ago, when engaged on my methods of amalgamating ores without roasting. I did not observe that the compound had any special effect, or that it was in any degree a substitute for the copper chlorides in leaching or amalgamation of unroasted ores, which, however, proves nothing as to roasted ores. I found that warm, strong sodium hypo solution could extract 80 per cent or more, by leaching, from the partzite ores of Blind Springs.

Granting that the compound is useful, which I cannot doubt since Mr. Stetefeldt says it is, I would inquire, for information, whether the copper salts which are usually, or frequently, present in roasted ores, as dichloride, etc., and which are not removed in the washing but dissolve in the leaching, are not as good as the added bluestone of Mr. Russell's "extra solution."

While on this subject I will mention a circumstance which I have not thought of sufficient importance to justify a special communication. Some time ago Mr. Stetefeldt, in one of his communications, gave Mr. Russell credit for having discovered that the ordinary so-called "chlorination assay" does not correctly indicate the percentage of silver chloride in roasted ore. Now this fact had been published long before in your paper, for proof of which I refer to the account of my investigations in the MINING AND SCIENTIFIC PRESS, some time during the summer of 1876, and which was reproduced in my book, "Leaching Gold and Silver Ores" in 1881, which was previous to Mr. Stetefeldt's announcement of Mr. Russell's discovery, and which hook the former gentleman possessed or had seen.

Mr. Stetefeldt proposed that the assay should be called a "lixivation assay," ignoring, or forgetting, that I had already given it the equally appropriate name of "solubility assay." (See page 93 of the book.)

I mention this in illustration of an apparent tendency among Eastern scientific and professional men to ignore or belittle the work of Western men, and, perhaps, especially of those who have not thought it worth while to append *tails to their names*. However, in the now somewhat monotonous singing of Mr. Russell's praises by Mr. Stetefeldt, it is quite conceivable that Mr. Stetefeldt may have an object very distinct from that of disparaging others, and, as I am not in the habit of mining matters, I will say plainly that I suppose him to be interested in Mr. Russell's patents, in which case he is quite right, from a certain point of view, a point of view, however, from which many gentlemen would prefer to be unobserved, if not distinctly invisible.

I will take this opportunity to mention a few facts which I have "discovered," though it is quite likely that others may have preceded me, there will at least be no necessity for yet others to follow.

Both copper and silver are readily precipitated from solutions of their salts in solution of sodium hyposulphite, by metallic iron. Knowing this as to the silver I made the experiment of amalgamating roasted ore in an iron mortar with addition of sodium hyposulphite. The result was, I got no amalgam, but the interior of the mortar received an adherent coat of a pink color, consisting of silver and copper which would not amalgamate, and which I had to remove by means of acid.

Nickel is precipitated by copper and by iron from the hyposulphite solution. The coat is adherent, but may be scaled off from the copper by bending and beating that. The peculiarity about the deposit is, that although not apparently metallic, it is not attracted by the magnet. I think it contains sulphur, but have not verified the idea.

Nickel and cobalt are completely precipitated by zinc from ammoniacal solutions, in the form of black magnetic powders, which I believe to be the pure metals. With a single couple, of zinc and platinum; the latter in the solution of nickel or cobalt, precipitation proceeds rapidly, nickel being deposited as a slightly coherent and adherent sheet on the platinum. An assay

or a metallurgical process can be made of this, but it will not separate the two metals, the one from the other.

Recurring to Russell's process, one of the difficulties in the treatment of the Silver King ore by the leaching process was the adherence of the ore to the walls of the rotatory furnaces, forming a crust of constantly increasing thickness, and this trouble increased as the ore treated was more heavily charged with zinc-blende, to which, and to galena, the trouble was due, owing to the formation of zinc and lead chlorides. If that ore could be leached by Russell's process, after a roasting without salt, a great advantage would be gained. When the ore became so bad that it could not be roasted in the ordinary way, without balling, I roasted without salt up to a certain stage, and then chloridized by an addition of calcined copperas and only two per cent of salt, the usual proportion which was found necessary when added earlier being ten per cent. The result was that the incrustation of the furnaces was very much lessened, the roasting was more rapid, the tendency to balling was entirely obviated and, though "solubility" was high, the leaching was tedious mechanically, owing to the dusty condition of the ore. With coarser crushing and something like Nevins' two cylinder roasting furnace for oxidizing and chloridizing separately, the work might have been continued longer than it was. The leaching vats should also have suction pipes, which I would recommend in most cases, and especially in case of leaching ores, roasted without salt, by Russell's process. Laboratory experience proves that leaching (or filtering) under pressure is far more effective as well as more rapid than without pressure.

At the Mount Cory works, Mr. Arents has a new (to me at least) style of leaching vat which is very easily and cheaply discharged, and is worth the attention of those who have to put up leaching plants. C. H. A.

MILLING AT THE NAVAJO MINE.—From the annual report of Superintendent W. C. Price, of the Navajo mine, we take the following concerning the milling operations: The mill run covers a period of 1874 days, of which the actual running time of the engine was 1763½, showing a loss of 10½, including all stoppages of every nature incidental to a mill run, of which six days of this was for the erection of a new furnace. The running time of the battery was 175½ days, and made an average crushing of 13 3-5 tons per diem. During this time there was milled 2,392 13 20 tons of ore, of which 37 3 20 tons was custom ore. The average battery pulp assay of the ore from the mine was \$158.90 per ton, and was worked to 90 95-100 per cent of the battery assay. Custom ore averaged \$161.25 per ton, and was worked to 85 per cent. Shipped bullion on customers' account to the amount of \$2,118.41. On company account, to the Bank of California (from Navajo ore), \$340,510.49; from custom ore and clean-up, \$10,278.99, making a total production in bullion of \$350,789.43 (assay value), or less discounts, express charges, hullion tax and reclamations, \$284,044.43 (coin value) during the fiscal year. The mill workings for the past year show no material difference from the usual excellent results that have been attained in previous years. The lower furnace gave out in December, having been in use the past seven years and was replaced with a new one. Milling operations were suspended on February 3d, as the reduction of wages was not acceded to by the employees. Explorations were then at once resumed in the mine, the suspension of which had been necessitated by the milling operations, which required almost the full capacity of the hoist.

ENCOURAGING PROSPECT.—If the Blue Jacket people make the success which their present appearances indicate, it will give an impetus to mining operations in that section and create such a boom as has rarely been experienced in the State. There are within a radius of a few miles of the Blue Jacket, almost innumerable ledges of the same character of ore, which if it can be successfully worked will furnish material for hundreds of stamps for many years to come. It is claimed that Mr. Milford, the superintendent, by a very simple chemical combination, has overcome the difficulties heretofore experienced in working the ore, and that too without the expensive process of roasting. If this is the case, there is nothing to prevent that section becoming one of the most prominent and productive districts on the coast. There is an abundance of fair grade ore, plenty of water and fuel, and all other facilities for mining and milling as complete as could be desired. It would not be at all astonishing from the present outlook, if in less than two years the most populous and flourishing mining town in the State would spring up in the mountains in which the Blue Jacket is located.

OIL IN WASHINGTON TERRITORY.—J. N. Gale, of this city, was down to Puyallup this week, and states that quite an excitement was created at the oil wells on Tuesday by new and promising developments. While they were engaged in excavating or clearing away the debris from the surface, preparatory to boring, oil, accompanied by gas, was seen oozing from a crevice in the rock which was uncovered. W. H. Kneeland, the superintendent, stated that the prospects are equal to any he ever saw in Pennsylvania, and he firmly believes he will strike a flowing well.—*Olympia Transcript*.

The Cassel Gold Extraction Process.

The great importance of treating our refractory gold ores and the concentrates saved from the ordinary appliances in use at the principal gold mines in all parts of this world, received a practical demonstration last week at the works of the company in Verulam street, Gray's Inn road, London, E. C. Mr. Cassel's process for the extraction of gold, which has been exhibited at the Inventions Exhibition, has received the attention of many scientific and practical authorities interested in making the best of our auriferous resource, and profitably maintaining a supply of gold so essential for the general prosperity of nations as well as for individuals. At the request of a number of scientists and others, the directors of the Cassel Gold Extraction Company gave a practical demonstration of Mr. Cassel's invention recently.

The necessity for an increasing and continuous supply of gold has now become so thoroughly recognized for the requirements of finance, trade, commerce and industries, and the necessities of every-day life, that those who devote their energies to a practical method of permanently increasing its supply become general benefactors. Several tons of antimonial gold concentrates were treated that had been obtained from Mr. Andrew McIlwraith's mines, in Queensland. This gentleman, who was present, is a relative of Sir Thomas McIlwraith, Premier of that colony. According to the assay of Messrs. Johnson, Matthey & Co., it showed that by the Cassel process 91 per cent of the gold was extracted. The process is purely one of chlorination. Common salt solution, or sea-water, and lime are the only substances used. Instead of the free gas being separately generated in the ordinary and costly way, the chlorine is evolved in the apparatus in the nascent state in contact with the ores, in which condition it has an immensely greater combining capacity for gold. At the same time nascent oxygen is also generated, which, oxidizing the sulphides, arsenides, etc., liberates the gold, the nascent chlorine at once converting it into a terchloride.

A secondary reaction here takes place, and hydrochlorous acid is formed, which oxidizes the pyrites; hydrochloric acid is also formed, which attacks any iron present, and forming a protosalt of that metal, this soluble iron compound precipitates the gold as fast as the chlorine brings it into solution, and thus prevents its extraction. Mr. Cassel, recognizing, after many experiments, the complicated nature of the above reaction, which so puzzled his predecessors, and being the first to point it out, has at length devised means whereby the iron compounds, which are invariably present in refractory ores, are retained in their insoluble form while under treatment, and thus are prevented from exercising any influence upon the solution of gold. This he accomplishes by the addition of caustic lime to the mixture of crushed ore and salt, which earth, by reason of its alkaline properties, at once combines with any hydrochloric acid, as fast as the latter is formed, and completely neutralizes it, so that no iron can be taken up. At the same time a hypochlorite of lime is formed, which again being decomposed by the action of the water present, affords additional nascent chlorine for the gold; the ultimate products of the reaction being chloride of sodium in excess, chloride of calcium, tri-chloride of gold, and undecomposed gangue at the anode, and chloride of sodium and sodium hydrate at the cathode.

Various forms of apparatus were shown and explained by the inventor and by Dr. Atcherly and Dr. Liepman, who assisted in conducting the operations; the apparatus most approved of, and giving the most satisfactory results, looks very much like the well-known Frieberg or amalgamating barrel. It consists of a large drum, inside of which are arranged a number of carbon rods; these rods form the anode or positive poles, and are metallically connected with the corresponding pole of a dynamo, while the other pole of the dynamo is connected with the hollow iron shaft of the drum, which serves both as axis to the drum and also as negative pole of the apparatus. This shaft terminates through stuffing-boxes in hollow standards or tanks, where finally the gold accumulates. The drum is charged with the ores and salt water added thereto, and then set in motion by suitable gearing at a speed of about eight revolutions per minute. The current is then passed through it decomposing the salt water, and nascent chlorine and oxygen are evolved at the anode. By the revolution of the drum the ores are constantly brought in contact with the carbons, where both these elements are generated, and the metals are readily dissolved. The adding of the lime neutralizes the acid as soon as formed, and thus prevents the formation of iron salts, and precipitates those already formed. Into the hollow shaft are bored a number of holes, and the shaft itself is covered with asbestos, which, while preventing the gangue from entering the shaft, allows the liquefied gold to penetrate through the cloth. After the addition of lime, which precipitates all other metals present except gold the latter metal is rapidly dissolved and deposited by the electrical action in the interior of the pipe in a finely divided metallic state and is carried from thence into the hollow standards by means of an archimedean screw

fixed in the pipe. These standards are provided with movable doors, from which the gold slime is from time to time taken, dried off, and smelted. The whole of the operations displaying the value of the Cassel process for saving gold was watched with much intelligent interest by all those who had the pleasure of being present, and the inventor and his assistants, Dr. Rowland Atcherly and Dr. Liepman, were highly complimented upon the results obtained and the success achieved.—*London Mining Journal*.

Sweetwater.

A little over three years ago, says the *Bodie Miner*, the first stir was made in the Sweetwater mines, in what is now known as the Patterson mining district. Discoveries and developments there created no essential mining boom; but practical mining men, seeing that it was a mineral paying region, proceeded to develop and work some of the properties for what they might be worth. A small mill was erected, and shipments of bullion in limited quantities have been comparatively regular ever since. But mineral enough is not yet being produced to make of Clinton a prosperous mining town. A serious drawback to the prosperity of Sweetwater in its infancy was a doubt thrown over the titles to property there. Nothing will keep capital out of mining regions more surely than will a conflict of titles to the property which capital would seek to develop. At Sweetwater the entire surface of the country is volcanic and mineral in its indications. Seven separate and distinct canyons converge there, in each one of which good prospects abound. And when the present stagnation in mining activity everywhere shall have recuperated there is no reason in the world why Sweetwater should not come in for its fair share of prosperity. The present population of Patterson mining district numbers about 100, probably one-half of whom are miners and prospectors, and the other half composed of millmen, wood dealers, packers, and business people of Clinton. That town now contains two stores, two hotels, two saloons, livery stable, blacksmith shop, barber shop, butcher shop, recorder and justice offices, a town hall, schoolhouse, twenty-five or more dwellings, and location of the Summers Con. mill and the buildings necessary to carry on all departments of a mining and milling business. The mines of this company are being actively developed, and operations at present are exclusively directed to opening the north ore chute or chimney. This portion of their mining ground has been reached by extending the deepest, or No. 2 Tunnel, from the workings of the old ore body northerly into the mountain about 600 feet, making the entire length of the tunnel over 1100 feet, and cuts this ore bearing section 700 feet deep on incline of vein. All ground above is entirely unprospected, except some light work.

Since the 18th of June this tunnel has been passing through ore varying from 18 inches to 3 feet in thickness, and assaying from \$15 to \$80 a ton, average samples. Some delay has occurred from lack of ventilation, but this want has been supplied by a blower driven by horse power. The supply of air is still limited, but sufficient to continue prospect work. From six to ten miners are employed. The mill is now supplied with tailings, employing from six to eight men, working 25 tons per day; and working ores from the mine at such other times as is sufficient to keep the stamps running.

Some prospecting work is being done upon the Great Western and Star mining claims, and some good milling ore is being sacked to ship. Six to eight men are at work in this canyon.

One tunnel is being run in Silverado canyon, by Mr. Gullikson of Antelope, with good prospects. Milling ore is being taken from this tunnel, which is now just cleverly in.

A tunnel is being run on the Jenny mine, and though scarcely below the surface some good ore is being discovered.

A shaft being sunk to develop the Ryan, on Patterson mountain, has attained a depth of 50 feet, but not yet cut the vein. Rich float, containing a large percentage of gold, is found in this vicinity.

Most active prospect work is being pushed on a number of mining claims along the easterly base and southerly end of this mineral belt, known as the "Frying Pan mines." The surface at this point, for two miles in length by two thousand feet in width, is strewn with heavy boulders of rich float. The deep, overlying debris causing this fissure has been a great drawback to the rapid prospecting of those claims. But a dozen or more determined prospectors, backed by some Mono county mining men, are making a vigorous effort to gain a solid formation in depth and find the source from which so much ore has been detached. And it will only be from want of facilities and supplies if, before another winter, a mine of great magnitude and wealth is not uncovered in this locality.

The Eclipse mill will soon be ready to work ores from the Frying Pan mines and other claims in which the owners are interested.

A PROFITABLE MINE.—The *Sentinel* says up to the present time the total amount of the assessments levied by the Eureka Con. Company is \$350,000. The total amount disbursed in dividends aggregates nearly \$5,000,000.

MECHANICAL PROGRESS.

Influence of Mechanical Invention.

In a recent issue of *Bradstreet's* the subject of "Progress in Manufacturing" is touched upon, and it is shown by reference to researches of Mr. Edward Atkinson to what extent the world is indebted to mechanical invention for the great abundance of useful commodities. The result is shown in a clear manner by the aid of charts. For the purpose of illustrating his argument or theory, Mr. Atkinson selected, among other industries, the manufacture of cotton sheetings, comparing the prices and other figures of 1840 with those of 1883 and 1885. The data were obtained from two mills which have always been successful.

In 1840 the product of cotton sheetings per hand per year was 9600 yards, while in 1883 it was 28,032 yards, an absolute increase of 190 per cent to efficiency of labor growing out of improvements in machinery.

In 1840 the number of spindles was 12,500; in 1883 it has increased to 30,500, an increase of 146 per cent.

The value of product per hand in 1840 was \$868; in 1883 it was \$1973, an increase of 127 per cent.

The rate of wages per hour in 1840 was 4.49 cents. In 1883 it was 8.80 cents, an increase of 96 per cent.

The rate of wages per year was \$175 in 1840, and in 1883, \$287, an increase of 64 per cent.

The number of operatives in 1840 and in 1883, remained about the same, while the increase in machinery was about 186 per cent.

The hours of labor were 13 in 1840 and 11 in 1883, being a reduction of about 15 per cent. In 1840 the price of cloth was about 9 cents, while in 1883 it had been reduced to about 7 cents, being a reduction of about 22 per cent.

Mr. Atkinson has summarized the progress thus: "Fifty years ago the average earnings of all the operatives in a large cotton mill, who worked thirteen hours or more a day, and among whom were comprised a much larger proportion of men than at the present time, while the women were older and there were fewer children, were \$2.50 and \$2.62 per week. The quantity of machinery which each hand could tend was much less; the production of each spindle and loom was less; the cost in money of the mills per spindle or loom was much greater, while the price of cloth was at times more than double the price at which it can now be sold with a reasonable profit. The average earnings of all the female operatives in what purports to be the same factory at the present time, on the same fabric, working ten or eleven hours a day, are \$5 per week, and in some cases even \$6 or more to the most skillful. That is to say, women now earn about twice as much in ten hours as men and women combined averaged in thirteen hours then. The course of events has been as follows: A continuous reduction in the hours of labor, coupled with an increase in the earnings per hour; a diminution in the ratio of capital to production, coupled with an increase in its productive efficiency; a constant increase in the supply of cotton fabrics per capita, coupled with a decrease in the price; a continuous increase in the purchasing power of gold dollars in respect to almost all articles of necessary subsistence."

It is pointed out that these facts afford a complete demonstration of the fallacy that high wages and high cost of production are synonymous; that the rate of wages is only one of many elements, instead of the single important element in determining the cost of production in any industry; that it is quite possible that the highly paid labor in our best cotton mills costs less per pound or yard of product than the "pauper labor" in the English mills, and that if the obstacle of obstructive tariff taxes on sundry things which they have to use were cleared away, American manufacturers would be more than able to hold their own.

TESTING STEAM BOILERS.—When a boiler has undergone repairs it is a usual and a very necessary practice to test it, not only to show the quality of the repairs, but also to find any other defects or weak parts which may have escaped notice. To test a boiler in such a case means to fill it with water and to apply pressure, "somehow," as it is often said, and, as the feed connections are often severed at these times, it of course means something else than the engine pump being used. To send to a boiler shop for a test pump is in many cases considered too expensive, and the practice of filling the boiler with cold water, touching up any leaks, and then opening the junction-valve from the next boiler and applying pressure by turning steam upon the top of the water, is consequently adopted. A severer test for repairs can scarcely be imagined, the strains produced being considerably greater than under any possible working condition, and the repair work due to testing is frequently longer in hand than that before testing.

TEMPERING DRILLS.—A correspondent of the *Blacksmith* tells that journal how he tempers drills, as follows: "I learned it from experience, and think there is no better plan. I dress the drill to the desired shape, then heat to a cherry red and insert it gently in a cup of warm water, which should be placed on the forge for convenience. I then take it out, and when the temper runs down to a dark straw color dip it into a can of common lard or grease,

such as we use in cutting threads, and cool it off above the cutting edge. This rule is good for chisels, punches and all kinds of small tools. I have tempered drills in this way that would drill through 1½-inch wrought-iron. I think they are less liable to heat than those tempered in water alone."

STEEL CANAL BOATS.—It is believed, says the *Age of Steel*, that steel canal boats are practicable and may be made profitable if, say for example, a steel steamer is run with two steel coustors. Steel is said to be free from objections, as compared with iron. Some plates of steel have just been tested in Pittsburg, which were made for a new steamer for the Detroit & Cleveland Steam Navigation Company. In other tests made by the Detroit Dry Dock Company a ball of iron weighing 950 pounds was dropped from a height of 35 feet on a plate 3-16 of an inch thick. The blow made a bulge in the plate that extended 20 inches into the ground, but the plate was not broken. The plate was then turned over and the ball dropped on the bulge. This was repeated five times, and then the plate was not broken, but when the ball was dropped on an iron plate one half inch thick the plate was broken at the first blow. These tests show plainly that thin steel plates are not only sufficiently strong, but that their elasticity would make them far superior to wood for building even the roughest barge.

STEEL NAIL CUTLERY.—One of the working force of *The Age of Steel* has been testing the malleability of the steel nails in market and finds that they can be readily drawn out cold into knife blades of the regulation table pattern; this without crack or flaw. It is an excellent test of the quality of the metal. That journal says that since the publication of the article a very decided interest in the subject has been manifested in many quarters, and has led to a number of other similar experiments. One of these was made from a boat nail eight inches in length, manufactured by the Riverside Iron Works, Wheeling, W. Va. The knife when completed was twelve inches in length, showing the malleability of the metal to be unusually great. The blade, when polished, resembled in shape and appearance the best quality of American carving knives. The Riverside Iron Company were the first in the country to erect their own plant for the manufacture of steel nail plate.

PRINCIPLES OF ADJUSTING BEARINGS FOR LINE SHAFTING.—The practice of high speed in shafts, and the entire substitution of belting for gear wheels, has called for some improved method of arranging the bearings of line shafts. The conditions required in such bearings are as follows: 1. The bearings should be long enough so that the pressure will never exceed 50 pounds per square inch of bearing area, and the material should be able to withstand a surface speed of 250 feet per minute, without wearing or heating. 2. The bearings should be adjustable in some manner so as to adjust themselves to the line of the shaft, and thus receive an equal pressure over the surface, to accommodate the unavoidable deflection caused by the strain and weight of the pulleys. 3. The bearings should be arranged with adjustment in two planes, so that the shaft may at any time be set in line without trouble or expense.

RAZOR BLADES are forged from cast steel. They are ground and scorched to take off the black scale, being heated in a coke or charcoal fire and dipped obliquely into water. After being drilled and stamped they are hardened and tempered. In tempering they are laid on their backs on a clear fire and are removed as their edges attain a pale straw color. Shavings of leather added to the fire prevent cracking when the blades are put into water. After tempering they are ground successively on stone, a lap charged with fine emery, and a second lap with finer emery. The final polish is given on a soft leather wheel charged with crocus, both razor and wheel being heated. It is then honed, working from the point to the heel, being laid flat for the purpose. Wire edges are rubbed off on a horn.

WEIGHTING A WOODEN FLY-WHEEL.—A California correspondent of the *Blacksmith and Wheelwright* says: Some time ago I saw in a mechanical paper the statement that a wooden fly-wheel could not be so evenly weighted as to work satisfactorily. But it can be done by boxing holes from the rim toward the center at regular distances, say every three inches around the circumference, and pouring in lead. Afterwards the holes must be plugged. If the speed be high, a rivet must be put through the wheel to hold each plug.

A PRIZE OFFER.—The Berlin society for the advancement of manufacture has offered a prize of fifteen hundred marks for the best essay on the progress, present position, and capability of application, or the photo-mechanic process for the reproduction of drawings, wood-cuts, copper-plates, oil paintings, and photographic representations of nature, with a comparative review of its results.

AMERICAN WHEELS IN ENGLAND.—The recent demand for English haussom cabs has disclosed the significant fact that the wheels imported there are of American make. Buyers here have therefore actually paid the cost of freight to and from London, and duty on their re-importation of these articles manufactured in their own country.

SCIENTIFIC PROGRESS.

Genesis.

The beginning or genesis of material is always a subject of more than ordinary interest for consideration when its progress brings it within the reach of our discriminating faculties.

There appears to be a natural instinct of the human mind which demands causes for the conditions which it beholds, and we also unconsciously seek to trace backward in one line toward the beginning or initial point, and forward in the other toward the consequences and probabilities of the future and the possible. It is therefore not strange that man should attempt to trace the history of the foundation and structure of the earth's surface from the fragmentary indications which have been here and there revealed at various points in its career. We have already stated our belief that the harmonious work, which is indicated everywhere in the domain of nature, shows that the creative forces which produce the results we now behold are constantly in active operation, and that the formation of mineral and its deposition in veins is going on constantly.

Basing our premises upon the acknowledged activity of the forces everywhere present, and upon the economical utility which allows no particle of matter to remain idle or uselessly inert, it is safe to state that all of the results of what we may term destruction, are rapidly forming new combinations and entering into new structures in most cases likely to be in harmony with the original position which they once occupied, than otherwise.

The constructive history of the slate and sandstone, as well as every other character of rock, indicate to a certainty that the immense burden of material which the waters of our thousands of rivers annually carry, from mountain side and valley out into the ocean depths, are there undergoing the same processes of solidification under the laws of crystalline forces, and assuming the character and form which will one day fit them to perform an important part in the drama of existence where they are to appear. It will not be affirmed that this new rocky strata which is being constantly reformed in the ocean's depths, according to a well defined law, will be barren of mineral treasures, or that it will be less suited to the activity of the future than the same class and character of rocks to-day exhibited.

Everywhere in the circle of existence around us, we behold death as a mother feeding life, and life folding itself in the garments cast away by forms which have lived and served their purpose before passing to a new state in the endless cycles of progression, through which all matter is passing in one form or another.—*The Mining Review.*

Science and Modern Discovery.

Professor G. C. Stokes, Secretary of the Royal Society of England, recently delivered a very interesting address before that body in which he gave an important account of the progress of physical science during the past quarter of a century, and in reviewing the results, specially noted that as scientific truth developed, so had men to give up the idea that there was any opposition between the Book of Nature and the Book of Revelation. He said that for the last twenty years or so, one of the most striking advances in science had been made in the application of the spectroscopic, and in the information obtained with regard to the constitution of the heavenly bodies. The discovery that there were in these particular chemical elements, which were also present in our earth, exalted our idea of the universality of the laws of nature, and there was nothing in that contrary to what he had learned in Revelation.

Entering with some particularity into the composition of the sun, the professor said this gave an idea of an enormous temperature, since iron existed there in a state of vapour. This was wholly inconsistent with the possibility of the existence there of living beings at all approaching in character to those we have here. Are we then to regard this as a waste of materials? Might we not rather argue that as in animals we ascend by greater specialization, so we could consider the differentiation of office in different members of the solar system as marks of superiority, and could regard the sun as performing most important functions for that system? In fact, all life on our earth was ultimately derived from the radiation of solar heat. Referring to the doctrine of conservation of energy and of dissipation of energy, he pointed out at some length how the sun, so far as we could see, was not calculated for an eternal duration in the same state and performing the same functions as now. We must regard the universe on a grand scale, and then there was progress. If we contemplated nothing but periodicity, perhaps we might rest content and think things would go on forever as at present; but, looking on the state of the universe on a grand scale as one of progress, this idea obliged us to refer to a first cause.

AN INVENTION FOR PRINTING MUSIC AS IT IS PLAYED.—An apparatus invented by Mr. Herbert Frang of Newburg, England, for printing music as played, is described as very ingenious, and should be of considerable usefulness to the ready composer of music. This device when placed in electric communication with a

pianoforte or other keyboard instrument, prints the music as it is being played. The machine derives its motive force from powerful clock-work. When in motion, a band of paper is drawn through the machine, and during its passage is ruled with the staff lines and passes under a number of small marking wheels, which corresponds to the keys of the pianoforte, and it is here that the music is recorded. The notation in which the music is recorded is not the ordinary one. When a note is depressed on the keyboard, which is in connection with the recording machine, the corresponding wheel will begin to mark, and the length of the line made will be in proportion to the length of note. Thus, if a line a quarter of an inch in length represents a quaver, a line an eighth of an inch will represent a semi quaver. This system of notation is easily translated into the ordinary notation by anyone who understands the latter. The connection with the keyboard is obtained by a pin fixed under each note which dips into a small cup of mercury. This arrangement in no way interferes with the touch of the keyboard. As the price of this instrument, 20 guineas, is moderate, it should find a considerable field of usefulness.

INTERIOR TEMPERATURE OF THE EARTH.—The German Government is having a deep shaft sunk near Schladebach, with the object of obtaining various kinds of scientific information, and especially trustworthy data concerning the rate of increase of the earth's temperature as we descend into the interior. The excavation is being carried on by a diamond-tipped borer driven by water. So far back as the beginning of this year the shaft had reached the depth of 1392 meters, which is believed to be the lowest depth yet reached by boring. The temperature at successive stages is ascertained by an ingenious instrument which serves as a special thermometer, the principle of construction being the fact that, as the heat increases the mercury will expand so as to flow over the lip of a sufficiently short open tube in greater and greater quantities. The measurement of the differences of those overflows will give the rate of increase of the temperature. It has been ascertained that the temperature at the depth of 1392 m. was 49° C., or 120° F. If the temperature increases regularly at this rate, the boiling point of water ought to be reached at a depth of 3000 meters, and at 75 km. we should find the heat at which platinum melts. This would go to show that the earth's crust cannot be more than about one-ninetieth of its radius.

THE WAY INCANDESCENT LAMPS ARE MADE AND THE AIR EXHAUSTED.—"The way that incandescent lamps are made is very simple," an electrician said recently. "There are different ways of preparing the filaments, which are shaped, carbonized, and treated at a white heat. They are then placed in platinum holders, imbedded in glass, and next go into the hands of the glass blower. The glass bulbs have round openings at the bottoms and little tubes at the tops. The little tubes all connect with a big tube. This is called a fork, and resembles a cluster of blackberries. Two or three dozen bulbs may be on a fork. The glass blower places filaments in each bulb at the bottom, and welds the glass about the platinum holders to the edges of the opening. Then the air is drawn from the bulbs. The open end of the big tube is attached to an air-pump, which has 40 pounds of mercury at its top. As the mercury drops it carries all the air with it, and vacuums are created in the bulbs. The operator then takes a Bunsen burner, and directs its flame against the little tubes close to the bulbs. This closes the bulbs, which are then removed from the big tube. The glass blower finishes them off. The exhausting of the air from so many lamps at once makes the cost small. The bulbs can be made by any ordinary glass blower, but it requires a man of intelligence to make the filaments."—*Electrical Review.*

A NEW SAFETY-LAMP.—M. Gaston Trouve is said to have constructed a portable electric glow lamp, intended for use where there is an explosive atmosphere. This lamp is intended to be of service in mines, cellulose factories, flour mills, spinning mills, etc. It is automatic in its action, and is stated to be very simple in construction. There are two varieties of the lamp made, one of which will only light when taken up in the hand, and the other when it is hung up or put down. The current is produced by a battery contained in the lamp.

PROMPTNESS OF IGNITION.—It is stated in a recent Government report that the quality of prompt ignition is so valuable in a naval vessel that it almost precludes the employment of anthracite in time of war in favor of a more free-burning coal, and that it has considerable advantages in time of peace. In this connection, it may be stated that the slack of anthracite is worthless on the grate of a boiler, whereas the slack of free-burning coal, if not too old, is tolerably efficient in the formation of steam.

GEORGIA'S NATURAL INK.—A natural ink is found at the bottom of a copper mine at the foot of the Kenesaw mountain, in Cobb county, Ga. It is a peculiar liquid of a deep wine color, and when a few drops of nut-gall are added it turns jet black, and at once becomes ink of the best quality. The records of the county have for years been kept in this natural ink, which neither fades, freezes, nor corrodes.—*Inland Printer.*



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
 Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
 Per line (agate)..... .25 .75 2.25 7.00
 Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
 One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Aug. 29, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Triumph Ore Concentrators; Profitable Lead Mining; Deep Mining for Gold, 145. Passing Events; Labor in Claims; The Prospector, 148. The Mechanics' Fair; A Magnetic Ore Separator; The Militia Encampment; A New Home Industry, 149.

ILLUSTRATIONS.—Triumph Ore Concentrator, Showing New Riffle Table, 145. The Spanish Bayonet in Bloom at Pasadena, 150. The Little Magnetic Ore Separator, 153.

CORRESPONDENCE.—The Russell Leaching Process, 146.

MISCELLANEOUS.—The Cassel Gold Extraction Process; Sweetwater, 146. The Volatilization of Gold; Mining Transfer; The Yucca, or Spanish Bayonet; A New Concentrator; The Outlook at Butte; The Marlin Elevator, 150. Ancient and Modern Warfare; A Word to Idle Miners; Mining and Scientific Press, 151.

MECHANICAL PROGRESS.—Influence of Mechanical Invention; Testing Steam Boilers; Tempering Drills; Steel Canal Boats; Steel Nail Cutters; Principles of Adjusting Bearings for Line Shifting; Weighting a Wooden Fly-Wheel; A Prize Offer; American Wheels in England, 147.

SCIENTIFIC PROGRESS.—Genesis; Science and Modern Discovery; An Inventor for Printing Music as it is Played; Interior Temperature of the Earth; The Way Incandescent Lamps are Made and the Air Exhausted; A New Safety-Lamp; Promptness of Ignition; Georgia's Natural Ink, 147.

USEFUL INFORMATION.—Sweet Toothed Americans; The Care of Canaries; A Chat About Car Wheels; Paper Slippers; California as an Oil-Producing Country; Genius and Common Sense; A Wash for Old Painted Wood-work; A Good Brown Oak Stain; Marine Animals; Important Enterprise; A Swift Flowing River; Cement for Petroleum Cisterns; A Remarkable Bedstead; The Divining Rod, 151.

GOOD HEALTH.—Fresh Air and Ventilation; Riding up Steep Grades; Sanitary Science; Mind and Disease; Sleeplessness; How to Take a Pill; Milk; Beer from Bananas, 151.

Business Announcements.

Scale Preventive—Downie B. L. P. Co., S. F.
 Delinquent Notice—Grosch Con. M. Co.
 Crystal Springs—St. Helena, Napa Co., Cal.

See Advertising Columns.

Passing Events.

The Mechanics' Institute Exhibition was opened this week and is being largely attended. There are many novel displays this year, and prominent among them are those of the counties of the State, which exhibit their peculiar products. In this branch there is expected to be much rivalry.

As will be noticed in our mining summary, another of the big Comstock mines has put a full complement of men at work after a period of idleness. For a long time there has been no development of magnitude made in that region, but those having faith in the old lode still look forward with hope to better times.

There is little to report concerning the mines of this State. Work is going steadily on and many mines are being quietly developed. There are plenty of profitable ones among them of which the public hear little, since the mines are not listed on the stock boards.

THE DISCOUNT ON BULLION.—H. H. McCollay shipped two bars of bullion from the Wild Deer mine, at Willow Creek, Humboldt county, to San Francisco last week. The returns, says the *Winnemucca Silver State* show that the assayed value of the bullion was \$4,132.11; the discount on the same, \$630.14, and the assayer's charges \$10.16, making the net value of the bars \$3,491.81. About one-third of the value of the bullion is gold, otherwise the discount would have been more. This is enough to discourage silver mining.

Labor on Claims.

It is imperative by our mining laws that the claimant when filing his application for patent, or at any times thereafter within the 60 days of publication, should file with the Register a certificate of the U. S. Surveyor-General that \$500 worth of labor has been expended on improvements made upon the claim. This certificate must be filed before the expiration of the 60 days of publication. Some Colorado miners have had their mineral entry canceled because they failed to do this.

It appears that the owners of the Little Pet lode claim made application for patent for said claim, and notice thereof was given by publication and posting, as required by law. During the period of publication claimants of the Deposit lode filed their adverse claim and protest against the issuances of patent to the owners of the Little Pet. After some time had passed, however, the original entry was allowed, the adverse claim having been silenced by a decision in favor of the Little Pet.

Just after the Little Pet entry was allowed the claimants of the Deposit lode filed in the district Land Office a protest against the issuance of patent upon the Little Pet claim, upon several grounds, to wit:

1st. That no mineral had been discovered by the locators of the Little Pet claim or their successors in interest, within the limits of their location.

2d. That the applicants had not expended \$500 in labor and improvements on the claim.

3d. That the premises in conflict were not the property of the claimants, but belonged exclusively to the protestants.

The protestants also aver that the reason that they did not commence suit upon their adverse claim within 30 days was because their counsel was seriously ill.

The Commissioner of the Land Office held that it was only necessary to pass upon the question whether the required value in labor and improvements had been expended upon said claim, and that the record failed to show that any certificate of the United States Surveyor-General, showing that the required labor or improvements had been expended upon said claim, had been filed in the case. It was also shown by the report of the U. S. Deputy Mineral Surveyor, relative to his survey of said claim, that there had not been expended thereon in labor and improvements the value of \$500. It also appeared that the portion relative to the value of labor and improvements, in the certificate of the U. S. Surveyor-General accompanying the plat of survey and field notes of said claim, was crossed out. It was therefore decided that unless the proper certificate of the Surveyor-General was filed with the Register, the action of the district land officers in allowing the entry was erroneous, and such entry, in view of the protest and adverse claim, could not be confirmed, but in the event that said certificate was duly filed, the Register and Receiver were directed to order a hearing to determine the nature, extent and value of the improvements made by the applicants for patent and their grantors. No appeal appears to have been taken from said decision.

After this, however, the certificate of the U. S. Surveyor-General was filed to the effect that the value of the labor and improvements on the Little Pet claim was not less than the required \$500. The Land Office, however, held that the certificate was not duly filed, and the entry was canceled because this certificate was not filed at the proper time. Still, they gave 30 days more to appeal. The appeal was made from the decision, and the Secretary of the Interior has decided that the Land Office decision was correct. In effect this is that the certificate must be filed before the end of the 60 days of publication, or it is not in accordance with law.

A DISPATCH from Redding, Shasta county, says that the actual sale of the Iron Mountain mine to practical miners for \$200,000 is confirmed by James Salles, one of the late owners, who will remain in full charge of the mine. They will proceed immediately to construct a road from the mine to Copley Station, on the railroad and erect works. The shaft in the Sherer & Radler mine, when down 40 feet, struck a new body of tellurium ore. The ledge is nine feet wide.

THE paper mill at Linwood, Los Angeles, has proved very successful.

The Prospector.

In an article a few months since, in speaking of the character and uses of the mineral prospector, we remarked that he should be duly encouraged and not be looked upon as a vagrant who dislikes regular, hard work. Many good miners make poor prospectors, this being a kind of work for which some men are particularly adapted, and because they lead a nomadic life is no reason that they are not as good citizens as those living in towns and following more regular pursuits. They are the pioneers of the mining camps and serve a most useful purpose, since the result of their searches is the basis of the mining industry.

What is here said is very true, and we might have added that but for the labors of the prospector many parts of our mineral domain, now well known and thickly populated would, in all probability, have remained to this day but sparsely settled, if not wholly a *terra incognita*.

Of the genuine, successful prospector, as of the poet, it may be said, he is born, not made. To succeed in this calling a man must possess certain inbred aptitudes, without which he will be likely to fail should he devote himself to the business. He should be of a hopeful temperament and an easy going disposition, should have a quick eye to detect not only mineral indications but also Indian signs, weather prognostications, etc. Having passed over a country he should be able to remember all its natural features, landmarks, trails, etc.; know the long, dry stretches, the good camping places, where there is wood, water and grass, so that neither he nor his animals may suffer—especially the latter. The prospector must be brave, hardy and self-possessed; capable of confronting danger coolly, and full of resources to meet an emergency. He must, of course, be careless of luxuries and even comforts, content to lie down solitary and sleep in the woods, and finally take the chances of perishing, as many of this class do, alone in the mountains or far out on the arid desert, "his shroud his gray blankets, his sepulture the drifting sands."

The prospector never gets financially stranded till he strikes the city: as long as he stays in the mountains he manages by some inexplicable means to raise a grub stake and keep in the field. If, having struck some big thing, he is tempted to seek the city in the hope of selling the same or inducing some one to take hold and help develop it, the chances are that he gets dead broke and finds it difficult to raise the wherewith to take him back to his old haunts, this being effected perhaps by his running across some credulous person, who, listening to his stories of bonanzas lying around loose, helps him out, hoping to capture a few of these through a small money advance. Formerly plenty of people could be found ready to cash these drafts on the future. Of late, however, they have, to the grief of the prospector, become distressingly scarce. In the days of mining stampedes and early mineral exploration there were those who went to hunt for other things than gold and silver. There were prospectors for ranches; toll road and water franchises, town and mill sites, coal and wood lands, and even for newspaper openings, these journalistic ventures being sometimes engaged in on the strength of very feeble indications—prospects that showed hardly more than a color to the pan.

To write up the history of some of these mineral explorers would form a very interesting chapter in the mining annals of the country. Thinking over the list we recall a few of these names, though others there be, equally entitled to notice, that do not now come to mind. There was Dr. John A. Veatch and Andrew, his son, who well represented the quiet, gentlemanly, educated school of prospectors.

Living first in Texas, where they saw much wild life, the business came natural to these men on their advent in California, to which country they emigrated at an early day. Having a thoroughly scientific education, the father, on his arrival here, almost at once began the search after other forms of mineral wealth than gold. To him is due the credit of having first discovered borax in California, and we think also some other of the useful minerals, both in this State and elsewhere on the coast. Nor were his original researches confined to the mineral kingdom; they were extended to other departments of the natural science, botany having claimed much of his attention.

The son Andrew, a most amiable and intelli-

gent young man, found his highest pleasure in traversing the deserts and exploring the mountains of the distant interior, hunting for mineral deposits, a business in which he was eminently successful. He was the discoverer of the Reese river country in Central Nevada, also of the Cortez district lying to the north of it, both containing many valuable silver-bearing lodes, some of which are being successfully worked at this present time. Though the means of finding and pointing out to others the sources of so much wealth, neither of the Veatches ever acquired much wealth themselves—died, in fact, rather poor—a condition largely due to an easy-going generosity exercised with so little discrimination that it bordered on absolute unthrift.

Breyfogle, the discoverer, or rather, perhaps, it should be said, the re-discoverer of the Lost Ledge, so-called, was another natural, or at least habitual prospector. This Lost Ledge was a vein deposit rich in gold, situated in or on the confines of Death valley, on the northern border of the Mohave desert. According to the tradition it was first found by some immigrants coming to California by way of Salt Lake and the southern route, who brought with them some pieces of very rich rock. Several ineffectual attempts having been afterwards made to find this deposit, it came to be known as the Lost Ledge. About 1863 Breyfogle, leaving Central Nevada, where he had been pursuing his favorite vocation, set out all alone to find this ledge, which he, no doubt, succeeded in doing, as he brought back with him a quantity of ore rich in gold. The next year, in attempting to return to the place, he was attacked by the Indians and so badly wounded that he was forced to retreat, having been barely able to make his way back to Ione, in Nye county, whence he set out. This hurt, though it did not immediately prove fatal, put an end to the veteran's weary journeyings over the deserts, having so crippled him that he could no longer well get about and finally caused his death.

"Quartz Johnson," who, when not out peregrinating about the country in search of minerals, can be seen almost any day on the streets of San Francisco, is another veteran and inveterate prospector, being a good example of the hopeful, active, enthusiastic type. Never, we venture to say, has "Quartz Johnson" been known to talk on any other than mining subjects, nor has any one ever discovered him when he was not loaded down with mineral specimens of one kind and another, this being his normal condition. If a word is said in his hearing about gold, silver, lead, copper, iron, anti-mony, tin, tellurium, salt, soda, borax, or any other metal or mineral useful in the arts or known to science, then doth "Quartz Johnson" on the instant pluck from the depths of his capacious pockets a sample of that same stuff, and exhibiting it proceed to describe what it is, whence it came, and what he intends to do with it, and everybody knows him, for he is not hard to get acquainted with. What grips and signs and passwords are to the various fraternal Orders, the word mineral is to him, its mere mentioning opening his heart and making him akin to all the world. But, though a great talker, Johnson talks well, being generally intelligent, conversant with mining matters and a good judge of minerals.

Two of the most noted prospectors ever in the field consisted of Joel S. Mead and his companion, the name of whom we do not know, and probably will never know, as both these men are now dead. Mead arrived in California from the State of New York early in the summer of '49, and at once proceeded to the southern mines, where he always made money, though never stopping long in one spot. Even at that day, flitting from place to place, he distinguished himself as the finder of new diggings. In 1858 he went to Frazier river, having been in the van of the tumultuous outbreak that occurred at that time. From Frazier river he went the next year to Idaho, where he was among the first to discover and work the rich gulches for which that then almost unknown Territory afterwards became famous. At that time the country swarmed with hostile Indians, rendering the life of the miner exceedingly precarious. Journeying on to Montana a year or two later he repeated there the rough and eventful experiences he had gone through in Idaho, rich diggings everywhere, with death and danger all round.

After joining a movement in Montana to

clean out the cut throats who infested that Territory, attacking solitary camps and murdering all indiscriminately who were supposed to have money. Mead and his companion, turning their faces south, traveled all the way to Southern Arizona, and soon after on into Mexico, whence, after a while, they returned to Arizona. While in that section of country they were engaged in many fights with the Apaches, in one of which Mead's companion was killed, an event that appears to have affected the latter deeply. It is related that on this occasion he rushed ahead of his party and avenged the death of his associate by slaying two of the savages, one of whom he dispatched with a knife, having come to too close quarters to admit of the use of fire-arms. On seeing his comrade fall, Mead is said to have laughed out like a maniac, this being the only occasion on which he was ever known to give way to any strong manifestation of joy or sorrow. Sedate and immovable, he was at the same time warm hearted and generous, and as brave a man, perhaps, as ever lived, having been noted even on the mining frontiers for his cool and desperate courage.

After having spent several years in Southern Arizona and Northern Mexico, Mead left that region and went to the Black Hills in Dakota, where he acquired some valuable quartz interests. But remembering that he had, when going from Frazier river to Idaho, seen in the Kootenai country an immense deposit of galena, he could not rest till he had gone back and further examined the same, which he did four or five years ago. While engaged in this work he was killed by an explosion of powder, dying while yet a comparatively young man. This body of galena has since become the property of a rich company of which Capt. Ainsworth, formerly of Portland, Oregon, but now of North Temescal, Alameda county, is president. The company considers the deposit very valuable.

We would be glad to continue these sketches of the more notable of our early prospectors, and may do so at another time, having devoted to the subject as much space as can just now be spared for such purpose.

The Mechanics' Fair.

The opening exercises of the 20th Annual Exhibition of the Mechanics' Institute took place at the Grand Opera House, on Tuesday last.

President P. B. Cornwall delivered the opening address, briefly reviewing the objects of the institute, which had "cleared a path of progress and cast up a highway on which social industry may go forward," and welcoming the audience in its name.

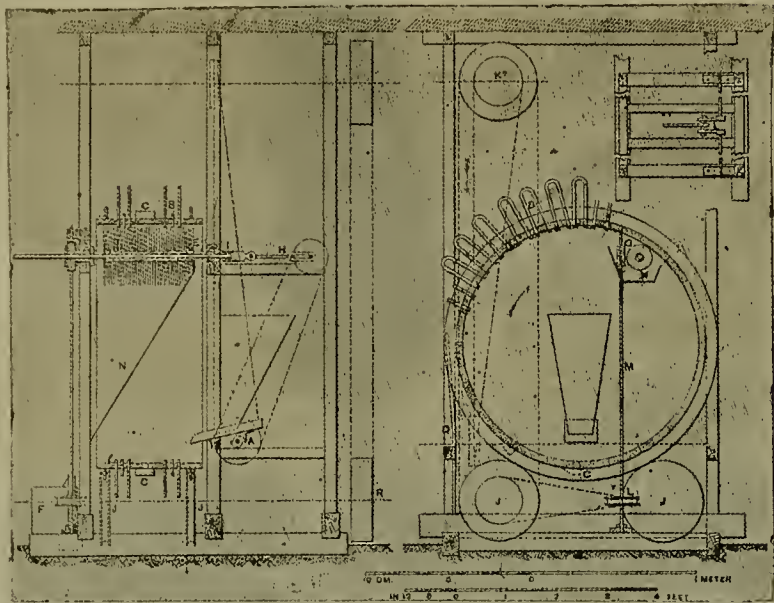
Hon. H. C. Dibble delivered the annual address, and the remaining numbers of the programme were as follows: Opening march, "God Save America" (Ellenberg), by the orchestra; prayer, by the Rev. E. G. Beckwith; grand overture (composer, Charles Schultz), by the orchestra; cornet solo, "Brilliant," performed by Mr. John Donnigan; song, "Good-By" (Tosti), by Miss Rose Courson; recitation, "Forging of the Anchor" (Ferguson), by Miss May L. Cooper; "Prestissimo Galop" (Waldteufel), by the orchestra.

There was a very large attendance at the exercises, showing the interest the people of San Francisco feel in the fair. The exhibition has already attracted thousands of visitors, and although not quite complete in all its appointments, shows that it will probably excel its predecessors. The building itself has been thoroughly overhauled, repainted and refurnished throughout. It has been made more attractive than ever before. The old circular fountain in the center of the main aisle has been replaced by a massive one of granite, surmounted by a bronze figure of Neptune reaching half way to the roof. On three sides of the fountain are bronze dolphins. The band stand has been placed in the middle of the hall, where the fountain formerly was. In the gallery, just back of the fountain is stationed the great organ built by Bergstrom. A profusion of vari-colored streamers and bunting decorates the roof and sides of the hall, while at intervals from the balcony railing is hung blue, fringed with white.

The artesian well at White Plains, Nevada, after being sunk 2250 feet without striking flowing, fresh water, has been abandoned. It cost \$100,000.

A Magnetic Ore Separator.

At Příbram, Bohemia, in the Lill ore dressing works are two magnetic separating machines used for the separation of iron ore from zinc blende. Mr. Ellis Clark, Jr., described them in a paper read before the American Institute of Mining Engineers. The engraving on this page shows the machine. The iron ore and zinc blende are separated from other material by the ordinary concentration processes, and are then in the form of a powder, the grains being less than 0.04 inch in diameter. This powder is composed of spathic iron ore and zinc blende, and is roasted in a small oven, with frequent stirring, for an hour, when the iron ore is rendered sufficiently magnetic. It is then placed in the hopper of the machine, which is shaken by a *dumpling*, or cam, A, keyed to an iron shaft, and moved by belting and pulleys. The ore falls from the mouth of this hopper into a hollow cylinder of wood with open ends, around the circumference of which horseshoe magnets, B, are set into the wood, so that their poles project about 0.39 inch into the inside of the drum, or wooden cylinder. Outside the drum, and 15.75 inches apart, pieces of hard wood, C, are nailed. They are triangular in section, and, by the revolution of the drum, raise a stiff and elastic wooden spring, D, 3.28 feet long, 2.36 inches wide, and 1.18 inches



MACHINE FOR SEPARATING ORE BY MAGNETISM.

thick at the base, coming to an edge at the apex.

When the triangular cam releases the wooden spring, the latter strikes the drum a sharp, quick blow, sufficient to knock off any particles of zinc blende that may have attached themselves to the magnets, or the inside periphery of the drum, and partially jarring off the particles of iron ore that are attached to the magnets in the portion of the drum that is uppermost, and close to the elastic stick, but not the more strongly magnetic pieces of ore.

The iron ore that reaches the upper portion of the drum and is then jarred off falls on a sheet-iron shoot, N, and the strongly magnetic particles are now swept off the magnets into the sheet-iron by means of a revolving brush, E, aided by the jarring of the wooden spring, and run through the shoot into a receptacle, F. The brush is provided with stiff bristles, and has two motions, one a revolution on its axis, given by a screw and pinion, G, and the other a back and forward motion, produced by a crank, H, operated by a pulley and belting on the other side of the drum. Within the axle of the brush, which consists of a piece of gas-pipe, is a ball and socket-joint, I, which permits this double motion. The large wooden cylinder has a narrow iron band running around its edge on both sides, which fits into four small grooved wheels, J, on which the drum rests; two of these wheels are connected by a shaft, and the other two are disconnected from the first two and from each other. Motion is communicated to the first mentioned grooved wheels by a belt-pulley, R, on the same shaft, while the latter two merely support the drum and turn with it. A small pulley on the same shaft as the connected grooved wheels gives motion by means of a cord belting to a horizon-

tal pulley, L, at the base of the upright shaft, M, on which the screw, G, is cut, which turns the pinion keyed to the axle of the brush. On the other side of the drum is a pulley which turns the shaft on which the cam (*dumpling*), belonging to the hopper, is placed, and communicates motion by means of a belt and small pulleys to another shaft which near the middle is bent into a crank, and gives the backward and forward motion to the revolving brush.

In one machine small horseshoe magnets, to the number of 511, are used. These are the ordinary sized magnets which are sold as toys in the philosophical instruments shops, and are 3.15 inches long, 0.59 inch wide, and made of 0.12 inch plate. The other machine has 120 very large horse shoe magnets, 7.87 inches long, 1.18 inches wide, and made of 0.24 inch plate; in addition there are 104 small ones. The feed is quite slow, and, to obtain the best work, the machines must not make more than five revolutions a minute. Each machine separates four cubic feet of iron ore from the zinc blende in a day of 12 hours. They have been 13 months in use, and are very well liked, the preference being given to the one working with small magnets, as the large ones make the machine very heavy, so that it does not run smoothly. The separated zinc blende falls to the bottom of the drum, and by slow revolutions, gradually works towards the sides, where

duties. It is to be hoped that similar gatherings of our militia-men will be held annually in the future. One of the best places in the State was selected for the camp, and Santa Cruz was unusually lively and gay—a very large number of visitors, aside from the soldiers, being present.

A New Home Industry.

Manufacture of Eucalyptus Boiler Scale Preventive.

There is a plain looking little factory back of Lake Merritt, in the Piedmont hills, Alameda county, where they are manufacturing from the leaves of the eucalyptus tree an extract for the prevention of scale in boilers. There are numerous groves of the blue gum (eucalyptus globulus) in the vicinity, so that the raw material is abundant. The leaves and twigs are stripped from the branches and crowded into retorts. In these retorts are steam pipes into which steam at 40 pounds pressure is led. After several hours' treatment the desiccated leaves are withdrawn; the liquid extract and oil formed during the operation being drawn off and separated. The oil is shipped to Europe, where it is used for medicinal purposes, and the extract is put up in five-gallon cans or barrels, ready for use.

The discovery of the efficacy of the eucalyptus leaves for removing and preventing boiler scale, was an accidental one, and was made by George Downie, of Salinas. Experiments were then made, and it was found that the extract from the leaves served the same purpose. A company was formed and a factory started, since which time—a couple of years past—the substance has been widely used, about 1500 gallons a day now being made. The shipments to New York and Liverpool since January 1st have aggregated nearly 100,000 gallons.

The market is by no means a local one, large quantities being shipped to Liverpool and London as well as to the Eastern States. It has been adopted on the transatlantic steamship lines and been found very successful indeed. Exhaustive experiments are now being made with the extract in the English Navy.

It is in use on the Pacific Coast steamship lines and by a number of prominent steam users in this city, and elsewhere in the State, having about displaced compounds for similar purposes. It has been tried successfully in the U. S. Navy, the Chief Engineer of the U. S. S. *Ranger* reporting that the "use of eucalyptus has been proved to protect the iron of the boilers from corrosion."

After examining the compound, Prof. E. W. Hilgard says: "After removing the tannin as far as possible by digestion with animal membrane, the acid reaction shown by the extract was found to be equivalent to only .127 per cent of sulphuric acid, an amount so small that it is doubtful whether the cleansing action upon boilers can be attributed to acid solution." This is a great point, for if the scale is not removed by acid it cannot injuriously effect the boiler, and shows that it does its work thoroughly. It has been used in boilers of every description, and in all kinds of water both on land and sea, and the engineers who have tried it have found it efficient in removing and preventing the formation of scale, whether carbonate of lime, sulphate of lime or carbonate of magnesia.

The substance is purely vegetable, and will not cause foaming or priming, as it tends to prevent it in alkali water. Another curious feature also is that it prevents pitting or corrosion, dispensing with the necessity of using zinc. In a stationary boiler, one gallon for each 15-horse-power is put in at the beginning of each run of two or three weeks; in steamboat boilers, one gallon to each 40-horse-power.

The extract is made by the Downie Boiler Incrustation Preventive Co., of this city, and agencies have been established in the principal cities in the United States and Europe. Patents have been obtained in the principal countries of the world. Although this home industry is a comparatively new one, it has made very rapid advances, and the product is known favorably abroad already. Mr. Joseph McGillivray is now in Europe introducing the extract, and has met with great success. Judging from the testimonials received by the company, some of which appear in our advertising columns, this extract is remarkably efficient in serving the purposes for which it is intended.

The Militia Encampment.

This year, for the first time, the different regiments of the National Guard of California have been in camp together, in command of the Major-General. The State encampment was at Santa Cruz, and continued for one week. During this time the routine of camp-life was performed, there were drills, inspections, parades, etc., and on the last day there was a grand sham battle, at which the Governor of the State and other notables were present.

The citizen-soldiers are reported to have acquitted themselves creditably during the encampment. All the details of camp-life were carried out for the instruction of officers and men. To militia whose chief duties have been in the armories or the street, there was much to learn, and the experience gained in this encampment must be of benefit to them all.

It is to these men, in the various cities of the Union, that the Government will look to first in case of insurrection or war. As they are schooled in military tactics, their experience would be of great benefit to the country in case numbers of recruits should be suddenly called for. And for these reasons, encampments such as the one which they have just experienced, are not only useful to the officers and men, but to all citizens. While allowed to indulge in rather free social recreations, upon which some criticism has been made, discipline was maintained sufficient to train the men in their camp

The Volatilization of Gold.

Though it is popularly assumed that gold is not volatile, yet metallurgists have long known that under certain conditions it can be volatilized. Thus gold-foil sublimes in a current of chlorine at 300 degrees C., as auric chloride, and auric chloride combines with a number of metallic chlorides, forming double salts called chloro-aurates, and it is probable that some of these little-studied compounds are more volatile than the auric chloride itself. In the so-called "Miller's chlorine process" for refining gold by passing a stream of chlorine gas through molten gold, which has been for years in successful operation in the Royal Mint, Sydney, Australia, a certain loss of gold occurs by volatilization in connection with the chlorides of silver and some of the base metals.

Though the fact of gold volatilization in roasting certain gold ores has long been known, and has been made public by Kustel, Rlotte, Aaron and others, yet the extent of this loss does not appear to be generally appreciated. In "Leaching Gold and Silver Ores," published in 1881, Mr. Charles H. Aaron, mining engineer, of San Francisco, says that in the chloridizing roasting of gold ores he found that he was sustaining a heavy loss in gold—a loss which, before he discovered its cause ("being a novice in this branch of metallurgy"), had amounted to some \$3000. He then made tests in a muffle, and found that with four per cent of salt there was a loss of more than 50 per cent of the gold. Or, to use his words, "I weighed two half-ounces of a sample and roasted them in a muffle side by side, under precisely the same conditions, except that to one of them I added four per cent of salt. The roasting was purposely pushed to an extreme as to heat and time, and when the two sets were assayed, under exactly similar conditions, that which was salted was found to contain less than half as much gold as the unsalted one."

"I then took some light, fluffy sublimate from the flue of the roasting-furnace, an assay of which gave me a value of some \$600 per ton, chiefly gold. The quantity of this material was, however, very small, and the bulk of the matter in the dust chamber was not much richer than the average of the ore treated, a circumstance which indicates that the gold was actually to a great extent volatilized in some not easily condensable form. . . . As soon as I made the necessary change by reserving the salt until the nearly dead roasting of the ore was finished, not only did the roasted ore assay 20 per cent richer than when raw, but the yield overran my guarantee."

I afterward found that a very small quantity of salt—not more than three pounds to the ton—might be mixed with the crude ore without detriment to the gold, and with decided advantage to the extraction of the silver."

This subject has recently had attention directed to it by some very interesting experiments in chloridizing roasting made by Mr. C. A. Stetefeldt, mining engineer, of this city. These experiments form, we understand, the basis of a paper to be presented at the next meeting of the American Institute of Mining Engineers; and we should have deferred our notice of the subject until that time, but that we noticed Mr. Stetefeldt's experiments have been communicated from "Advance-sheets" of his report to the London Mining Journal by a correspondent, who, with some fulsome flattery (which must be rather embarrassing to Mr. Stetefeldt), announces the discovery of the heavy loss of gold by volatilization in this case as a "remarkable result," "nowhere on record," etc.; whereas, in fact, it has for years been known among metallurgists. Mr. Stetefeldt's experiments, though conducted on a small scale, are extremely instructive, and form a marked progress in the investigation of this important practical problem.

The ore of Las Minas, Zamelehuacan, Mexico, on which Mr. Stetefeldt's experiments were made, is composed of from 40 to 60 per cent magnetite, from 3½ to 7 per cent copper pyrites, and from 3 to 22 per cent iron pyrites. The ore loses only from 1 to 3 per cent in weight by an oxidizing-roasting. It contains from 0.3 to 0.8 ounce gold per ton of 2000 pounds.

Mr. Stetefeldt's roasting experiments consisted of oxidizing and chloridizing roasting in a small reverberatory furnace, with charges of 200 pounds, the capacity of the furnace being at most 500 pounds.

As might have been expected, it was found that "a mere oxidizing-roasting leaves a large percentage of the magnetite intact," and "a direct chloridizing-roasting removes the magnetite almost completely and very rapidly," but with a heavy loss in gold. Mr. Stetefeldt says: "In determining the gold value of the ore before and after chloridizing-roasting, I found an enormous loss of this metal by volatilization;" and as did Mr. Aaron, Mr. Stetefeldt repeated the experiment by roasting for one hour with 3 per cent salt in a muffle. The following were the results: 2 and 4 were partially roasted before adding the salt:

CHARGES ROASTED IN THE REVERBERATORY FURNACE			
Number	Before chloridizing-roasting.	After chloridizing-roasting.	Present loss.
2.....	0.916 oz.	0.420 oz.	53.5
4.....	0.202 "	0.150 "	42.8
5.....	0.533 "	0.075 "	80.1
6.....	0.050 "	0.075 "	88.5
CHARGES ROASTED IN THE MUFFLE.			
1.....	0.700 ozs.	0.050 oz.	93.0
2.....	0.525 "	0.075 "	85.7
3.....	0.650 "	0.065 "	90.0

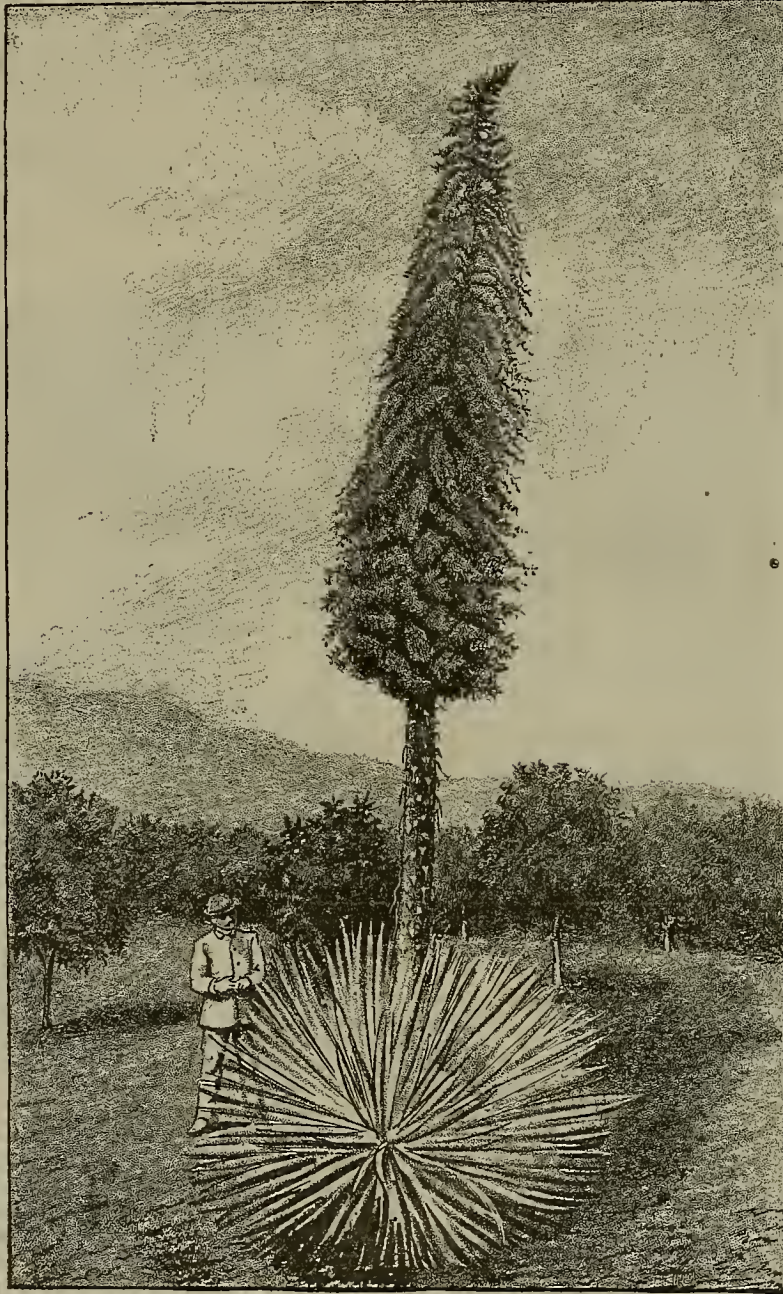
"There is no doubt that the volatilization of the gold takes place with that of the cuprous chloride. It increased with the quantity of cuprous chloride formed, and then volatilized and decomposed. It is also a function of temperature. Finally, I am convinced that the magnetite, as a contact reagent, plays an important part in causing this loss, a fact that invites further investigation."

These experiments and deductions are extremely interesting and instructive, and when repeated on other classes of ores and on a large working scale may lead to important economic results. Were it not for the well-known difficulty of condensing the volatilized precious metals, Mr. Stetefeldt suggests that "we would have here a most simple and perfect method to extract not only the gold from the Las Minas ores, but gain considerable copper besides."

Mr. Stetefeldt proposes oxidizing-roasting the ore in Stetefeldt shaft-furnaces—a complete change of the magnetite to ferric oxide is not

The Yucca, or Spanish Bayonet.

The engraving on this page shows a magnificent specimen of this plant. It was engraved from a photograph of a plant that bloomed in Pasadena in the summer of 1884. The exact age of the plant is not known, but it is not more than eight or nine years ago that it was transplanted to the spot where it bloomed and died. It was growing in an orange orchard, as shown in the picture, and received the care and cultivation that the orange trees did; the result is shown in the engraving. In their wild state, the bloom stem seldom attains a height of more than eight or twelve feet, while this one measured about 25 feet in height. The shaft or flower stalk is the growth of but a few weeks; and as it stood with its top completely covered with creamy-white flowers, it was a sight that is seldom seen. While in bloom it was visited



THE SPANISH BAYONET IN BLOOM AT PASADENA.

necessary—and amalgamation with dry gold or silver amalgam in an arastra in preference to an iron pan. Liquid quicksilver was not found advantageous, a fact already remarked by other metallurgists in similar cases. Mr. Stetefeldt believes it possible to extract from 90 to 95 per cent of the gold by this method.—*Engineering and Mining Journal*

MINING TRANSFER.—The Mayflower Mining Company has concluded the purchase of the mining property adjoining its own in Placer county, and belonging to Anthony Clark and F. Chapellet. The claims purchased are the Justice Consolidated, Golden Eagle, Bedrock, Hull and Lookout. The considerations are as follows: \$6000 paid down, \$28,500 in one year, another \$28,500 each in three, six and nine months thereafter, in all \$120,000. At the end of a year the purchasers have the option of paying 5 per cent per annum on \$114,000 and extending the time for payment to two years. Possession is to be taken by the Mayflower company at once. A tunnel is to be driven in Brusby canyon, and the sellers, Messrs. Clark and Chapellet are to have joint use of it with the Mayflower Company.

by hundreds from all parts of the county. This species of the yucca (*yucca baccata*) dies after it blooms. The plants are quite numerous on the mountains and foothills in the southern part of this State, and when in bloom their white crests can be seen for miles, towering above all else.

Mr. W. W. Bliss, of Duarte, says he has seen it stated that the bees gather large quantities of honey from this plant, but he does not think that this is the case, although he has seen bees at work on the flowers. The most important use of this plant to the bee keepers is the brushes which are made from the leaves that grow at the bottom of the plant. These brushes are decidedly the best thing that has yet been discovered for brushing bees off from the combs in extracting. They are a vegetable fiber, soft and pliable, yet almost indestructible, and never come loose in the "handle," no matter how much they are exposed to the weather. Mr. Bliss secured the leaves of the plant shown in the engraving, being the largest that he had ever seen, and made from them magnificent brushes for the purposes stated. We understand that they are made and sold to bee-keepers by dealers in supplies for the apiary.

A New Concentrator.

From the Denver *Public Opinion* we take the following description of the new "Matchless Concentrator," owned by the Tahor Investment Co., of Denver. It has a motion almost identical with the miner's gold pan, and requires a stream of water supplied from a 1½ inch pipe. About five-horse-power is adequate to run the machine. It has capacity to treat from two to four tons per hour, saving from 75 to 90 per cent of the mineral contained.

It is mounted on a base of 12-inch square timbers, 14 feet long and eight feet wide, over the center of which runs a shaft connected by bevel gear to an upright shaft at either end. The upright shafts are 2½ feet long, and terminate in horizontal adjustable cranks, having movable wrist-pins, which fit vertically into short, horizontal shafts, supporting a frame of three-inch gas-pipe, 14 feet long and 17 feet wide, which frame is suspended at the middle of each side by hearings on the journals of the short horizontal shafts, thus holding said frame rigged longitudinally, but allowing lateral motion. Four iron posts with ball and socket joints at either end, rest between the frame and base, one at each corner, supporting the burden. These posts have their bases inclined inward, and adjustable curved iron bed plates, and give a lateral oscillating movement to the frame while the cranks are rotating it.

The pitch of the machine is at an inclination of three-eighths of an inch to the foot, so that when the plates are full at the mouth they are nearly a feather edge at the back. The ore belt of plates is moved slowly backward, automatically, by means of an adjustable ratcheted wheel attachment, the speed of which can be regulated at pleasure. Twenty-four rows of pans are on top forming the incline ore table, at one time, which inclination is also adjustable.

At the head of this ore table clear water is fed upon it in small jets from a pipe resting just above the upper or rear octagon carrier, and cleaning the partially concentrated mineral, flows from one plate forward to another, one-third the distance of the ore table, where it comes in contact with fresh ore pulp, fed from a hopper there mounted; thence, carrying the tailings or wastage of the ore with it, it flows and discharges upon an inclined chute or apron, in front of the forward carriers.

During this flow of mixed water and ore or pulp, it is roasted, oscillated and jarred in each row of pans successfully at the rate of 120 revolutions per minute, and the mineral contained in the ore settled to the pan bottoms and against the circular riffles, while the tailings pass over forward.

The backward, continuous, slow motion of the ore-belt inverts the pans, and the mineral concentrates are washed off by jets of water into a stationary tank under the rear octagon carriers. The movement of this panning machine is made wholly adjustable, so as to adapt it to every character of concentrating ore.

THE OUTLOOK AT BUTTE.—The Butte *Inter-Mountain* says: Mining events of the past month have all been of an encouraging character. On a number of the principal mines of the district deep explorations are being pushed with good results. No better evidence could be asked of the faith which mine owners have in the permanent productiveness of their properties than the expenditure of money in the lower levels, and in the sinking of shafts. There is very little surface work being done now in any of the leading silver and copper mines of Butte, but down in the 600, 700 and 800-foot levels active exploration seems to be the order of the day. This is the case in the Anaconda, Lexington, Alice, Colusa and other well known mines, and it means that the ore reserves are to be increased and the output enlarged. Within the past week several important strikes have been made, notably in the Goldsmith and Blackrock. From the Bluebird come reports which almost stagger belief, yet they are not overdrawn. Rumors are also received of the early resumption of operations on several well-known properties which have been allowed to lie idle for some time for reasons best known to the chief stockholders. The mills and smelters are all making a record and turning out more hullion and matte than ever. Particularly is this true of the Moulton and Lexington. The Alice is getting in good shape to increase its product as recent developments in the company's mines give promise of richer ore. The Silver Bow mill is making a good run from leased mines. The smelters are in active operation. The new water jacket smelter on Silver Bow creek will soon be ready to start up. From Anaconda come reports of increasing activity and when the new concentrator shall be finished the company will be in much better condition to produce an increased quantity of metal and at a decreased cost. The plant is now running like clock work.

THE MARTIN ELEVATOR.—The Oroville *Mercury* says that L. L. Robinson, Pres. W. A. Radford, Secretary, and D. Stokes, Superintendent, of the North Bloomfield mine, reached that place and visited the Cherokee and Miocene mines. The gentlemen were delighted with the Martin Elevator, at work in the Miocene, and Mr. Robinson thinks it is the finest application of water power he has ever seen.

Ancient and Modern Warfare.

The only real difference between ancient and modern warfare is the application, in recent times, of steam, gunpowder and dynamite. These changes have, of course, involved machinery and appliances for their use and application. To effect the same amount of execution modern armies are not necessarily as large as those of ancient times, for the reason that a much larger part of the work of war is now done in the shops and foundry. Those who make the powder and fill the cartridges are as much a part of the army as those who fire them off. So with the foundrymen and mechanics who make the cannon.

In naval warfare we have actually gone back, within the last few years, to one of the most common and effective expedients of the ancients—that of ramming an adversary.

"Science," says the *London Spectator*, "has not yet said its last word on the adaptation of nature's secrets to resistance against rapine, carnage and wrong, whether exercised by nation against nation, or individuals. Even now substances are known to chemists which it only needs finer mechanical skill to convert into efficient and invincible agents for defending civilization against barbarism and savagery. What secrets may be, and no doubt are, hid in the womb of nature, and are waiting to be revealed by the hand of science, can only be conjectured. But we may be sure of this much—that the higher the civilization, and the more developed the intellect of the future, the more hopeless will become the attempts of needy and adventurous barbarians against the well being of highly civilized nations. If the Romans had left to Britain, with their civilization, a body of physical knowledge, similar to that of to-day, the subsequent Saxon Conquest would have been impossible."

The *Spectator*, in another article, in alluding to the opinion which some are beginning to entertain, in regard to the possibility that the terribly destructive nature of modern implements may possibly put an end to warfare, says:

There is not the slightest certainty that any invention, however terrible, would put an end to war; while there is almost a certainty that if such an invention were perfected it would grievously increase the miseries of mankind. Taken in the lump, men will face any means of destruction whatsoever, if also they possess it themselves. Give two men pistols, and they will fight across a handkerchief. They are not afraid of death, but only of death without a chance of victory. King Theodore of Abyssinia asked his courtiers, when the rocket shells fell at his feet, if he could reasonably be expected to face things like those, and ultimately, in pure despair of defeating science with unscientific weapons, killed himself; but if he also had possessed rockets, he would have fought on. No men, not even Prussian soldiers or English sailors, will face shells without shells to throw back; but when they have shells they face the enemy's shell as bravely as they did the old round shot. The methods of war are changed by science, but war is not extinguished. Suppose it true that able chemists and mechanics could invent a method of throwing an asphyxiating vapor on a sleeping army, what would be the result? First, the adoption of some protective covering, such as iron-clad huts for sleeping in; next, the adoption of a method of encamping which spread the army over a surface too great or too uneven to be reached; and next, the use of similar mechanics and chemists as the assailing force. Huxley would march with his fishermen to choke Tyndall with his Alpine climbers. War would then consist mainly of efforts to obtain advantageous positions, from which showers of death would be thrown, but war would not cease. Forlorn hopes would be organized among chemists or mechanics as easily as among soldiers, enormous rewards would be paid to the new warriors, and nations would fight each other as briskly as ever.

A WORD TO IDLE MINERS.—Miners and prospectors, anxious to do something for themselves, would show wisdom in giving Eureka district a fair trial before going off to other and distant parts. By many of those who have been lured off by glowing stories it is said that the equal of Eureka's properties are seldom seen. Especially it is said by these men that few camps offer as good opportunities to miners who want to work on their own account, or, for that matter, to miners anxious to work on any profitable layout, as Eureka. True, it is hard for miners to get work here on day's pay or for them to locate promising properties for themselves. But they can get good leases and tribute on the most favorable terms, and for whatever they strike a ready market awaits them at home. Is it not better to work a mine that is almost certain to contain good ore and get the greater part of its product than to experiment on a property, the value of which is very doubtful?—*Eureka Sentinel*.

MINING AND SCIENTIFIC PRESS.—One of the best mining and scientific papers in the world is "The Mining and Scientific Press," published by Dewey & Company at 252 Market street, San Francisco. It should have a large circulation among miners and among those who wish to keep posted as to the inventions of the age. The Press is reliable in every respect, and is conducted with ability.—*Foothill Tidings* (Nevada Co. Cal.).

USEFUL INFORMATION.

SWEET TOOTHED AMERICANS.—If, as some writers assert, the comfort in which the masses of a people live is measured by the quantity of sugar they consumed, our people rank high in the matter of good living. Our consumption of sugar is 56 pounds for every soul of the population. Only one nation shows a greater consumption, and that is England, with 67 pounds per capita. The quantity in France is 25 pounds, in Germany 18 pounds, Holland 153 pounds, Russia 5 pounds. The Germans, though large producers of (beet) sugar, consume only one third as much per capita as we. Another interesting fact is that we are steadily increasing our consumption per head. In 1867 it was 29 pounds, in 1884 it was 54 pounds, showing a nearly doubled consumption per head in 17 years. Our aggregate consumption of sugar (not including molasses and syrup) in 1884 was over 3,000,000,000 pounds, 2,437,000,000 pounds or four-fifths of which was imported, and 640,000,000 pounds produced at home. Of the home product 287,712,000 pounds was cane sugar from Louisiana, 14,000,000 pounds sugar from other States, 36,576,000 pounds maple sugar, 1,277,000 pounds beet sugar, chiefly from California; 726,000 pounds sorghum sugar, and 300,000,000 pounds glucose. It will be observed that our product of cane sugar is exceeded by our product of glucose, made from corn. Our sorghum crop makes a very small showing—about one per cent of the domestic product. Sorghum sugar shows better—30,000,000 gallons, which is double the crop of Louisiana molasses.—*St. Louis Republican*.

THE CARE OF CANARIES.—A correspondent of the *Germantown Telegraph* says: I frequently see inquiries about the care and raising of canary-birds. I have kept birds for the past 12 years and never had one sick or die, and I have raised a great many. Some think that a bird should never be fed anything but canary-seed. I have always given equal parts of canary and hemp. The first thing in the morning I give a piece of bread and fresh water, then roll the seed so as to crack the hard shell of the hemp. At noon I give fresh water, and often a piece of potato, either boiled or baked, and whenever I can a piece of apple. In summer I give lettuce, cabbage and wild pepper-grass, which last grows plentifully here by the roadside. They need clean sand occasionally, say once a week. Last spring I raised 20 birds from 2 pairs. When setting they need hard-boiled eggs in addition to their usual food, a half of one a day being sufficient for a pair, and when they are feeding the young birds roll the yolk of the egg, or chop very fine and mix with rolled cracker; you can also give plain tin pipes, in the season of them. An extra cage is useful, as they must be kept clean to be healthy. When setting they may be kept as quiet as possible, and in one place, as they will often leave the nest, if moved from where they usually hang, even to another side of the room. When six weeks old they may be removed from one cage to another without injury.

A CHAT ABOUT CAR WHEELS.—An official of the Pennsylvania Railroad states that there are fully 10,000,000 iron car wheels in use on American railroads. That figure does not include the wheels on palace coaches and the better class of passenger coaches. "How much iron does it take to make a wheel?" he was asked. "About 525 pounds of pig iron," he replied, "and about 1,250,000 wheels are worn out every year. But do not conclude from that the iron men are called upon to supply the 312,500 tons of material required to make the new wheels; because the worn out wheels themselves supply about 290,000 tons." "How long will a good car wheel last?" "Formerly it would last eight years. But now the reduction of railroads to a standard gauge and the improvement in loading and unloading facilities keep the length of service down. This is because the uniformity in gauge keeps the cars in more continuous use, and the improvements in loading and unloading facilities enable the cars to be put to more active service. The wheels on palace coaches and on first-class passenger coaches are known as paper wheels. They are made with a steel rim or flange, and iron hub, but the web is composed of sheets of paper cemented together. They combine lightness with strength."

PAPER SLIPPERS are the latest form in which paper is introduced. Mr. W. Litchfield, of new Broad street, London, has patented a system of manufacturing slippers, sandals and other coverings for the feet out of paper. In carrying out this invention paper, paper pulp, or papier-mache is employed for the upper, which is moulded to the desired form and size, and a sole is provided made of paper or paste-board, leather-board or other suitable paper material, which is united to the upper by means of cement, glue or other adhesive material. The upper is preferably creased, embossed or perforated at the instep and sides, or other parts thereof, so as to prevent the breaking or tearing of the same while in use. The sole may be made with or without a heel, and, if so desired, the slipper, or other foot covering may be provided with an internal lining of any suitable material.

CALIFORNIA AS AN OIL-PRODUCING COUNTRY.—California is now third on the list of petroleum-producing States of the United States. Pennsylvania leads, and New York is second. After

California come West Virginia, Ohio and Kentucky. A little oil is found in Colorado, Wyoming and New Mexico, although not much has been obtained in the latter places. California is gradually increasing her production, as new wells are opened in Southern California, and the industry is now a prosperous one there. As far back as 1878, 15,227 barrels were produced. In 1879 this increased to 19,858 barrels; 1880 showed returns of 42,399 barrels; 50,000 barrels in 1881, and 70,000 in 1882. The year 1883 showed an increase, and in 1884 the production was over 100,000 barrels. A barrel is uniformly 42 gallons. California consumes all the oil produced, and about 100,000 gallons per annum from the East as well.

GENIUS AND COMMON SENSE.—Genius generally makes the world catch its breath with admiration at its exalted flight, but it frequently goes to bed without its supper, takes a slice of hope for breakfast, and tightens its belt for dinner, while plodding common sense gropes along with its eyes to the ground, and by hard knocks and close picking gets three meals a day.

A WASH FOR OLD PAINTED WOODWORK.—Two ounces of soda dissolved in a quart of hot water will make a ready and useful solution for cleaning old painted work preparatory to repainting. This mixture, in the above proportion, should be applied when warm, and the woodwork afterward washed with water to remove all traces of soda.

A GOOD BROWN OAK STAIN is produced by preparing the wood with a solution of one ounce of catechu, boiled with one and a half pints of water. When dry, brush over a solution of bicarbonate of potash, one ounce to one and a half pints of water.

MARINE ANIMALS congregate mainly along the coast of continents on soundings. The meeting place of two maritime currents of different temperatures, as on the banks of Newfoundland, favors the development of a good diversity of fishes.

IMPORTANT ENTERPRISE.—An Eastern syndicate is looking for 25,000 acres of land in California, for the purpose of growing sugar cane and sorghum. A Georgia planter, backed by large capital, is at the head of the enterprise.

A SWIFT FLOWING RIVER.—The Sutlej, one of the greatest streams of British India, is probably the swiftest large river in the world. It has a descent of 10,000 feet in 180 miles, an average of about sixty-seven feet per mile.

CEMENT FOR PETROLEUM CISTERNS.—A useful cement, which hardens very quickly, is formed of litharge mixed with glycerine. It may be used for water and steam pipes, as well as for lining cisterns for petroleum oils.

A REMARKABLE BEDSTEAD, made to order by a Milwaukee furniture firm, is twenty four feet wide, and has nine compartments, each intended to hold one of the purchaser's children.

THE DIVINING ROD, sometimes used by well diggers, and at an early date by oil prospectors, is a popular fiction that dates back to the eleventh century.

GOOD MEALTH.

Fresh Air and Ventilation.

The question naturally occurs, what rule can we have so as to know that we get enough fresh air and not too much? The general principle is simpler than its application. It is this:

The average amount of air breathed by every person is about 24 cubic inches at each breath, with about 20 respirations a minute. This would be a cubic foot in three and a half minutes, or 400 cubic feet in 24 hours, or the contents of a room seven feet square and eight feet high. But this is only a fiftieth part of what every healthy person needs, for breathing vitiates the air rapidly, because the air exhaled has 100 times as much carbonic acid gas as the atmosphere, while twice the amount contained in the atmosphere, or eight parts in 10,000, is as large a proportion as can be breathed without injury to the health. Crowded rooms in winter, schools, etc., are sometimes found to contain three or four times as much, and headaches, and other ailments are the consequences of breathing the same air over and over again.

There should, therefore, be enough fresh air for every person daily to amount to 20,000 cubic feet, or enough to fill 18 rooms 10 feet square and 10 feet high. This would be amply supplied by an opening, tube, or orifice three inches square, with a moderate current. In the day-time there is usually enough air introduced into rooms through opening doors, cracks in window casing and in other ways. The chief danger is in sleeping rooms, where pains should be taken to have a circulation. When the room is warm, the air outdoors is quite cold, constant, and often sufficient currents are caused. A hundred persons should have a ventilating orifice equal to two and a half feet square.

RIDING UP STEEP GRADES, as in mountain railways, or ascending high mountains where the ascent from the sea level is rapid, often produces a very unpleasant and sometimes fatal

sickness. This sickness is known to the medical faculty as "sirocco," and very often sends people to bed for several weeks. The symptoms are a terrible pressure upon the temples, nausea, bleeding at the nose and ears and faintness, but the effects can be avoided by taking precautions and observing rules that experience has suggested, the chief one being to drink a glass of brandy and keep perfectly quiet, as the slightest degree of exercise will floor the strongest man. These effects are very frequently observed, and often with very serious effects in the ascent of the mountain railroad of Peru. People who are compelled to make the ascent of the road to the Cerro del Pasco mine, if they have not become accustomed to it, usually take two or three days for the journey, stopping off at the stations along the line, and going to bed at once upon reaching the town of Chicla, which stands at the summit.

SANITARY SCIENCE is of quite recent origin; so late, indeed, that the men who formulated it are still young. Its proposition to prevent disease by removing the conditions that provoked disease, merits the popular approval, and legislation has been quick to help sanitarians put their science to the test. With plenty of money, and in fair localities, it is not difficult to satisfy all the demands of the sanitarians. It will, however, hardly be contended that the sanitarians have formulated insurance against the outbreak of the zymotic diseases for the ordinary householder in any locality where necessity has placed him. And yet this is the very problem which sanitary science is to solve. Much can be done in one home to make it healthful; but the influences that affect one home are so intermixed with the influences that affect large areas, that State and national interference is demanded by sanitary science. Householders should take more pains to inform themselves in regard to the principles of sanitary science, so that they may be able to critically examine their own homes, and influence opinion, so that healthful conditions may be made compulsory under the law. This is good work, and the more of it the better. There is an immense chasm between crazy-quilts and sewer-pipes, sonatas and bad drainage; but it can be bridged by informing the women, and teaching the girls. If rosy children and long-lived husbands are worth the while, this education in what constitutes a healthy home is worth a place in the school curriculum for girls.

MIND AND DISEASE.—The influence of the mind upon the body, for sickness or health, is beyond all estimation. For a person to think he has a disease will often produce that disease. This we see effected when the mind is intensely concentrated upon the disease of another. It is found in hospitals that surgeons and physicians who make a specialty of a certain disease are liable to contract it themselves, and mental power is so great that sometimes people die of diseases which they only have in imagination. Well persons, to remain well, should remain cheerful and happy, and sick persons should have their attention drawn as much as possible from themselves. It is by their faith men are saved, and it is by their faith men die. If he will not die he can often live in spite of disease; and if he have little attachment for life, he may slip away as easily as a child will fall asleep.

SLEEPLESSNESS.—Those troubled with sleeplessness are invited by a writer in the *New York Mail and Express* to try the following remedy. It is based upon the theory that sleep is prevented by an excess of blood in the brain and may be induced by drawing it to other parts of the body: "Having assumed the usual posture of repose, inhale and exhale slowly and steadily long breaths, devoting the whole attention to making the inhalations of exactly the same length. The length should be much greater than that of ordinary breathing, although not sufficient to disturb the circulation by working the lungs to their utmost capacity. Any person who has force of will enough to concentrate his whole attention on the maintenance of this style of breathing can compel sleep in very unfavorable circumstances."

HOW TO TAKE A PILL.—The *Medical Reporter* gives the following directions: Place one or more pills under the tongue, then take a mouthful of water or other liquid and swallow (just as in the act of drinking); this done, look for the pill. Invariably the "I-can't-take-a-pill" patient is astonished, and sometimes he investigates the mouth with his finger to reassure himself if he has really swallowed the pill. The secret lies in the fact that in the act of drinking the tongue curves back upon itself; the pill, taken by the force of the current, is imperceptibly washed down the esophagus.

MILK.—Milk when swallowed rapidly by the glassful is very unwholesome. A quantity entering the stomach at once is changed from a fluid by the acid juices of that organ into a hard, cheesy curd, through which the gastric juices cannot pass; it is turned over and over, and as its surface can only be reached, it digests very slowly. It is sometimes fatal to a weak stomach. It should be taken slowly, eaten with something else, or sipped by the spoonful.

BEER FROM BANANAS.—Missionaries in the equatorial lake region of Africa have discovered that a kind of beer made of bananas is a prophylactic against malaria fevers, and that this drink is indispensable to their health.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SOUTH SPRING HILL.—*Ledger*, Aug. 22: On Monday last the drift at the 700-foot level encountered the ledge. The ore at this depth, so far as explored, is of splendid quality—equal in fact to any heretofore met with. The dimensions of the ledge are not known yet. Lumber is arriving on the ground for the additional ten-stamps to the mill. It is being hauled direct to Tarr's mill. Knight & Co., the contractors, expect to have the extra ten-stamps in running order within 60 days.

MISCELLANEOUS.—A number of men have been at work the past week cutting a ditch for the pipe to carry water from the Zeile reservoir to the mill. The new pipe is 15 inches in diameter, and there is 1100 feet of it to be laid. At the reservoir the embankment is being raised, so as to enable the water to be raised one foot higher—in fact, bring the water to the level of the ditch. At the Amador Queen operations are at a standstill, owing to lack of water. This is very unfortunate for the owners, who have gone to great expense in putting up a thoroughly equipped mill of 20-stamps, only to find the same useless until the rainy season sets in. At the mine everything looks promising. The ore body is said to be large enough to warrant the construction of a 60-stamp mill, and that fifteen men would be sufficient to keep a mill of that capacity running steadily. The Tellurium near Pine Grove is to be known hereafter as the San Joaquin mine. George Parker is the foreman. Only three or four men are at work at present, but a full force will be employed as soon as the ruins of the old shaft can be cleaned out. A New York company has commenced operations on George White's quartz claim, north east of Jackson.

SCANT WATER.—*Amador Sentinel*, Aug. 22: Scarcity of water has caused the closing down of several mines in the county. The hot weather causes the water to evaporate in the canal before it reaches the mines. A good prospect has been developed at the Quinn mine, Middle Bar district. The shaft is down fifty feet, with a large ledge in sight showing plenty of good sulphurets. Lack of water prevents any crushing of the rock.

Calaveras.

GRAVEL.—*At. Echo*, Aug. 22: It is currently reported that rich gravel has been struck in the Jack Rabbit mine. A rich strike was recently made in a quartz mine owned by J. J. Rapp, at Robinson's Ferry, known as "Our Flag" mine. Several thousand dollars have already been extracted.

Inyo.

PANAMINT.—*Inyo Reporter*, Aug. 22: The unsettled questions of title, etc., affecting properties at Panamint ever since the destruction of the big mill there some two years ago, and which in the meantime, has quite closed the camp down, have finally been effectually and satisfactorily settled, and now very soon again Surprise canyon will be almost as busy with life as during its flush days. Superintendent N. G. Fairman started a few days ago to the bay to purchase lumber, machinery, and everything for a complete new 10-stamp silver mill. The plant will include all the latest appliances for successfully handling base ores, and will include a first-class roaster and concentrating machinery. The work, we are assured on credible authority, will be pushed along just as rapidly as possible. The property is now all in the hands of the Inyo Consolidated M. & Mr. Co., of New York. Knowing something of that camp as we do, we are perfectly satisfied this enterprise will be a success.

MAMMOTH.—The Lisbon, as the new 5-stamp mill at Mammoth is called, started on its initial run some ten days ago.

HAWLEY MINE.—*Inyo Independent*, Aug. 22: From Cerro Gordo there comes reports that in the Hawley mine there are unmistakable evidences that one of the great ore bodies for which the district was noted in former times is about to be struck. In fact it is said that the ore has already been reached. The report is given for what it is worth. No one doubts, however, that if a large ore body has not already been found, it will be in a few days. The tunnel is now in ground the character of which is well known.

ORE SHIPMENTS.—This week about 80 tons of ore belonging to T. Boland were shipped from the Union mine at Cerro Gordo. Bob Locket and his partners shipped 20 tons from the lower levels of the same mine.

Mariposa.

COULTERVILLE ITEMS.—*Mariposa Herald*, Aug. 22: The Banderita mine has shut down for two weeks, in order that the miners may have a vacation. Some of them have gone to different portions of the county to visit their families, while others are spending the time in Coulterville. The Reed brothers have struck a very rich mine about three miles above the Banderita, on the north fork of the Merced. The vein is about two feet in thickness and pays from 25 cents to 50 cents a pan. They have sunk a shaft to the water level, twenty feet, and the vein looks better than it did at the top. The find is considered very valuable. The Hasloe mine is producing plenty of rich rock, and the new mill is reported as a success. The Red Cloud people have just finished sinking a 100-foot shaft, and much to their surprise a very rich vein was found at the bottom. They expected to have to drift to find the pay rock. The superintendent, Mr. Gaines, is in the city.

Mono.

MILL CREEK.—*Boodie Press*, Aug. 19: Jas. McDonald, of the Bryant mine at Lundy, was in town to-day, with a shipment of bullion from the last clean-out of the mill, which closed down on the 17th after a fine run on rich ore. Mr. McDonald says that only enough milling is being done to pay current expenses of developing the mine, which is being opened by a new tunnel running on the ledge and now in 100 feet. In a distance of 450 feet, while the ore extracted pays for running it, the ledge will be opened by the tunnel 300 feet below the old works, thus leaving vast stoping ground. The Butterfield mill started up yesterday on very high grade ore from the Jackson mine, under the superintendency of R. T. Pierce, who arrived there on the 15th. The

last lot of only 21 tons yielded \$1,200. The Little Enma mine has some 25 tons of rich ore waiting reduction at the same works. The Condon brothers yesterday commenced packing a lot of 15 tons from Golden Trench mine to Ashe's arrastra. The Gorilla mill continues to run in full blast. The real prosperity of the Mill Creek country is due to the fact that the boys have gone ahead independently to work gold mines that pay from the croppings down, a matter in which they have been materially assisted by the reduction from \$12.50 to \$5 per ton for crushing, at the Butterfield mill. Hence the actual output of gold is greater than ever before, and the mine owners do not care a continental whether the much mooted May Lundy sale ever transpires or not.

Nevada.

PROBABLY A SALE.—*Grass Valley Union*, Aug. 22: The late rumors in regard to the sale of the old Allison Ranch mine (at one time the great quartz mine of this district) are beginning to take shape, and it is now stated that a company of French capitalists, at present visiting the State, have contracted to take it at a given price and date, with the intention of starting up operations at an early day. It has been known for some time that negotiations have been going on, and it is reported that this is the outcome of the same. Of all the idle mining properties in this district there is none that stands higher in local favor than the Allison Ranch, which it is confidently believed is yet a mine of great value.

LONE TREE MINE.—*Foothill Tidings*, Aug. 21: The Lone Tree mining claim is now being thrifly and energetically worked by a company of gentlemen from San Jose and Gilroy, the work being principally done under the direction of Mr. Sevenoaks. The Lone Tree was worked to some extent several years ago, and some very rich ore was taken from the ledge. The mine for several years has been idle and the tunnel caved. A few leading spirits in the town who always had faith in the Lone Tree, have kept up their interests and have from time to time done such work upon the ledge as their means would allow. The tunnel is now almost entirely cleaned out and refitted, and last week the miners cut two large quartz stringers that are making direct toward the main ledge, which the miners say they will reach in a short time. Rock from these stringers, or ledges as they might be called, for they are from three to five inches thick, prospects well. We have seen the result of some pounded pieces, and it showed well in sulphurets of the very best sort, while all through it were plainly seen, with the eye alone, large, coarse colors of gold. The rock from these small ledges, that is the portion of them that has been taken up by the miners, will, every bit of it, prospect amply well, and many of the pieces that have been brought to town plainly show free gold. The prospects of the Lone Tree are just now very encouraging, and the two very rich stringers just cut surely extend to the main ledge, and will help to enrich that body of ore. The Lone Tree is located in one of the richest portions of our mining localities, and is surrounded by rich quartz ledges, each of them whenever tested have never failed to give up their shining treasures in a generous quantity. It will be but a little time now until the company will have their tunnel in working shape, and then they will start rapid work for the main ledge that is known to exist not more than 200 feet from where the miners are now working.

WATER PROJECT REVIVED.—Some time since the *Tidings* announced that the Empire company had abandoned the project of introducing water power into the Empire mine. The project was abandoned, owing to the fact that amicable arrangements could not be made with parties owning land along the proposed line of pipe. Through the energetic efforts of Mr. Wm. B. Bourn, these difficulties, that is most of them, have been overcome, and now the Empire company, through Mr. Bourn and some more of the principal owners, are busily engaged in forming a company in San Francisco, for the purpose of carrying out the original water scheme, which will be of incalculable value to that section of our mining district lying south of Grass Valley.

Shasta.

A BOOM.—*Shasta Co. Democrat*, Aug. 19: Mining interests are experiencing a decided boom at the present writing. The mountains are alive with hard-working prospectors seeking hidden fortunes. The Copper City quartz mill was started up again with additional smelting furnaces. Success is assured. The sale of the Lost Confidence mine is not yet publicly confirmed, but the general supposition is that it will be. Whitton & Small are building a large arrastra on their Squaw Creek claim. They have several tons of rock on the dump out of which they make wages milling in a hand mortar. The mill on the Harrison mine is being put in place rapidly, and will be hammering away by the first of next month. Sixteen men are employed about the mill and mine. Dan O'Neal has started a tunnel that will tap the Florida 175 feet deep. The tunnel will be about 350 feet in length. On account of the scarcity of water he can run his mill only six hours a day. Jack Conant came down from Squaw Creek Monday, and showed us some gold quartz specimens from his Squaw Creek mines, also a handsome chunk of bullion he pounded out in a hand-mortar. Workmen were set to work last Monday excavating for a mill-site for the reduction works to be put up on the Scheerer mine by Robinson. The works will be located within a few yards of the mine. The discovery recently made on Slickrock creek in Flat creek district, by Fred TenEick and Jim Magoon is said to be one of the best prospects found in the county for many years. The whole vein shows free gold and much of the rock will pay good wages in milling it in a hand mortar. It is confined between walls of porphyry and granite, and ought to be a contact fissure vein. It courses nearly east and west. Messrs. Titus & Grant in Bullychoop district, have struck the ledge in the Central mine 5 feet in width, and will average \$20 rock. Part of their Huntington mill has arrived at the end of the wagon-road, and a sled-road is being built that it may be taken to their mill-site. Davis Bros. have struck the lode in their tunnel on the Pound Cake mine, and it looks remarkably well. The Hoskin Bros. continue to extract good ore from the Little Gem. Bullychoop is just now getting into shape to show what it really is.

Sierra.

PRIMROSE.—*Mountain Messenger*, Aug. 20: P. A. Lamping was in town last week. He has organized a company in Oakland to open and develop the

Primrose mine, in Hog canyon. The first work done will be to clean out the shaft which was filled up several years ago while running an upper tunnel. The old tunnel from the bottom of the shaft to the ledge will be opened and the ledge developed. On account of the several dry seasons, this is a favorable time for this work. So far as worked the Primrose ledge was very rich, and it is probable that when properly developed, it can hardly fail to pay handsome profits.

San Diego.

JULIAN DISTRICT.—*San Diego Union*, Aug. 20: Mr. W. R. Defrees, who in 1872 and later was one of our citizens, and actively engaged in mining operations in the Julian district, has been paying a visit to his old stamping ground. He has been conducting some important mining enterprises since we last saw him. We are glad to hear him say that his early faith in the permanent value of our San Diego mining section is as strong as ever. After visiting Julian and vicinity he has returned here to take the train to New York on Saturday morning. He will come back to San Diego in four or five weeks, and will proceed to Julian, where he will reopen the old Owens mine, as well as the Washington mine. The Owens mine has been lying idle for over ten years; and yet when Mr. Defrees had charge of it, it always paid handsomely. He expects to make it pay again. Mr. Defrees thinks, also, that the Washington, the first discovery at Julian, can be made to pay—in fact, he is sure of it. He regards the mining section of our county as very important, and speaks in high terms of the Stonewall, Shenandoah and other mines. The *Union* has always firmly believed that the gold quartz mines of this county were a permanent source of wealth, and we take satisfaction in placing on record, in confirmation of our belief, the opinion of one of the most experienced and able mining experts in the country.

San Bernardino.

CALICO MINING DISTRICT.—*Print*, Aug. 22: Since our last general report, the mines that we heretofore made mention of, are working with their usual force and vigor, and producing the usual output of bullion. We have in the meantime examined most thoroughly the Kearsage owned by Robert McCullough and E. E. Stacy. A shaft has been sunk at the depth of 40 or 50 feet. A tunnel has been run, connecting with the shaft. The vein is of an average width of say two feet, upon an ore body or chimney which is without a doubt upon the same great ore body as that of the Silver Odessa, as the trend of the ore of that mine. The owners have for a long time past been working, and that with success, upon this mine. The Kearsage is without doubt one of the finest properties now held in private hands in this district, and is being worked with energy by the present holders, not so much with a view of sale as that of benefit to themselves. The mine is undoubtedly on the great fissure of the Silver Odessa, and is a true vein with well defined walls, with every and all indications of being a genuine and true fissure.

THE CLEVELAND.—This mine lies between Calico and the Fish Ponds and is now under bond to Hugh Stevens, who has but recently returned from an extended tour through New Mexico, Colorado, etc. The vein is encased between lime and porphyry, is carbonate of lead. A shaft has been sunk upon the vein to a depth of 30 feet. At this depth the ledge was crosscut, and 12 feet in width, in solid carbonates of lead, carrying from \$20 to \$30 per ton in silver. The vein is within less than four miles of the railroad and of easy access thereto.

PLUTARCH.—Since our last report upon this mine work under the direction of John McBride, the principal owner, has been advanced in different parts of the mine, notably in shaft No. 7, which has now obtained a depth of 70 feet, with a well defined foot-wall and a fine showing of high grade ore. The ores of this mine have uniformly paid well. The vein is directly upon the great ore channel or mineral zone which runs as courses or cuts the formation from north to south. That is upon the Bismarck and Silver Odessa belt, which lies north of the King and Sue belt.

KING.—Work is progressing upon this mine as usual, some 80 or 90 men are employed in and about the mine. We shall visit the mine and inspect it and report more thoroughly in our next issue. This much we will say now. The mine is producing the average monthly output of bullion. And all the crosscuts and levels are looking well, we will visit sometime during the coming week by invitation of D. Bahten, superintendent, and will then make a complete review of the workings of the mine.

THE WATERLOO.—We have been informed and have no reason to doubt the same, that developments of importance have recently been made in this mine, which belongs to the Oro Grande Co.

ALHAMBRA AND GOLCONDA.—The Golconda Mining Co., of San Francisco are operating in a small way on one of their claims, the Alhambra. Two tunnels are being run in from the south side of and half way down the hill for the purpose of opening up what is thought to be a rich ledge in the center. No developments of consequence have been made in the tunnels which are in a few yards. The best indications are in the cuts above on the surface, all of which show ore, principally of a good milling grade and occasionally streaks and bunches of ore that assay up in the hundreds of dollars. The present work which is done by several men, is intended as prospecting, and is under the careful and judicious management of G. W. Rogers. Strong hopes are entertained that large bodies of fine ore will be opened up and that the mine will develop into a valuable one. On a small portion of this mine N. E. Cline and nephew have a lease and they are taking out some fine ore in small quantities, the profitability of which will be determined after milling. Nothing is being done on the Golconda at present. The 60-foot incline shaft and the large chambers at the head of the same show over a great portion of the walls, and give ample encouragement for future developments.

Tuolumne.

RUNNING.—*Cor. Tuolumne Independent*, Aug. 22: The Dead Horse mine is running at full blast. They are busily engaged in sinking the shaft deeper. This is acknowledged to be one of the best mines in the county, and we earnestly hope that the company in charge will meet with brilliant success. Machinery has recently been shipped from San Francisco, to be placed on the Morning Star mine, near Chero-

kee. This mine has been in active operation for some time past, with flattering prospects. The Charlotte mine has started with a small force. This mine is considered to be very valuable, but unfortunately, it has been in continual wrangle for the past year, caused by several different parties claiming it. However, we hope that it is at last settled sufficiently to permit the rightful owners to go ahead and work it unmolested. Mr. Lucas, of Sonora, is engaged in opening the tunnel on the Lady Washington mine, near Summerville. Mr. Lucas informs us that as soon as it is opened for exhibition the property will be sold. A mining expert came up to examine the Hunter mine on Saturday last. There are several other mines in this neighborhood in active operation.

TURNED THE RIVER.—*McQuade, Fitch & Co.* are rushing work on their claim, on the Stanislaus, near Reynolds' Ferry. They have turned the river by a dam, leaving one-half a mile of the bed dry. The dam is constructed by driving stakes and filling back by sacks of sand. The cut is across an elbow of the river, into which the stream is turned. The gravel will be raised from the old bed of the river by steam power, and the machinery arrived upon the ground this week. The derricks and other apparatus are in place and mining will commence at once. Fourteen men are employed, several of whom are also interested in the mine. It is a Sonora enterprise, and the supplies are obtained here, and the proceeds will also be invested here. The claim will doubtless prove a profitable one to the enterprising owners.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, Aug. 22: The deep winze is now 137 feet below the 3000 level, with the bottom still in strongly mineralized vein matter with ore giving good assays. Sinking is being continued deeper for a pump, it now being below the 3100 level, and in a day or two, or about the first of the week a station is to be opened at that level for a drift southeast to connect with the drift from the Combination shaft. All work will be concentrated upon this drift, as in sinking the winze deeper this will be the shortest cut to the shaft to run out ore, waste, etc. The entire distance is about 130 feet, and the other end of the drift, at the Combination shaft, is already commenced, the chambering out of the station being in active progress. From the shaft the drift will be run due west for 100 feet, when a turn will be made to the right, and the drift run in a northwesterly course to meet the drift from the winze. At the point where this drift turns, 100 feet from the shaft, a drift is to be started southwest from the Chollar ground. Both these drifts, and especially the one for the Hale and Norcross, will pass through very interesting ground, and somewhat demonstrate the bonanza value of the east portion of the Hale and Norcross ore vein.

YELLOW JACKET.—Work was actively resumed in this mine Thursday night with a full complement of men, 150 being employed, twenty-five more than before work was suspended in order to arrange for running the Brunswick mill by steam as well as water power. This arrangement being completed sooner by several days than was anticipated, the mill started into full operation Thursday morning on Yellow Jacket ore, there being a good supply at the dumps of both the mill and the mine. Water will furnish about one-third of the motive-power, and the crushing capacity is increased to 210 tons each twenty-four hours. The mine is also in better shape for extraction, and more men will be put to work as may be required. The main incline has been put in a complete state of repair from the 1100 down to the 1300 level, and made available for ore extraction. The Imperial incline has also been cleared out and repaired at a point above the 1500 level where it was caved, and is now utilized for ventilating the 1300 level of the Jacket, a good circulation of air now passing through the Jacket incline.

CHOLLAR.—The main drift west, now being opened on the 3100 level, from the Combination shaft will be advanced 100 feet west from the shaft, and from that point it will branch each way in the form of a Y, one branch going northwest to the Hale and Norcross, and the other southwest to the Chollar. This lower drift into the Chollar will be more advantageous in the way of exploration than the present 3000 level which has been considerably explored already. The new section of the hydraulic pump in the Combination shaft has, since it started into practical operation last Saturday, been working as smoothly and effectively as could well be desired. The big pump is now complete and able to contend against a whole river of water.

CROWN POINT.—This mine and the Belcher are both shut down for the present. The Crown Point machinery is being overhauled and put in complete order for an effective run when work shall start up again. The mills which have run on ore from these mines are also being overhauled and put in order. These are the Mexican, Santiago and Eureka, all water mills which the Carson river is too low to furnish motive power for at present. The flume of the Mexican mill, having become old and dilapidated, is being reconstructed in a substantial manner throughout.

CON. CALIFORNIA AND VIRGINIA.—From the Jones lease section about fifty tons of ore per day are being extracted, which, according to battery samples at the Eureka mill, assays a little over \$15 per ton. The 1750 level, worked on company account, yields about 140 tons per day, assaying \$22 per ton. On the 1600 level a drift is being run to the northwest for ventilation and prospecting purposes.

BES. AND BELCHER.—Crosscut No. 2, west, on the 1000 level has been extended 44 feet during the week, making a total distance of 50 feet. The face is in clay and vein porphyry, with no ore indications as yet. This crosscut is about 200 feet south of the Consolidated Virginia line and 100 feet south of crosscut No. 1, in which operations have been suspended.

SIERRA NEVADA.—The crosscut west from the main north lateral drift on the 520 level has been extended 50 feet during the week, making a total length of 90 feet. Material, dry, hard, vein porphyry, which grows softer in the face of the drift,

ALTA.—The station chamber of the drift west, on the 700 level, is being enlarged and put in substantial order for an advance westward into the merits of the ore-body prospect, developed by the upraise above the 500 level.

KENTUCK.—Enough ore is being extracted to supply the Rock Point mill, which, from lack of water in the Carson river, is now only running to about one-third of its capacity.

GOULD AND CURRY.—On the 1000 level west crosscut No. 1 has been advanced 48 feet, making a total length of 201 feet. Material in the face clay and vein porphyry.

OPHIR.—The upraise from the 500-foot level has been completed to its connection with the old Mexican shaft, which is now being cleaned out and repaired.

Eureka District.

AN ENCOURAGING FIND.—*Sentinel*, Aug. 22: It affords the *Sentinel* great pleasure to chronicle an important development in the Ruby Hill Tunnel. It is the most encouraging thing that has transpired in this district in a long time. Eureka is not yet played out. We have always had unbounded faith in the deep bowels of old Prospect mountain. The strike is especially important from its great depth. It will be remembered that General Connor had a line body of ore in the Eureka tunnel. That body in its day was at the deepest point reached in the mountain. The Ruby Hill tunnel is 700 feet lower than the Eureka tunnel, and 200 feet lower than the Prospect Mountain tunnel. The samples brought down yesterday from the new find are as fine as silk. We never saw finer looking ore in the camp. The assays and other particulars are given elsewhere in to-day's *Sentinel*. The samples are on exhibition at the Jackson House. If the discovery continues to improve for a few days as it has in the last 24 hours, the Ruby Hill tunnel will have a paying bonanza. The company is incorporated and has a magnificent scope of territory. The original owners did the sensible thing in the beginning of consolidating a number of claims, some 20 odd, and taking stock in the tunnel company. The owners were feeling particularly jubilant last night. The stock made a big jump in the confidence of the holders on the strength of the strike. All of the shares are owned by Eureka people.

ARIZONA.

MINING IN MOHAVE.—*Miner*, Aug. 20: Chlorides are all doing well throughout the county. If John Barry makes a success of his new smelter at Cerbat, lead claims in that vicinity will become valuable. John K. Mackenzie is taking out some good ore at the Cubel mine, and is likely to do well out of his lease. J. M. Gale has struck another good body of ore on the Moonbeam mine, at Stockton Hill. George Mendez made a shipment of ten tons of ore from his claim near Chloride, through Beecher & Co. Messrs. Smith & Co., of the Golconda mine, made another 12-ton shipment last week. This mine is now putting out about fifty tons of ore per month, the result of the work of four men. Most of the ore comes from the seventy-foot level where the ore body is two feet wide, averaging 42 ounces in silver, \$15 in gold and 30 per cent in lead. The Golconda is rapidly coming to the front as one of the best paying mines in Mohave county. The next thing the miners in this district have to look forward to is the Cerbat smelter. We understand that Mr. Barry has made all the arrangements necessary to have a smelter running at Cerbat in a very few weeks, and that he has already commenced shipping in the necessary material. A carload of lumber and two carloads of coke are already at Kingman for him, so we are informed. Mr. Barry is an old resident of this district and a man of much energy and perseverance, and we wish him every success in his new venture. Mr. John Barry, who is now in charge of the mines and mill of the Arizona Northern Mining Company, has commenced work on the Cerbat mine, and now has some six or eight men taking out ore. His main efforts will, however, be directed to the Connor mine, on which he now has a force of men at work, cleaning out the shafts and drifts. The Connor is a good mine, and Mr. Barry knows it, and has faith in its future. The men who are working on the Hibernia mine in Cedar district for Henry Raymond, have struck a fine body of ore which assays away up in the hundreds. Capt. Hardy has been obliged to quit work temporarily on the Indian Boy tunnel on account of the heat and consequent bad air. The work of driving in this tunnel will be continued as soon as cooler weather sets in. Mr. Hardy tells us that Johnnie Mackenzie struck fourteen inches of rich ore in a place on the Cupel ground, hitherto supposed to be barren. Mr. Potter, of the Pueblo smelting works, is making the rounds of the district for the purpose of securing ore for his company. He is offering rates for lead ores which run from \$15.50 to \$18 per ton for freight and treatment, and from \$18 to \$25 for dry ores. He is offering forty to fifty cents a unit for lead, and promises still better rates if the railroad company can be induced to lower their freight rates. James Daggett made another shipment of about two tons from the Queen Bee mine last week. Ore from this claim nets him about \$65 per ton at Kingman. An expert from New York, whose name we did not learn, was at Stockton Hill last week examining the Moonbeam and other properties owned by J. M. Gale. Aistrop & Co. made a shipment from the C. O. D. mine to the Kingman sampling work which turned out favorably. Rube Wright and Harley Fay are taking out some fine ore from the Mariposa mine at Stockton. Taggart & Co. are making about 7 feet a week on their tunnel on the Little Chief mine, with only one man employed.

ARIZONA QUEEN.—*Prescott Courier*, Aug. 24: The Clark family, of New Haven, Conn., who held the greater part of the stock of the Arizona Queen Mining Company (Chicago and other mines on Groom creek) will resume operations there before long. As a preliminary, they have secured the consent of the stockholders to a mortgage of fifty thousand dollars to cover the advances they propose making and those already made. It will be a sincere satisfaction when the company's mill, which has been so long idle, commences work again. The stampede for Pine Flat still continues, a considerable number of our citizens having started, yesterday, to take up locations as near as they can to the recent horn silver strike. An area of several square miles in that vicinity will be fully mortgaged before the

week is out. If only one out of every ten of the locations so made, is honestly prospected, there will be work enough on hand to keep our idle miners busy for the balance of the year. John Holmes, a successful miner of Turkey Creek district, who recently went to Pueblo with a shipment of ore, has returned home. He was accompanied by Captain Brand, who goes out to Turkey creek to inspect certain mines and mills and, perhaps, work the same.

LOTS OF SILVER.—Great excitement in Turkey Creek. Shull & Austin's stage from Alexandra, reached Prescott last evening, with 450 pounds of silver bullion from the Tusconia mill, a big bar of bullion from the Peck, and cheering news from the new and rich silver discovery in Turkey Creek district. This news is that, yesterday Messrs. Morgan & Powell took \$2500 worth of silver out of their claim; that other claims were yielding nearly as well. The people are excited and the rich for claims is great.

COLORADO.

TALC DISCOVERIES.—*Tribune-Republican*, Aug. 20: Eagle county miners are just now appearing considerably exercised over their discoveries in quartzite. Porphyry and lime formation is taking a rest while quartzite is the rage. The character of the mineral is quite astonishing to the miners, as are the caves which are so frequently encountered. Further development will be watched with much interest to know how much dependence for permanency can be placed upon the new mining curiosities. The last issue of the *Shaft* shows how irregular specimens may be run in assay value and yet how this tale mills in carload lots. We understand that a sample taken from this by a well-known Leadville assayer returned only 21 ounces silver to the ton, while the tag on the specimen credits it with 760 ounces. On investigation we find that this assay was made by W. W. Huntington for a sample taken next to this block of tale as it was dug from the mine. All this mineral looks alike. The eye or touch can not distinguish the lean from the rich. It assays from 15 ounces silver and 2-10 of an ounce gold to over 1,000 in silver and 10 or 15 ounces in gold. This particular specimen was brought to Red Cliff to show the character and nature of the ore only. It was taken to Leadville by a Leadville man as a curiosity at his own suggestion. The owners were not interested, nor did they care what was done with it. A copy of the assay returns mentioned above, made by Mr. Huntington, was placed upon the specimen. There was no intention to deceive, and it is more than probable that other samples taken from this cube will return even higher figures than those with which it is labeled. But the proof of the pie is in the eating. Six cars of this tale ore have been shipped from the camp in the last two weeks that have netted from \$150 to \$220 to the ton. What more positive proof of the great value of the mineral from these quartzite mines can be had?

IDAHO.

BOISE BASIN.—*Idaho Statesman*, Aug. 20: Mr. J. A. Richardson, civil engineer, who has been spending a few weeks in the Boise Basin, engaged in surveying several mines for patent, has returned to Boise. From him we learn that several mines in that section are showing up exceptionally well. The Banner mine, after a seventeen days' run on ore taken from about 200 feet of tunnel and 150 feet of stope, netted \$41,000. The Morroe boys are developing the Silver Chief and are sinking a shaft and erecting hoisting works. K. P. Plowman made a good run on his placer claim which he worked ninety days, the product of his clean-up being \$28,000. The Gold Hill Company, at Quartzburg, have abandoned their old works and are developing their new property. They have thus far taken about \$100,000 out of the new vein, and are erecting new hoisting works. Their mill is not running at present but will start up again shortly. Ben Willson is doing good work with his elevators and his novel method of working his placers is giving the greatest satisfaction. The five-stamp quartz mill owned by Marion Waldron, the proprietor of the Golden Fleece mine, is idle, as the mine is not at present being worked. The quartz resources of the basin are gradually attracting more and more attention, and will eventually bring this camp to the front as one of the most permanent and productive in the Territory.

THE KETCHUM WORKS.—*Wood River Times*, Aug. 20: The two stacks of the Philadelphia Mining and Smelting Company, which have been idle for a few days, owing to the lack of flux, will be "blown in" again next Monday morning, for a campaign which may be protracted until February, the time of the annual cleaning-up. The company has just closed a contract with the Union Pacific Company by the terms of which it agrees to receive, at the depot at Ketchum, from now until the first of December, two carloads of coke and two carloads of iron ore per day, or four carloads altogether. It has also agreed to deliver to the company, for shipment to Omaha a minimum of two carloads (or 60,000 pounds) of lead bullion per day until the first of December. The contract being continuing, it may be extended after that date, from time to time, upon consent. The smelting company is receiving an average of 50 tons of ore per day, from certain fixed sources, besides miscellaneous lots from Lake Creek, Boulder, Galena and elsewhere, and there is no apprehension of the supply of ore failing. In fact, present appearances would almost justify the blowing-in of the third and fourth furnaces of the company, which have been idle the past two years.

THE LITTLE SMOKY PLACERS.—*Wood River Times*, Aug. 19: Al Arnold is in town to-day, from his Little Smoky claim. He has just made a clean-up and brought the result—20 ounces of gold—with him to be retorted. The gold is excellent. Besides being very fine, in value, a large percentage of it is nuggets, ranging in value from \$15 down. Mr. Arnold is confident his claim will yet make his fortune, and is satisfied with what has been accomplished thus far. He says all the placer land there has been located, and quite a number are working their claims this season, but with what result is not known. Most of the claims that were located this season are being worked. Some spots along the creek, he says, are very rich, while fair pay dirt is to be found all the way down the creek for a distance of 12 miles. A great future is no doubt in store for the gold belt.

MONTANA.

THE ALICE.—*Butte Miner*, Aug. 19: Everything around the Alice mine is bustle and enterprise. During the past week the new plunger has been connected with the main rod at the 800-foot level. This makes everything complete with the pumping machinery, and the big Cornish pump works more smoothly than it did with the "drawing lift." In consequence of making the necessary connection with the main rod, the pumping machinery was stopped and remained idle 48 hours last week, which caused the water to raise in the shaft 20 feet above the back of the 800-foot level. The water, however, will be all out of the mine on Monday morning and the work of running in the north and south crosscuts on the 800-foot level will be resumed. The daily ore output of the mine is as great as it has been at any time during the past two years, while the several stopes, drifts, raises, etc., show as much ore as was ever seen in the mine. The general appearance of the mine is as good as it ever was. The work of putting up the new galloways is going along very nicely. The big south-west hoist was put into place yesterday and is a mammoth affair. It weighs exactly five tons. When the new frames are in position the Alice hoisting works will be one of the finest and most elaborate in America. The big post was started up yesterday while our reporter was on the ground, and everything was found to work in a very satisfactory manner. The Alice 60-ton stamp mill was closed down two days last week for repairs, but is working in full blast again.

THE MAGNA CHARTA.—The main shaft of the Magna Charta is down to the 700-foot level and the work of cutting the station is being carried on with vigor. The general appearance of the mine is good. The stopes from the 700 to the 600-foot levels are producing the usual quantity of ore. The daily ore output can be materially increased if occasion should demand it. The Rising Star looks better than it ever did before, and is now added to the long list of paying mines of this camp. Fifteen tons of ore is the present daily output which will assay forty ounces to the ton. The stopes from the 700 to the 500-foot levels are all looking very good and an immense quantity of ore is in sight in the different places. Superintendent W. E. Hall has much faith in the future of the Rising Star mine.

AMY SILVERSMITH.—The courteous and genial Superintendent Lloyd, of the Amy Silver Smith mine, was found in his office, engaged in the pleasing work of paying off the sixty men employed by the company last month. Mr. Lloyd was in a pleasant state of mind, and informed our reporter that he was pleased to welcome the first newspaper man who ever visited the Amy Silver Smith. The new and commodious hoisting works is erected, and is found to be a well finished and complete building. The large amount of work in progress at this mine looks as though the management expected something big in the lower workings. A double hoisting engine has been purchased by the management and is now on its way here from the East, which, when it arrives will be put up with all possible dispatch. Then sinking the shaft below the 200-foot level will commence. The force of men at present engaged in the mine is prospecting. The Amy Silver Smith is in a good location and much is expected from it. We wish the mine and its worthy superintendent, Mr. Lloyd, unbounded prosperity.

GOLDSMITH NO. 1.—This mine is a very remarkable piece of property. The recent strike in the winze below the 150-foot level has improved greatly during the past week. When struck, the ledge was fifteen inches wide, but it has now widened out to two feet, and the ore being taken from it will assay in the neighborhood of \$700 to the ton. Miners are sinking on the ledge in the winze where it was first discovered, and also raising up on it from the 250-foot level. Present developments show that the ore body is a large and very valuable one. Twenty-five tons of ore from the new strike have been brought to the surface, and is now in sacks waiting to be shipped.

UNION CONSOLIDATED.—Prospecting is being actively carried on at these mines. The foundation for the new engine on Union No. 3 is being laid, the new machinery is on the ground, and everything around the mine indicates a determination on the part of the management to work the mine for "all there is in it."

MINER NOTES.—Everything at the Moulton is in first-class order. The usual quantity of ore is being taken out of the mine, and the general appearance of the property was never better.

THE KATIE PUTNAM.—*Helena Independent*, Aug. 20: Robert Whipple has just sold a quantity of ore from the above mine and contemplates the resumption of work next week. The Katie Putnam is, so far as developed, a rich and promising vein. It is situated south of Red Mountain.

STEMPLE DISTRICT.—The Great Grub Stake mine of Stemple district is producing its regular quota of bullion. The vein averages from ten inches to two feet in width and runs \$100 to the ton. There are now eight locations on this lead, aggregating 12,000 feet or two and a quarter miles. All these mines are producing good ore. It is the easiest lode in Montana to work, requiring no blasting whatever, the ore and walls being readily taken down with a pick. It is only thirty-five miles distant from the city and contributes no small amount toward promoting our welfare and prosperity. Extensive developments are going ahead, and before long the bullion output will be many times greater than it is now.

THE YELLOW BOY.—Next Monday Mr. Constans will start up the old Harvey mill in the Park upon quartz from the Yellow Boy lode. About 400 tons of free milling gold ore are now ready for the mill. The mine is situated near the head of Nelson gulch, west of the Park. It is said to present a fine appearance. Although the mill has been idle for some years, Mr. Dunphy, the present owner of the property, received word that nearly everything was in perfect order.

NEW SYNDICATE.—A rumor prevails upon the street that John Caplice has succeeded in forming a powerful company in New York to open up the Ten Mile mines, and that he will arrive in a few days, accompanied by a number of capitalists interested in the enterprise.

OREGON.

PLACER AND QUARTZ.—*Jacksonville Times*, Aug. 20: The Sterling Co.'s reservoir is assuming proportions. Reports from the Yank ledge continue of a flattering nature. J. C. Neuz and brother are at Galice creek prospecting their claims there. Priekett & Co., of Steamboat, are mining the Applegate with fair prospects. R. Cook was over from Steamboat yesterday. His tunnel is now 360 feet long. A great deal of prospecting is still being done in Jackson and Josephine counties. John Bolt says that a miner is engaged in crushing quartz on Applegate in a hand mortar and making \$1.50 a day. Thos. Berryman & Co., having finished their wing-dam in the Applegate, are working the bed of the river with good success. Mr. Sargent, while mining on Brush creek, in the Steamboat district, picked up one piece of gold worth \$25 and another worth \$7 Wednesday. J. C. Ruck and Mr. Wilson, an old Nevada miner, have discovered a fine large body of quartz in Willow Springs mining district, which promises very well. H. L. Hansen & Co. have opened a new mining claim near Waldo and will next season operate it. They think they have a small sized bonanza, and we hope they will not be disappointed. The new quartz mill will be here this fall, and will afford a good opportunity for those owning ledges to test their ore. This is an excellent inducement for a general prospecting of Jackson and Josephine counties. J. M. Walsh and H. T. Bragdon, of Ashland, have bonded and bought some quartz ledges on Wagner creek, and will immediately begin to develop them, a force of men having gone to work upon them last week. A mining expert has pronounced the rock as being very promising. Hon. Theo. Cameron informs us that A. D. McKee & Co. have struck good pay on Elliott creek. They recently took out one nugget of gold worth \$36 and some smaller ones. That is proving an excellent summer camp, there being too much snow and water in winter for expeditious mining.

PINE VALLEY MINES.—*Cor. Democratic Times*, Aug. 21: The Pine valley (Union county) mines are attracting much attention from the wide awake business men of the northeast corner of our state. I was at the new camps Saturday and Sunday, collecting samples from many of the mines. There are now over 300 mines claimed and located. Allen & Cox have just bought a one-fourth interest in four mines, paying \$10,000 for the same. O. born, Tartar & Denna have also invested \$10,000 for the Mountain Chief and an interest in several other mines. I also learn that Mr. Perkins, of Eagle valley, yesterday bought the interest of a lucky poor man in several mines he had discovered and located, paying \$10,000 for the lot. Those that pretend to know say that the discoverer sold for less than one-tenth of what his property was really worth. Miss Julia Coggins has an interest in upwards of forty good mines, and by the miners here is thought to be the wealthiest young lady in Oregon. It is said that this young lady while traveling in company with her father (or her health) up the east side of this wonderful Eagle mountain, discovered three rich gold mines, which ultimately led to the great Pine valley boom. None of the mines have been opened beyond a depth of five or six feet. While I was there two young men came into camp with very rich specimens, jubilant and happy over their good luck. Their find was about seven or eight miles north of Cornucopia. Wm. Harper has started a large arastra to work up the quartz, and a company has been organized to put up a twenty-stamp mill. There is an abundance of water and plenty of fall to it. All of Pine gulch for a distance of seven miles is already taken up in twenty-acre lots for placer mining. The only way of reaching these mines is by way of Sparta, Eagle valley and Pine valley. The mines, by a direct line, are only 25 or 30 miles northeast of Baker city. None of the placer mines have been opened yet.

UTAH.

SANDSTONE MINING NOTES.—*Southern Utah Times*, Aug. 20: Both mills have been running regularly on company ores, with usual results. Both companies are working a full force of men in the mines, and the output has been of the average grade and quality. Walter Seidentopf made a small shipment of ore from the old Leeds mine to the Stormont mill one day last week. The bullion shipment from the Reef, for the month of July, per Wells, Fargo & Co., aggregated \$29,218.08. A six-inch seam of ore was struck in A. Levy's mine on the East Reef during the week, a sample of which assayed 213 ounces silver per ton. Ed. Lochney is pushing things on the Bonanza. He brought in some fine specimens, taken from the property, and evidently thinks that he has the world by the arm. There appears to be bad blood between the owners of the Mountain Chief mine, a property of some prominence in the district west of St. George and there is likely to be litigation as the result. Ab. Polleys returned from a visit to the Iron country, where he went to look at a silver claim in which he is interested. He says that the quartz is very rich, there is plenty of it in sight on the surface, and if it will only go down he has as good a thing as he wants. Parties up from St. George report that the mines out in the Tutsaquit district are showing up big. A three-foot vein of fine galena was struck recently in the "Scorpion," which belongs to the Mountain Chief group of mines. The other mines of this company improve as work progresses and are looking exceedingly well. With lead, selling at the price it is at present, there is no reason why the smelter should not be turning out bullion on a paying basis. A little practical and energetic management would bring this property to the front at once.

REVIEW.—*Salt Lake Tribune*, Aug. 22: Ontario shipments for the week were forty-six bars of bullion, \$27,225.51, making the total output for the year to date \$972,752.34, from which seven dividends of \$75,000 each have been paid, and the eighth of the year will be paid the last of the present month. Silver Reef sent up during the week three silver bars, worth \$4,339, of which the Stormont sent two, \$2,930, and the Christy one, \$1,409. The Hannier has started up again, sending in on the 10th one car of bullion, \$2,430. The product of the Germania for the week was twelve bars refined silver, \$14,060.20, and fourteen cars bullion, \$37,127.28, a total of \$51,187.40.



HERCULES SLAYING THE GIANTS.

HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE

THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

18 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron, Only One Seam. No Corners to Catch. Runs with Least Power.

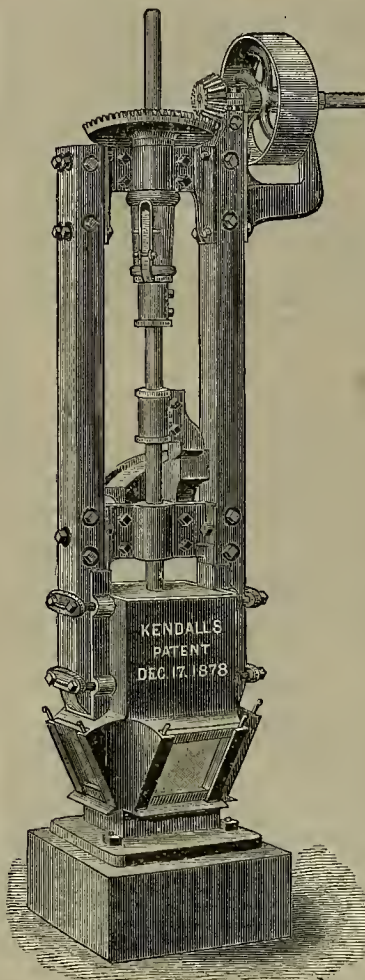
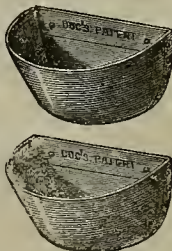
BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

IRON CLAD MANUFACTURING CO.,
22 Cliff Street, New York.

DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.



L. C. MARSHUTZ.

T. G. CATNRELL.

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound Engines,

FLOUR, SUGAR, SAW and QUARTZ MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL.

Send for Circulars and Price List.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'fg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office - 47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast - Joseph H. Dorsey, 529 Commercial St. S. F.



RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort and safety. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, San Francisco.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

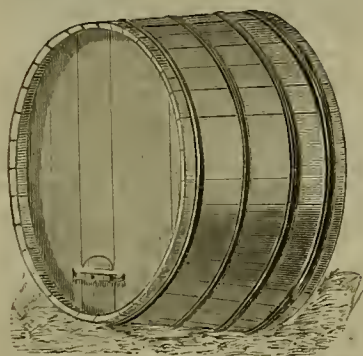
WAREHOUSE AND BRANCH OFFICE:

No. 243 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

MECHANICS' MILLS.



Water Tanks.

Wine Tanks.

Our well-known TANKS are made by machinery,
from the best of materials, and shipped to all parts of
the country. Each piece numbered. No skill required
in setting up.

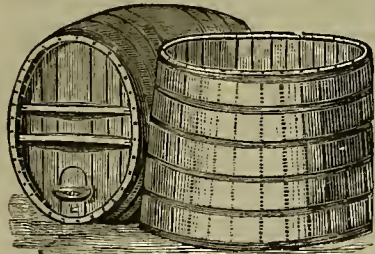
WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!

CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

N. W. SPAULDING
SAW COMPANYManufacturers of
SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

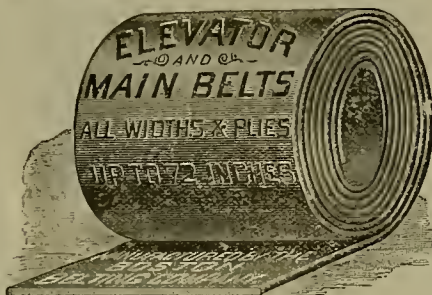
CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Cata-
logue. 17 and 19 Fremont St., San Francisco.

Engraving.

Superior Wood and Metal Engrav-
ing, Electrotyping, and Stereop-
ing done at the office of the MIN-
ING AND SCIENTIFIC PRESS, S. F., at favorable rates.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made.

GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD,

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer
Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the
United States. Will fill orders for delivery in Rocky Mountain and Pacific
Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought
gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND

NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.

E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL,
The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE.

Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the
world. Unlike all other Packings, the Jenkins Standard
Packing can be made any thickness desired in a joint by
placing two or as many thicknesses together as desired, and
following up joint, it vulcanizes in place and becomes a
metal of itself (it is frequently called Jenkins Metal), and
will last for years, as it does not rot or burn out. Avoid all
imitations, as a good article is always subject to cheap imi-
tations. The genuine has stamped on every sheet "Jen-
kins Standard Packing," and is for sale by the Trade
generally.

Manufactured only by

For Sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal.

JENKINS BROS., 71 John St., New York.

Metallurgy and Ores.

SELBY
SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes
will be sent free upon application. Agents for
Humboldt Crucible Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, J. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the

most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Hulth & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.

ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. H. KUSTEL.

★ METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my

Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical instruction given in Treating Ores by im-

proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

624 SACRAMENTO STREET,

SAN FRANCISCO, CALIFORNIA.

THE HARMON SEMINARY,

Berkeley, Cal.

A BOARDING AND DAY SCHOOL FOR

YOUNG LADIES.

Pupils taken at any time.

For Catalogue or other information, address:

THE MISSES HARMON, Berkeley, Cal.

Or E. J. WICKSON, 414 Clay St., S. F.

Mining Share Market.

The resumption of work in the Yellow Jacket mine on the Comstock, is the most notable feature connected with the mining share market. The reason of this resumption of work is simply because of the auxiliary steam arrangement at the Brunswick mill, on the Carson river, being completed a week or two sooner than was anticipated. The mill is now correspondingly increased in capacity beyond what was expected, and more men will be put to work in the mine as may be required. Milling facilities will not admit of the Crown Point and Belcher being started up for the present, but the machinery of the mills and works is being overhauled and put in thorough order, and when work is started up again it will be with good preparations for steady permanency.

Work in the middle mines, says the *Enterprise*, with a view to the practical development of the bonanza prospects, is being energetically advanced. The newly added section of the big hydraulic pump in the Combination shaft started off without any hitch whatever, and has been working steadily and perfectly ever since. This pump can easily handle more than double the amount of water thus far encountered in the lower levels, therefore no fears of any further flooding are entertained, and exploration work can now be pushed in any direction regardless of what bodies or seams of water may be encountered.

The Hale and Norcross deep winze has now reached the 300 level, and a station is to be opened shortly for a drift southeast, to connect with the Combination shaft or with the projected drift northwest from it.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, department 10, San Francisco.

GUATEMALA CENTRAL R. R. Co., Aug. 22.—Location between Escuintla and City of Guatemala. Capital stock \$2,000,000 in 20,000 shares. Directors, Ariel Lathrop, F. C. Douth, N. T. Smith, C. E. Green and S. T. Gage.

AMADOR AND NEVADA G. M. Co., Aug. 22.—Capital stock \$10,000,000. Directors, W. S. Hobart, W. E. Eell, C. T. Bridges, W. D. Anderson and John H. Boalt.

TRINITY M. Co., Aug. 25.—Capital stock \$1,000,000. Directors, D. M. Seaton, Martin Quinlan, Asa H. Trueman, Robt. E. Low and James T. Hanna.

Bullion Shipments.

King, 22, \$3540; Calico M. Co., 22, \$1200; Butte, (M. T.), for week ending 15, \$76,512; Germania, 18, \$10,052; Crescent, 18, \$2200; Queen of the Hills, 18, \$1300; Germania, 19, \$6425; Hickory, 19, \$2054; Osceola, 19, \$443; Creedmore, 19, \$392; Germania, 20, \$5835; Hanauer, 19, \$2450; Crescent, 20, \$3500; Queen of the Hills, 20, \$1500; Hanauer, 20, \$2400; Stormont, 22, \$2800; Queen of the Hills, 22, \$1600; Hanauer, 22, \$7000; Mayflower, 22, \$1450; Germania, 23, \$4600; Ontario, 22, \$29,996. The banks of Salt Lake City report the receipt for the week ending August 19th, inclusive, of \$85,201.99 in bullion and \$16,140.99 in ore; a total of \$101,342.98.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLE—California.
A. C. KNOX—Ventura and Los Angeles Co's.
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
W. B. TURNER—Oregon.
Geo. McDOWELL—Fresno and Tulare Co's.
JOHN BURNS—Marin Co.
J. DE PIRE, Yolo Co.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

AMERICAN MINING ENGINEERS.—The next meeting of the American Institute of Mining Engineers will be held at Halifax, commencing on Wednesday, Sept. 16. A number of excursions are proposed, and about a dozen papers are announced.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Argenta M. Co.	Nevada.	13.	10.	July 29.	Sept. 1.	E. M. Hall.	327 Pine St.
Alaska M. and M. Co.	Alaska.	11.	10.	June 30.	Aug. 22.	T. J. Hay.	306 Pine St.
Benton Con. M. Co.	Nevada.	14.	10.	Aug. 25.	Sept. 30.	W. H. Watson.	302 Montgomery St.
Blue Bluff G. M. Co.	California.	9.	24.	Aug. 21.	Sept. 26.	L. S. Sadfield.	419 California St.
Bullion M. Co.	Nevada.	30.	25.	July 21.	Aug. 20.	J. M. Brazell.	328 Montgomery St.
Chollar M. Co.	Nevada.	17.	50.	July 23.	Aug. 27.	C. E. Elliot.	309 Montgomery St.
Copper M. Co. M. Co.	California.	2.	01.	June 17.	Aug. 13.	A. L. Perkins.	310 Pine St.
Cueva Santa M. Co.	Mexico.	6.	25.	Aug. 5.	Sept. 11.	W. L. Oliver.	328 Montgomery St.
Equitable Tunnel M. Co.	Utah.	32.	10.	Aug. 3.	Sept. 15.	J. C. Collins.	512 Montgomery St.
Elitracut Gravel M. Co.	California.	19.	05.	Aug. 11.	Sept. 16.	H. Kunz.	239 Sansome St.
Giant M. Co.	New Mexico.	1.	02.	Aug. 11.	Sept. 18.	S. P. Hildreth.	116 Montgomery St.
Holmes M. Co.	California.	1.	100.	Sept. 7.	Sept. 27.	C. T. Bridge.	329 Montgomery St.
Hale & Norcross M. Co.	Nevada.	56.	50.	Aug. 4.	Sept. 8.	J. F. Lightner.	309 Montgomery St.
Independence M. Co.	Nevada.	15.	20.	Aug. 20.	Sept. 23.	J. W. Pew.	310 Pine St.
Justice M. Co.	Nevada.	42.	15.	July 13.	Aug. 17.	E. E. Kelley.	419 California St.
Martha White M. Co.	Nevada.	20.	25.	Aug. 22.	Oct. 7.	J. J. Seville.	309 Montgomery St.
Murchie M. Co.	California.	9.	13.	June 24.	Aug. 7.	W. L. Oliver.	328 Montgomery St.
North Belle Isle M. Co.	Nevada.	8.	10.	Aug. 20.	Sept. 24.	J. W. Pew.	310 Pine St.
North Star M. Co.	California.	1.	20.	July 28.	Sept. 1.	A. Jennings.	401 California St.
Peer M. Co.	Arizona.	30.	30.	July 31.	Sept. 29.	A. Waterman.	309 Montgomery St.
Potosi M. Co.	California.	1.	10.	July 14.	Aug. 19.	C. E. Elliot.	309 Montgomery St.
Scorpion M. Co.	California.	2.	25.	June 24.	Aug. 1.	H. D. Mitchell.	125 Kearny St.
Summers Con. M. Co.	California.	4.	05.	July 16.	Aug. 31.	F. E. Luty.	330 Pine St.
Willow Creek M. Co.	Nevada.	1.	1.00.	July 25.	Sept. 10.	R. E. Elton.	310 Pine St.
Young America M. Co.	Nevada.	2.	10.	Aug. 6.	Sept. 8.	E. M. Hall.	327 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Arnold S. M. Co.	California.	A. Judson.	320 Sansome st.	Annual.	Sept 1
Alaska M. Co.	Alaska.	A. Judson.	320 Sansome st.	Annual.	Aug 31
Mountain Tunnel Gravel Co.	California.	A. P. Paul.	320 Montgomery st.	Annual.	Sept 1

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kosuth M. Co.	Nevada.	C. R. Sturtevant.	328 Montgomery st.	06.	Mar 16
Navajo M. Co.	Nevada.	R. W. Hildreth.	310 Pine st.	20.	July 30
Plymouth Con. G. M. Co.	California.	W. Van Norden.	Pres. 23 Nassau st. N. Y.	50.	Apr 6
Silver King M. Co.	Arizona.	J. Nash.	328 Montgomery st.	25.	July 15
Syndicate M. Co.	Nevada.	J. Stadfield Jr.	419 California st.	10.	May 5

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and mining previous ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Sinterification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solvent To Assay a Cupel; Assay by Amal amalgam; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1. postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market Street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc. Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation; Ores; Lead Ores; Copper Ores; Voluntary Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Zinc Ores; New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F. These are much needed books for miners and other practical men. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

THE OVERLAND MONTHLY.—This praiseworthy local periodical has shown unusually attractive tables of contents for the last few months. The conduct of the *Overland* is now in the hands of two well-known literateurs, Charles H. Shinn and Milcent W. Shinn, the former as business manager, the latter as editor, and both using their best talents and industry in the upbuilding of the magazine. It is pleasing to their friends to notice many indications of success. We are informed that the leading article for September will be by Prof. Josiah Royce, of Harvard, late of California, upon "The Sacramento Squatter Riot of 1850." Flora Haines Apponyi will furnish a personal sketch of the late Helen Hunt Jackson, and Ina D. Coolbrith will contribute a poem. These, with editorial comments upon Mrs. Jackson's literary work, will give this number great value as a memorial of the author of "Ramona." There will be an article from Hon. S. S. Cox, Minister to Turkey, on "The Thirty-Fifth and Thirty-Sixth Congresses." Dr. Henry De Groot will furnish a graphic account of the ancient "Mining Camp of You Bet." Capt. Wright, of the Confederate Army, and late lecturer of the California State Grange, will describe "How the Blockade Was Run." The most important stories will be: "A Plea before Judge Lynch," written by a well-known pioneer, and, "The Doctor of Leidesdorff Street," a brilliant and exciting story of San Francisco. These are only a few of the attractive and valuable articles to appear in September.

GREAT excitement! Rush for Muller's pebble spectacles. 135 Montgomery street, near Bush, X

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 6.	WEEK ENDING Aug. 13.	WEEK ENDING Aug. 20.	WEEK ENDING Aug. 27.
Alpha.	90.95	90.80	90.95	1.00
Alta.	35.40	40.35	40.30	40
Andes.	25.	25.20	25.	25
Argenta.	100.	100.	100.	1.10
Belcher.	2.05	2.40	2.25	2.40
Best & Belcher.	2.05	2.40	2.25	2.40
Bullion.	10.	15.10	15.10	20.45
Bonanza King.	1.00	1.15	1.15	1.15
Belle Isle.	1.00	1.15	1.15	1.15
Bodie Con.	1.00	1.15	1.15	1.15
Benton.	10.	10.	10.	10.
Bodie Tunnel.	10.	10.	10.	10.
Bulwer.	10.	10.	10.	10.
California.	1.80	2.00	2.00	2.00
Challenge.	15.	15.	15.	15.
Champion.	1.00	1.25	1.00	1.45
Chollar.	1.00	1.25	1.00	1.45
Confidence.	1.00	1.25	1.00	1.45
Con. Imperial.	1.00	1.25	1.00	1.45
Con. Virginia.	1.60	2.20	2.00	2.10
Con. Pacific.	1.10	1.25	1.15	1.20
Crown Point.	1.10	1.25	1.15	1.20
Day.	1.10	1.25	1.15	1.20
Enreka Con.	1.10	1.25	1.15	1.20
Enreka Tunnel.	1.10	1.25	1.15	1.20
Exchequer.	1.10	1.25	1.15	1.20
Grand Prize.	1.10	1.25	1.15	1.20
Gold & Curry.	1.30	1.50	1.35	1.50
Goldblow.	1.30	1.50	1.35	1.50
Hale & Norcross.	5.50	6.37	6.00	6.75
Holmes.	2.25	3.50	3.00	3.00
Independence.	10.	10.	10.	10.
Julia.	10.	10.	10.	10.
Justice.	10.	10.	10.	10.
Martin White.	1.15	1.25	1.20	1.35
Mono.	1.15	1.25	1.20	1.35
Mexican.	1.75	2.00	1.85	2.00
Mt. Diablo.	1.75	2.00	1.85	2.00
Northern Belle.	1.00	1.10	1.05	1.15
Navajo.	1.00	1.10	1.05	1.15
North Belle Isle.	1.00	1.10	1.05	1.15
Occidental.	1.15	1.20	1.15	1.25
Overman.	1.15	1.20	1.15	1.25
Potosi.	1.15	1.20	1.15	1.25
Pinal Con.	1.15	1.20	1.15	1.25
Savage.	1.15	1.20	1.15	1.25
Seg. Belcher.	1.15	1.20	1.15	1.25
Silver Hill.	1.15	1.20	1.15	1.25
Silver King.	1.15	1.20	1.15	1.25
Syndicate.	1.15	1.20	1.15	1.25
Toga.	1.15	1.20	1.15	1.25
Union Con.	1.15	1.20	1.15	1.25
Yah.	1.15	1.20	1.15	1.25
Yellow Jacket.	1.15	1.20	1.15	1.25
20 Crown Point.	1.15	1.20	1.15	1.25

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Aug. 27.	150 Hale & Nor.....	6.00
50 Alta.....	400 Jackson.....	75c
50 Belcher.....	650 Navajo.....	95c
145 B. & Belcher.....	50 Overman.....	40c
360 Bodie Con.....	120 Savage.....	2.95
100 Bulwer.....	100 Sierra Nevada.....	1.50
100 Con Va & Cal.....	50 Yellow Jacket.....	2.35
20 Crown Point.....		

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Aug. 27, 1885.		
ANTIMONY—Per pound.	12	@
Bell's.	12	@
Cook's.	13	@
BORAX—Refined.	7	@
IRON—Glengarnock ton.	26	@
Regiment, ton.	23	@
American Soft, 60lb.	26	@
Oregon Pig, ton.	25	@
Chipper Gap, Nos. 1 & 4.	25	@
Clay Lane White.	26	@
Shots, No. 1.	26	@
STEEEL—English Bar.	25	@
Black Diamond, ordinary sizes.	13	@
Plow.	5	@
Machinery.	8	@
Sanderson Bros.	13	@
COPPER—		
Brass sizes.	20	@
Fire-box sheets.	20	@
Bolt.	20	@
Yellow Metal.	12	@
LEAD—Pig.	4	@
Bar.	5	@
Pipe.	7	@
Sheet.	8	@
Shot, discount 10% on 500 lb. Prop. 2 bag.	1.85	@
Buck, 2 bag.	2.05	@
Chilled, do.	2.25	@
TIN PLATE—Coke.	5.25	@
Chilled, do.	6.75	@
ZINC—GERMAN.	7 1/2	@
Sheet, 7 1/2 ft. 7 to 10 lb. less the cask.	9	@
QUICKSILVER—By the flask.	33	@
Flasks, new.	1.05	@
Flasks, old.	85	@
NEW YORK PRICES—		
California Borax, refined.	7 1/2	@
Pig Iron, American.	16	@
Quicksilver.	41	@
Lead.	4	@
Copper.	11	@
Tin.	20	@
Bar Silver.	1	@

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.]

FOR WEEK ENDING AUGUST 18, 1885.

324,520.—TYPE WRITER—E. S. Belden, S. F.
324,532.—SMOKE-CONSUMING FURNACE—C. C. Carter, S. F.
324,539.—MILK CAN COVER—D. F. Crippen, Riverside, Cal.
324,673.—WIRE SCREEN STRETCHER—Charles Ehrenfeld, Pasadena, Cal.
324,765.—HARNESS CHECK—Wm. B. Frost, S. F.
324,556.—OATMEAL MACHINE—Jas. C. Holloway, S. F.
324,697.—HARVESTER—Daniel Houser, Stockton, Cal.
324,700.—BUDDING KNIFE—H. E. Hulbert, Santa Rosa, Cal.
324,777.—TREE PROP—I. H. Kizer, Riverside, Cal.
324,564.—SKATE—C. G. Lamont, Astoria, Or.
324,498.—OBSTETRICAL SUPPORTER—Jos. T. Surbaugh, Modesto, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through DEWEY & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

OATMEAL MACHINE.—James C. Holloway, S. F. No. 324,556. Dated Aug. 18, 1885. This invention relates to that class of oatmeal mills in which a rotating perforated rim is adapted to cut the oats against an exterior annular series of knives. The object of the invention is to provide a simple, effective and rapidly-working oatmeal mill of great capacity.

HARNESS CHECK.—Wm. B. Frost, S. F. Assignor of one-half to Geo. S. Ingersoll. No. 324,765. Dated Aug. 18, 1885. This consists of a check ring of either the form known as "side" or "over" check attached to the hit, passing through the usual guides or runners, and thence to a point where it is attached to the reins by which the horse or horses are driven, and an independent guide or terret.

BUDDING KNIFE.—Harry E. Hulbert, Santa Rosa. No. 324,700. Dated Aug. 18, 1885. The budding knife consists in a blade suitably mounted in a handle, and provided on its cutting edge, back of the point, with a small piece of a cone taken from vertex to base, and laid with its flat side down and point forward, or resembling somewhat the shape of an ordinary flat-iron. The object is to provide a simple budding knife adapted to be handled easily, accurately and rapidly.

DELINQUENT NOTICE.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for Circular to CHAMBERLAIN & ROBINSON, Prop's.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware — FOR — Manufacturing Chemists. Also Chemical Brick for Glover Tower.

DEWEY & CO
PATENT
SOLICITORS.
252, MARKET ST. S. F.
ELEVATOR 12 FRONT ST. S. F.

TWENTIETH Industrial Exhibition

MECHANICS' INSTITUTE

Opens August 25th.
Closes Sept. 26th.

With a most Comprehensive display of

MANUFACTURES, NATURAL PRODUCTS AND ART.

Grand Instrumental Concert Each Day and Evening.

SPECIAL FLORAL DAYS

Each Week. Over \$1200 offered as premiums for work.

ADMISSION:

Double Season Tickets.....	\$5 00
Single Season.....	3 00
Apprentices' Season.....	1 50
Child's Season.....	1 50

Single admission, 50c; Child's 25c.

Season Tickets to Members of the Institute at half rates.

P. B. CORNWALL, President.

W. P. STOUT, Secretary.

"CLAYTON" IMPROVED

ROCK DRILLS. MINING PUMPS.

AIR COMPRESSORS

For CATALOGUES, ESTIMATES, Etc., Address,
Clayton Compressor Works,
Near Brooklyn Bridge, BROOKLYN, N. Y.

[CUT THIS OUT AND SAVE IT.]

CRYSTAL SPRINGS RURAL HEALTH RETREAT,

ST. HELENA, CAL.



This delightful and popular Resort for Tourists and Invalids is situated on the side of Howell Mountain, 1200 feet above tide level, 500 feet above and overlooking Napa Valley, and two and a half miles from St. Helena, in Napa County.

THE NATURAL ADVANTAGES

Of the Health Retreat surpasses those of any other health resort. It is noted for its pure water, dry atmosphere, clear and balmy sunshine, even temperature, mild breezes, and the absence of high winds. Across the valley lies the Sonoma Mountain Range, breaking the sea breeze and shielding the Retreat from the chilling atmosphere of the coast, and presenting a safeguard against earth and di-cases. The grandeur of its mountain ranges, with its stupendous peaks lying in beauty at their feet, the famous Mount St. Helena rearing its lofty head to the clouds, the grassy plain lying beneath, reflecting the sunbeams like a grand mirror before the Retreat, all perfumed with a variety of wild flowers, lend an enchantment to this unsurpassed scene.

MALARIA IS A STRANGER TO THE RETREAT,

And in all this beautiful valley. In fact, the purity of the air on this hillside and in the upper valley, is a specific for malaria, and all diseases affecting the head, throat, and lungs; producing a healthy circulation through internal passages generally.

COME TO THE RETREAT.

Most ailments can be cured by proper care and judicious treatment. All may be benefited. Are you a professional man, a Judge, Lawyer, Minister, or Doctor, suffering from mental exertion? Are you a business man, exhausted mentally and physically by too close application to business, and burdened with responsibility, troubled with constant thought of your ailments, dread of life or fear of death? Come to

CRYSTAL SPRINGS

And we will do you good. Remember that all these are but symptoms of disordered nerves, deranged stomach, liver, and other digestive organs that may be cured and leave you easy, and happy, and feeling younger for your stay with us. The treatment invigorates you, gives you a light heart, a quiet stomach, and a cheerful countenance. We employ no quick remedies, no patent nostrums. We treat all cases by the most recent knowledge of

HYGIENIC AND RATIONAL PRACTICE.

Disease is the enemy of nature against the constant violation of her laws, and calls for hygienic regulation and wise observance of known physiological law. Then all will be peace again. Especial attention is called to all persons suffering from

CHRONIC DISEASES.

It is a well-known fact and recognized by all advanced pathologists of to-day that there is no specific for chronic ailments. They are only cured by hygienically removing the cause and giving nature time a proper conditions to heal itself. All surgical and mechanical assistance necessary in such cases is scientifically rendered. New facilities are constantly being added to make this the most advantageous, desirable, and efficient, as it is now the most natural and healthful

WINTER RESORT

In America, while a radical table is furnished for Invalids and proper diet prescribed for each individual case, no one is confined to a starvation diet, and better and more ample variety is furnished at meals than is usually found upon invalid tables elsewhere. All questions cheerfully answered. Persons desirous of knowing whether their case is one of probable cure, may do so before coming, by addressing RURAL HEALTH RETREAT.

The Managers have opened the Retreat under a new and experienced Director. They have secured the services of a thoroughly competent physician from New York, of nine years' experience in practice. Being a graduate from a three years' course of medicine and surgery in one of the New York Medical Colleges, it is his intention to keep abreast of the age in his profession. He is assisted by two lady attendants having a two years' course at one of the largest Hygienic and Surgical Sanitariums in the world, with five years' subsequent practice. Especial inducements offered to all suffering with ailments peculiar to females. The Retreat is also opened as a

SUMMER RESORT

To all who desire to spend a few weeks or months in recreation and receive the benefit from rest and breathing this mountain air, whose evenness and purity is unsurpassed. For such a wholesome and liberal table is especially provided. While the Chief Object of this institution is to afford a Sanitarium for those in need of Hygienic and Surgical Treatment, ample means are afforded for recreation, and entertainment is provided for all boarders and pleasure seekers who love decency and good order. Winding and picturesque roads, walls of blasted rock terracing the sidehills about the main building, cottages, and drive-ways, a fine campus, spacious woods, shady groves, arbored seats, swings, swinging rings, swinging chairs, rowing machines, machinery for developing the muscles and expanding the lungs, dumb-bell, and Indian club exercises are found here.

Are a factor of no small interest in coming to the Retreat. A Natural Cave, extending over 400 feet into the mountain, is within a few minutes' walk of the Retreat. A trip overland, twelve miles, through the pleasant and beautiful Napa Valley, of vines and flowers, to the Petrified Forest, can be made any day by a small party. Hotel accommodations or camp furnished. The summit of Round Tower Mountain, less than one-half mile from the Retreat, can be reached by a few minutes' walk, which, with its view covering of Madonna, Live-oak, and Fire, furnishes an unlimited source of enjoyment and interest to the pleasure seeker and admirer of nature. Situated as we are, with the city and bay of San Francisco, with its Golden Gate and the old Pacific Ocean, but 60 miles south of us, and the famous Mount St. Helena towering high above all round, and looking down upon us from the north, this is just the place for

EASTERN TRAVELERS

Tosken and regain their health, and at the same time view the curiosities and natural beauties of this portion of California, and escape the long, tedious, and sickly winter of the Eastern, Southern, and Middle States; for the winter season here is like the beautiful Spring time in the East. Geraniums, Verbenas, and Callas bloom all Winter in the open air.

LOOK AT IT

And think twice before you conclude to go to some other resort where they substitute for natural advantages "rare mineral water," but come and see for yourself where the water is pure as crystal.

EXPENSES.

Rooms, with board, Regular Treatment, \$15 to \$20 per week; without Treatment, from \$9 to \$15. Specially favorable terms for families and others by the month. Some rooms in cottages can be furnished at reasonable rates. Office treatment and surgical operations extra.

TESTIMONIALS.

OAKLAND, CAL., February 22, 1884.

I have visited a number of the "Springs" and "Resorts" in California, and without hesitation can say that the "Health Retreat" is the most delightful of them all. The water is pure; the climate cannot be excelled; and the scenery is unequalled. Baths may be taken here under the direction of experienced practitioners and nurses—an advantage which I have found at no other place which I visited. At one place (Hot Springs) I found an intelligent superintendent who informed me that many invalids came to his place who, by the injudicious use of baths, rendered their recovery almost impossible; but as they did not pretend to govern visitors in that respect, his advice would not be regarded if offered. At the "Health Retreat" it is not so. The feeblest may trust themselves with confidence in the hands of those who have charge of it. It is a quiet, pleasant, home-like place, where the sick are cared for and treated in harmony with nature's laws, and where the weary may find the most enjoyable rest.

E. D. J. H. WAGGNER,

Editor Signs of the Times, Oakland, Cal.

ST. HELENA, CAL., June 11, 1885.

Finding myself gradually failing, becoming emaciated, and with a bad cough, I was warned of consumption; I went to "Rural Health Retreat," weighing 130 pounds. Was happily surprised to find myself improving in one week. Now, at time of writing, my cough is entirely gone; have free use of both my lungs; weigh 155 pounds, a gain of 25 pounds in four weeks. Words are feeble to express my regard for the "Retreat," its physician, and managers, who have the rare faculty of making you feel perfectly at home. I feel that the mercy of God attended their efforts, and to them I owe my speedy and remarkable restoration.

E. D. JOHN A. BURDEN, E. Portland, Oregon.

Persons sending notice previously will be met at the St. Helena depot by a carriage from Retreat. For further particulars and information, address

RURAL HEALTH RETREAT, St. Helena, Cal.

Chicago Prices Beaten!
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Slout Mills, Separators, Revolving and Slout Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slout Punched Screens. Mining Screens a Specialty, from 1 to 15 (inch).

Orders Promptly Executed.

EUCALYPTUS

Boiler Scale Preventive and Remover.

This Preparation is now in use in many thousands of Steamship and Stationary Boilers all over the World, and has always driven other Scale Removers out of the Market when they have come into Competition.

WHAT IS SAID OF IT.

U. S. NAVY.

"On the surveying cruise of this vessel previous to this, similar in all respects, I found it necessary at times to scale the boilers. The use of Eucalyptus has obviated this necessity." "The use of Eucalyptus has been proved to protect the iron of the boilers from corrosion.—Report of Chief Engineer U. S. S. Ranger."

P. C. S. S. Co.

"I have used many kinds of scale removers, and never found anything that could do as thorough work as yours does. What we have used has paid for itself many times over in the saving in boiler repairs alone."

JOHN COSOROV, Supt. Eng'r P. C. S. S. Co.

O. & O. S. S. Co.

"I hope never to be without it."—T. Toulson, Chief Eng'r S. S. Arabic.

JOHN ROACH & SONS, N. Y.

"Your preparation is perfect in its working and a complete success in all things for which it is intended."

F. DORRITY, Supt. Forging Dept. Morgan Iron Works.

FULTON FOUNDRY.

"We find it to be the best in use for removing scale."—H. P. Christie, Supt.

STARR'S MILLS.

"It is a success, and we advise and endorse its use strongly."—Starr & Co., per A. D. Starr.

BUCKEYE MILL, MARYSVILLE.

"We have never in our experience of 15 years found anything to equal it."—Buckeye Mill Co., per Justus Greeley.

GIANT POWDER WORKS.

"I cheerfully add my testimonial to the many given already in regard to the efficacy of your scale remover."

FRANK ROLLER, Supt.

U. S. MINT.

"I take pleasure in recommending it as the best and cheapest thing I have used."

Geo. L. HARRIS, Chief Eng'r U. S. Mint.

We refer also to the following, some of our regular Pacific Coast Customers:

SAN FRANCISCO—Riesdon Iron and Locomotive Works; Union Iron Works; Market St. Cable Railway Co.; San Francisco Gaslight Co.; State Board of Harbor Commissioners; California Wire Works; A. M. Simpson & Bro.; Atna Iron Works; American Sugar Refinery; Baker & Hamilton; Spreckels & Bros.; Pacific Whaling Co.; U. S. Appraisers' Building; Davidson & Reed; Golden Age Mill Co.; Hobbs, Will & Co.; R. D. Hume & Co.; A. Lusk & Co.; Louis Sloss & Co.; Ship Owners' and Merchants' Towboat Co.; Selby Smelting and Lead Co.; San Francisco Laundry; Sol. Wangerheim & Co.; West Coast Furniture.

CHICO, CAL.—Sierra Lumber Co.; Chico Water Co.

OAKLAND, CAL.—Judson Manufacturing Co.; Samm's Mills; Pacific Press; Mitchell, Fisher & Ketcher.

SAN JOSE, CAL.—John Christian; Farmers' Union.

LOS ANGELES, CAL.—Los Angeles Electric Light Co.; Mills & Carr; V. Beaudry; Kerchoff-Guzner Mill and Lumber Co.

STOCKTON, CAL.—Insane Asylum; N. T. Whiting; White & Thomas.

Duncan's Mills L. and L. Co. Vanderhurst, Sanborn & Co., Salinas.

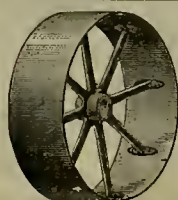
UTAH.—Ontario S. M. Co.; Park City; Santa Clara Valley Mill and Lumber Co.

The Preparation is put up in 10-gallon cases and 50-gallon barrels.

DOWNIE B. I. P. CO., Manufacturers,

No. 204 Market Street,

SAN FRANCISCO, CAL.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington

Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and

Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

DEWEY & CO. { 252 MARKET ST. S. F. } PATENT AGENTS.
Elevator, 12 Front St.

Iron and Machine Works.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam-
boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings
and Connections of all sizes and patterns, furnished
with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

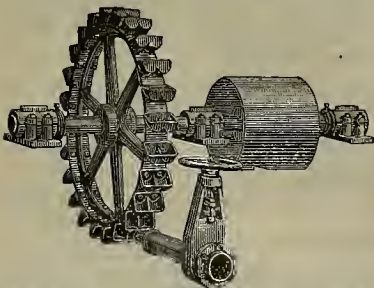
THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

— FOR —

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

— 1883 —

For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

22 Fremont Street,
SAN FRANCISCO.



L. PETERSON, INVENTORS. MODEL MAKER,

253 Market St., N. E. cor Front, up-stairs, S. F. Experimental
machinery and all kinds of models, tin, copper and brass.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-
ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high
pressures. Freedom from scaling. Equally
adapted for power and heating purposes.
Especially adapted for mills, factories, hotels,
stores or any place where safety is a necessity.
Will work well with muddy water and any kind
of fuel.

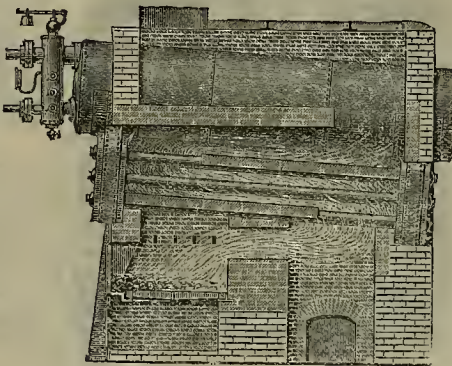
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentle-
men: We have had one of your Heine Patent
Safety Boilers in use for four months at our
Borax Works, in Alameda. It does good work
and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

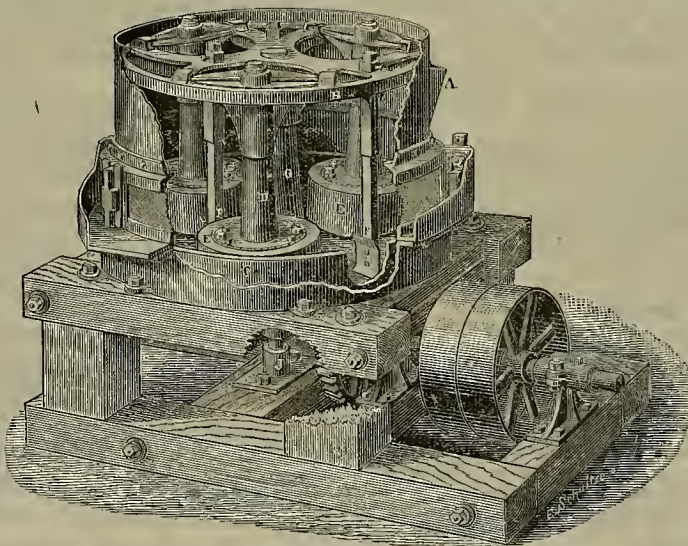
SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear
Sirs: I am using one of your Heine Patent
Safety Boilers in my Candy Factory on Twenty-
Third street, near Valencia. For economy of
fuel, safety and efficiency I have never seen its
equal. Very truly yours,
(Signed) W. S. TOWNSEND.



Send for Circular and Prices.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy
in Saving Gold. Economy in Transportation of Machinery.

Economy in Cost of Erection of Mill at Mine. Econo-
my in Time Required to Establish Plant
(one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of
continuous use at a number of mines in California has enabled the inventor to perfect and im-
prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

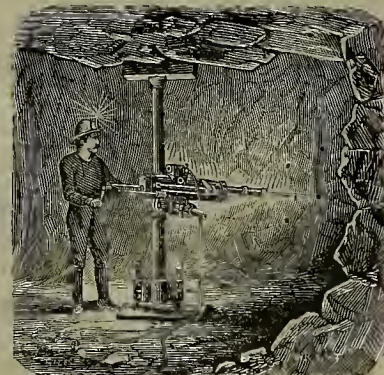
FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.

A. T. DEWEY.
W. B. EWER.
GEO. H. STRONG

Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class
Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal
nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original
cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies.
The information accumulated through long and careful practice before the Office, and the frequent examination of
Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled
us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not
few. Circulars of advice sent free on receipt of postags. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.



INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
Ports, will do 20 per cent more work than
the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Dr. J. H. RAE & CO.,

240 Montgomery St., cor. Pine, San Francisco.

7 Exchange Place, Boston, Mass.

MANAGING AGENTS.

VAPOR FUEL, for Furnaces, Smelting, Roasting
and Domestic use.

NATIONAL VACUUM DREDGE CO., for
River, Creek and Beach Mining.

ELECTRIC VOLTAIC AMALGAMATORS.

ELECTRIC SODIUM AMALGAM, being a
storage of Electricity.

Electro Metallurgy a Specialty.

Can be Consulted on Mines, Mills, Machinery, and
the Application of Electricity to the Reduction of Ores.

Room 7, Second Floor,
SAN FRANCISCO, CAL.

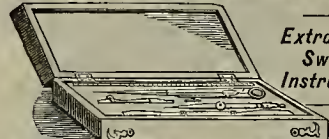
Room 5, First Floor,
BOSTON, MASS.

"ACME" DRAWING PAPERS

QUEEN & CO'S

ORIGINATED

PROFILE AND CROSS SECTION PAPERS



Extra Fine
Swiss
Instruments

QUEEN & CO'S Improved TRANSITS and
LEVELS, TAPES, CHAINS, RODS, RULES,
and Drawing Materials of every description. List and
description of our Ten Catalogues sent on application.

JAMES W. QUEEN & CO.,
924 Chestnut St., Philadelphia.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope,
Sisal Rope, Tarred Manila Rope, Hay Rope, Whale
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

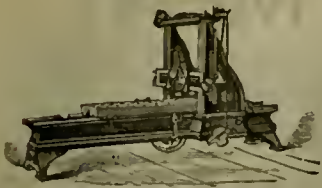
TUBBS & CO.

611 and 613 Front St., San Francisco.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



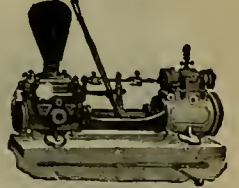
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

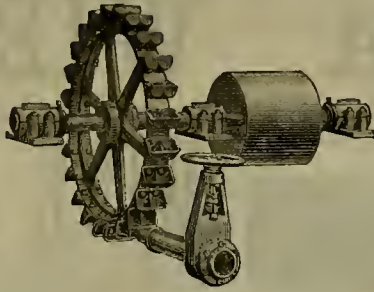
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR

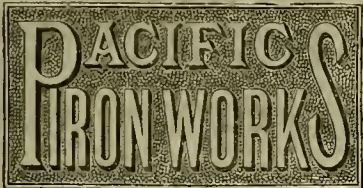


Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850. 1885.
RANKIN, BRAYTON & CO.,
.....BUILDERS OF.....
MINING MACHINERY.

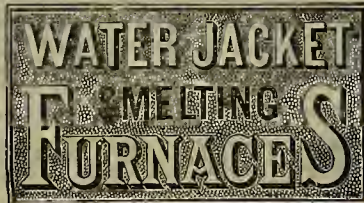
San Francisco: Chicago: New York:
127 First Street. 100 N. Clinton. 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
embracing machinery of LATEST DESIGN and
MOST IMPROVED construction. We offer our cus-
tomers the BEST RESULTS OF 35 YEARS' EX-
PERIENCE in this SPECIAL LINE of work, and
are PREPARED to furnish from SAN FRAN-
CISCO or CHICAGO, the MOST APPROVED
character of MINING AND REDUCTION MA-
CHINERY, adapted to all grades of ores and SU-
PERIOR to that of any other make, at the LOWEST
POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-
LIVER in COMPLETE RUNNING ORDER,
in any locality, MILLS, CONCENTRATION
WORKS, WATER JACKET SMELTING
FURNACES, HOISTING WORKS, PUMP-
ING MACHINERY, ETC., ETC., of any DE-
SIRE CAPACITY.

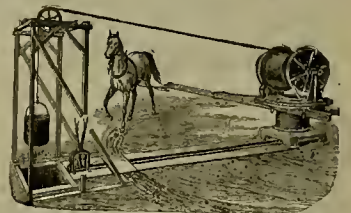
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
ores of NEW and ORIGINAL DESIGNS, covered
by LETTERS PATENT. No other Furnace CAN
COMPARE with these for DURABILITY, and in
CAPACITY for uninterrupted work. MORE
THAN 150 of them are now RUNNING in various
parts of THIS COUNTRY, as well as many in
FOREIGN COUNTRIES, giving results NEVER
BEFORE ATTAINED as regards CONTINUOUS
running, ECONOMY of fuel, AMOUNT and QUAL-
ITY of BULLION produced. These CLAIMS have
been PROVEN BY RESULTS in ANY NUM-
BER of INSTANCES, and the GREAT SUPE-
RIORITY of this SYSTEM of smelting ores DE-
MONSTRATED BEYOND QUESTION. COM-
PLETE PLANTS furnished to order of any CA-
PACITY, with ALL IMPROVEMENTS that ex-
perience has DEMONSTRATED as VALUABLE
in this class of work.



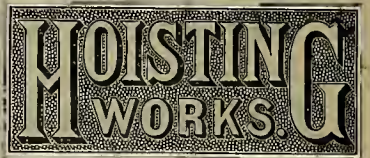
Beyond question the cheapest and
most effective machine of the kind
now in use adapted to all grades and
classes of ores.

This machine has been THOROUGHLY TESTED
for the past TWO YEARS, under a GREAT VA-
RIETY of CONDITIONS, giving most EXTRA-
ORDINARY results FAR IN ADVANCE of
anything EVER BEFORE REALIZED. A re-
cent COMPETITIVE TEST at the Carlisle Mine in
Mexico, showed an ADVANTAGE OF OVER 30
PER CENT in favor of THE DUNCAN. The
amount SAVED OVER THE TRUE being suffi-
cient to PAY THE ENTIRE COST of the ma-
chines EVERY MONTH OF THE YEAR. One
of its MOST VALUABLE features is as an AMAL-
GAMATOR. It saves all THE AMALGAM GOLD
AND SILVER that ESCAPES the BATTERIES,
PANS or SETTLERS, making the machine worth
MORE than ITS COST for THIS PURPOSE
ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist,
and affording means for the continuous operation of a
Pump or Blower, without interfering with a hoisting ap-
paratus. It is made entirely of iron, no piece weighs
over 300 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes
Steel Wagon, Buggy, and Truck Tires, Plow Steel, Machinery and Special Shape Steel to size and lengths.
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.

STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.

GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

CHICAGO PLATING COMPANY, 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St, San Francisco, Cal.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Barbed Wire.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

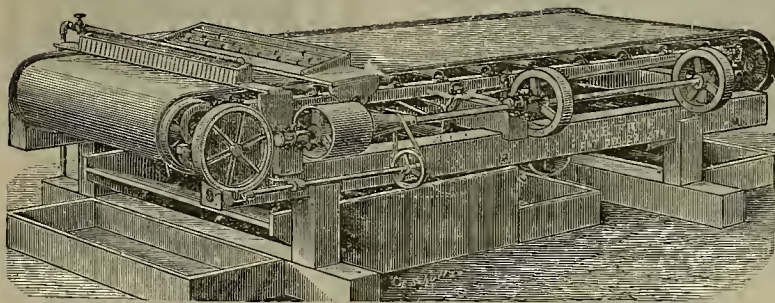
WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 229 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

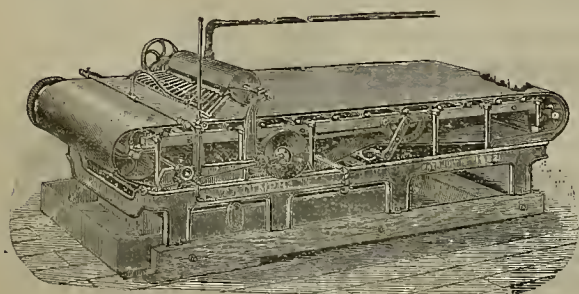
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.

THE "TRIUMPH" TRIUMPHANT!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$3.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test, which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners. This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, floated by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 5, 1885.

VOLUME LI
Number 10.

Dillenburg's Pipe-Coupling.

Michael Dillenburg, of this city, has patented, through the Mining and Scientific Press Patent Agency, a new form of pipe-coupling which consists of a split sleeve fitting on the pipe, and having a conical or wedge-shaped exterior surface, a head having a correspondingly-shaped aperture in which the sleeve is seated, a tubular connecting sleeve or link fitting upon the end of the pipe and seated within the inner portion of the aperture of the head, which is made with a plane surface to receive it, a washer between the tubular connecting sleeve and the split sleeve, and tie-bolts connecting the two heads.

The object of the invention is to provide a simple and effective pipe-coupling, without having to resort to threading the pipes. The coupling is a two-part one, the parts on one side being the counterpart of those on the other. For the sake of clearness, we shall use the singular number in describing them. Figure 1 is a front view of the split sleeve. Figure 2 is a view of the coupling, one-half being in section and the other half in elevation.

A is the pipe. B is the split sleeve, having its exterior surface of a wedge or conical shape. The sleeve is fitted on the pipe, with its base or portion of largest diameter adjacent to the end to be coupled, though removed therefrom a short distance.

C is the head. It consists of a casting or other piece having a central aperture, c. The inner portion of the aperture has a perfectly plane or parallel surface, whence said aperture continues in a conical shape, corresponding to the shape of the split sleeve B, which is seated therein.

Around the end of the pipe and against the inner end of the sleeve is a washer, D. B is the tubular sleeve or connecting-link, consisting of a short section of pipe. It is seated within the plane or parallel portion of the aperture of the head, and encircles the end of the pipe and bears against the washer. F are the tie-bolts between the two heads, and f are the nuts by which the bolts are set up.

The operation of the device is as follows: By tightening up the bolts the heads are drawn together, which, acting on the connecting-sleeve E, causes said sleeve to force the split sleeves apart.

These, being confined in the conical aperture of the heads, bind the tighter upon the pipes and hold them. The washers prevent any leak.

This device is applicable to the coupling of a pipe on to an elbow as well as to another pipe.

Among the advantages claimed by the inventor for this novel form of pipe coupling is that no threads have to be cut on the pipe. Moreover, there is no need to cut the pipe to exact lengths in order to make an exact joint, as the ends do not need to come together, but can be connected even if an end is a half an inch apart. Neither pipe nor any part of the coupling needs to be turned to make a connection. The coupling can be put on with the hands with the assistance of a small monkey wrench, and will be perfectly tight for gas or water. The fact that no threads have to be cut admits of this coupling being made very cheap. Mr. Dillenburg's address in this city is 909 18th street.

MANY miles of valuable timber have been destroyed by the forest fires in British Columbia.

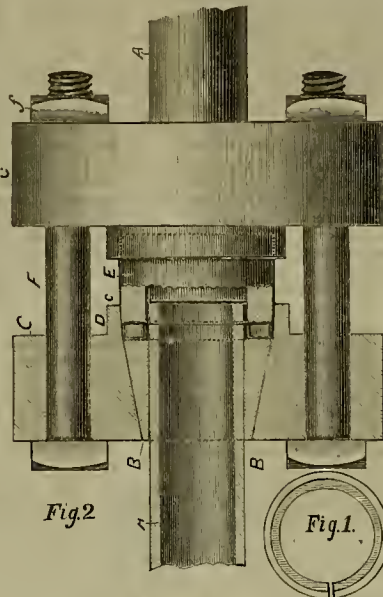
Copper and Lead Smelting in Australia.

A recent issue of the London *Mining Journal* makes mention of the fact that the Cloncurry Copper Company of Queensland, Australia had got into successful operation the Water Jacket smelting plant furnished them by the Pacific Iron Works, of San Francisco, and were turning out copper bullion at a great saving on previous cost of production. The company now feel confident that the facilities afforded by this process will enable them to make a good profit on their product at the present extremely low prices, as well as to meet any further possible decline.

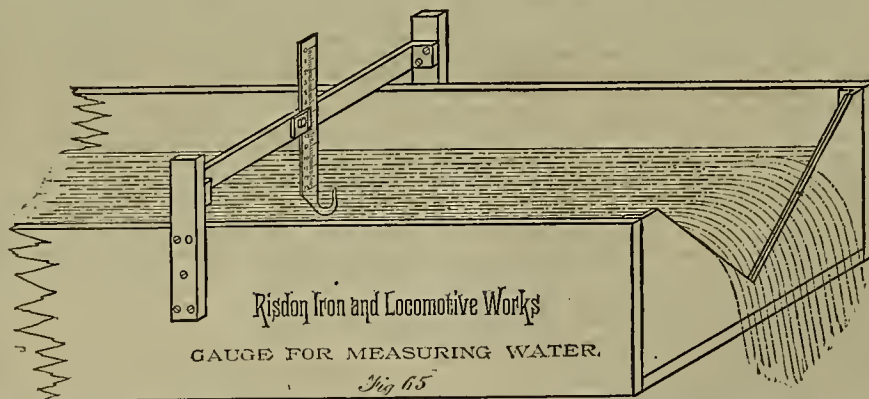
This process is also, we learn, being extensively adopted by many other companies in Australia, as well as in South America. The severe competition to which copper producers in all parts of the world are now being subjected is compelling

The chances are that before very long there will be many miles of cable railroads in New York City. It has taken a long time to get them introduced there, but the opposition has been mainly due to the existing street railroad companies who have until now successfully opposed their introduction. It is stated now, however, that the system is looked on with favor, and one road having commenced running, others will follow.

It seems that they are having some of the same trouble with the system that other Eastern roads have experienced, as a dispatch from there this week states that the new cable cars are not yet a success. There were provoking delays. The engineers say new grips were put on the cars, with the supposition that they were going to be a big improvement on the grips used in operating



DILLENBURG'S IMPROVED COUPLING.



The V-Notch Water Gauge.

The accompanying figure represents a water gauge with V-notch for measuring the flow of water. In the circular of the Risdon Iron and Locomotive Works of this city, is given a very extended table which shows the flow of water in cubic feet per minute through a notch of 90 degrees. Those who use this form of gauge can determine the flow for themselves by using the following formula:

The formula for the V-notch is thus expressed where the angle of the notch is 90°.

$Q = .306 H^{\frac{5}{2}}$ Q = Cubic feet per minute. $.306$ = A constant coefficient determined by experiment. H = The

height of the water in the gauge above the bottom of the notch, measured in inches, about two feet back from where the water is flowing out. $H^{\frac{5}{2}}$ can also be expressed $\sqrt{H^5}$, which means that the height H is to be multiplied by itself five times, then extract the square root.

The large coal mines at Rock Springs, 250 miles west of Cheyenne belong to the Union Pacific Railroad Co. The company recently imported some 400 Chinamen to take the places of white miners, but the latter, armed with shotguns, have driven the Chinamen away from the mines and burned their quarters.

MARSDEN Manson, Chief Engineer of the State Harbor Commission, has been selected as consulting engineer in connection with the proposed system of Stockton city sewerage.

COMPLAINT is made that some of the iron girder work brought from the East for house construction here, is not made in compliance with the law of this city.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Northern Arizona Mines.

EDITORS PRESS:—Although in the northern half of Arizona there are few mines well developed and systematically worked, when compared with the number in the southern part of the Territory, it is not because the mineral is wanting. The placers have been made to disgorge millions and a few quartz ledges have paid handsome profits for a long term of years, but for every mine—deserving of the name—there are fifty locations on which nothing but assessment work has ever been done and in a majority of cases the "improvements" are of no practical advantage in determining the extent of the lode, or the richness of the ore, being confined mainly to surface scratching. To the few who have carried their work beyond this point a debt of gratitude is due from other miners. Gold, silver, copper and other minerals are known to exist in many localities, often with the most favorable indications, but nothing is so convincing as a well explored ore body. One of the two copper mines, or groups of mines, in

Yavapai County

That have been regularly worked, the United Verde, was visited by your correspondent recently, and merits notice. It is situated on the eastern slope of the Black Hills (which range and others farther north are not yet well prospected) and twenty-eight miles northeast of Prescott.

Riding first along the foothills of the Sierra Prieta the road crosses Lonesome valley—true to its name—enters the Black Hills on the west and passes over the summit at an altitude of 7000 feet above sea level. The formation is mainly limestone, and a few old kilns are to be seen by the roadside which formerly supplied the local market. On the eastern descent the lime continues in horizontal stratifications—noticeable on all the ridges for miles along the range—until within a short distance of the mines when it is succeeded by diorite, which marks the line of the mineral belt. The whole region is capped by lime. The western spurs of the Mogollon mountains on the opposite side of the Verde valley are quite similar in appearance. Turning the point of a large mountain the road descends into a small gulch lying between high ridges, the one on the south terminating in precipitous bluffs. In this gulch are noticed bold outcroppings showing copper stains at a considerable distance, and here are the buildings of the company, tenantless at present, for the mine has been shut down temporarily. Besides commodious lodging houses there are the business office, assay office, blacksmith shop, hoisting works, furnaces, coke bins, etc., and a few hundred yards further down a cluster of houses known as the village of Jerome hangs from the side of the mountain. The original locations were the Wade Hampton, Eureka, North Chrome, South Chrome, Hermit and Venture, all now included in the United Verde Company's property.

On the mountain side above the tunnel on the chrome may be seen the

Works of a Prehistoric People,

Once numerous in the valley below, where remains of their stone structures still exist. They had stoped out the red oxide ore to a depth of 80 feet, but their works have since been filled up with debris washed from above, in which oak trees are now growing. Stone hammers, buck-horn picks and other implements were found when excavating their old works. Blue and green carbonates were also encountered in their workings, and as some of the best copper ore taken out by them was untouched, it is presumed they were in search only of material for pigments. Near by in a large open cut on the Eureka was taken out a large amount of carbonate and black oxide running high in silver, and carrying some gold. Later work has been confined to lower levels. In the old dumps are to be found many specimens rich in native and horn silver and gold, as well as malachite, azurite, bluestone, etc. The total

Amount of Development

Done in the way of sinking shafts and winzes, and extending tunnels and drifts, and some of which was purely exploring work, but attended with excellent results, will aggregate 2500 feet. A tunnel on the South Chrome, the first we entered, exposes for the first 30 or 40 feet a body of carbonate ore assaying 20 per cent in copper, after which it passes into oxy sulphurets yielding a much higher percentage of bullion. The developments in the Eureka, the original location, 450 feet west of the South Chrome, have been greater. A tunnel 275 feet in length is in low grade ore, averaging 10 per cent copper and 15 ounces in silver, but in the face a richer oxy sulphuret was struck, assaying 30 per cent. From a sump 28 feet square at this point 500 tons of ore was taken, averaging as above. A crosscut running east toward the Chrome traverses a low grade body for 150 feet, where an oxy sulphuret like that in the face of the tunnel is encountered. This crosscut was continued 95 feet further to the east side of the ore body, determining its width, 15 feet through 25 per cent ore and 80 feet through ore averaging 33 per cent. Over this crosscut a shaft has been sunk from the surface, 45 feet being through

the same rich ore, the balance through slate and iron-cap. In all of these tunnels and drifts the country rock is found to be principally slate. The greatest amount of work has been done on the Wade Hampton, a continuation of the Eureka, which lies on the north side of the gulch. Open cuts made in the croppings produced ore rich in both gold and silver. About 200 feet from the tunnel, on the Eureka, a shaft has been sunk 150 feet, over which hoisting works are erected. On the first level, at a depth of 80 feet, considerable work has been done, a large amount of ore having been stoped out nearly to the surface. A drift run in 40 feet struck the main ore body, and continuing northwest diagonally across it exposed a vein of azurite and carbonate ore 50 feet wide, which averages 25 per cent. Large caves were encountered in mining this crosscut, showing up rich ore 15 to 30 feet below its level. On the 150-foot level a good deal of prospecting work has been done. A drift run under the Eureka developments pierces the large rich body of oxy sulphurets spoken of, 80 feet wide, for a distance of 250 feet. Thus by the developments in the Eureka and Wade Hampton it is known to be 300 feet long, but as the northern limit has not been reached in the former or the southern in the Eureka or Chrome, its total length has not been determined, and it is not known whether it be a true vein or an immense deposit of ore. Nor has the depth been ascertained. At present there are over 300,000 tons of ore in sight, and how many times this may be multiplied cannot be well estimated at present. This amount of ore, if containing only 20 per cent copper, which is lower than assays or working tests, would produce 60,000 tons of bullion. The company has a 30-ton

Water Jacket Smelting Furnace

conveniently situated between and below the mines, and quite near to each, from which was produced daily 8 to 10 tons of copper matte, yielding 98 per cent refined copper. The largest run made in one day was 16 tons of black copper. The furnace was started August 1st, 1883, and up to December, 1884, when work was discontinued, had produced 2700 tons of matte, valued at \$930,000, of which \$300,000 was gold and silver. Another 30-ton water jacket was completed before work was discontinued, but has not been used. This will enable the company to double the yield. The ore contains enough iron to smelt well, and the only flux used is lime, of which there is a great quantity in the immediate vicinity, but even this may not be necessary. There is an abundance of wood near by for fuel and mining timbers. Water is brought in iron pipes two and a half miles, and the supply is more than ample for all uses. Hay, grain, fruit, vegetables, etc., are grown in the valley below, and in many respects the mine is favorably situated; but in one it is not at the present time.

By the road over the Black Hills it is 56 miles to Ash Fork, on the Atlantic and Pacific Railroad, but there is a shorter one running northward through the valley of the Verde. The cost of transporting bullion to the railroad was \$20 per ton, and the same for freighting coke from the railroad to the mine; and as a ton of coke is required to produce a ton of bullion, there was consequently a freight tax of \$40 on every ton of copper by the time it reached Ash Fork. Owing to this high tariff, and to the low price of copper, work was suspended, to be resumed again as soon as the outlook becomes more favorable. Although the mine was running at a profit, the company thought they could make good interest by reserving their ore for better times. As the mine furnishes employment for 150 men when running, its suspension was much regretted. The completion of the Prescott and Arizona Central Branch Railroad from the A. & P. would materially lessen the distance and cost of freighting by wagons, and a reduction of one cent per pound on hullion and coke would result in a saving to the company, with both water-jackets in operation, of \$400 a day, or for the year (300 days) \$120,000, in itself quite an item. When this branch road is completed (which it is expected to be in the course of a few months) the mine will not occupy its present position of isolation as regards transportation facilities.

The other mines mentioned as belonging to this group your correspondent did not visit. In the North Chrome very little work has been done. The Hermit and Venture, some distance down the mountain, have produced several hundred tons of ore richer than any in the mines described, some found in the latter going as high as 80 per cent in copper. The extent of the vein in those mines, or deposit, which it seems to be, is not known.

There Are Other Mines of Copper

As well as of gold and silver, in Northern Arizona which would undoubtedly be valuable properties, and could be made to return large profits if communication with distant markets were less difficult and expensive. Even with the prevailing low price of copper mines would pay good dividends if it were not necessary to haul hullion and supplies such great distances in wagons over mountain roads. It is confidently expected that the completion of the railroad mentioned will be followed by increased activity in the development of mining interests in all parts of the Territory tributary to it. Returning from the United Verde

A Curious Intermittent Spring

Was visited about two miles southwest. Two or three years ago some men engaged in digging a

well were surprised on returning to their work one morning to find it filled with water and a large stream running over the top. They had left it the night before about twelve feet deep and perfectly dry. Shortly after the water stopped running and a visit to the well showed it to be empty but with a hole a little more than a foot in diameter on the west or mountainside. Two days later the well filled and overflowed again, and has since continued in the same manner. It is said that at first it flowed regularly every third day, but an Italian who uses the water for irrigating a large garden informed the writer that when the moon is full it flows every second day, and during the remainder of the month every third day. Judging from the size of the aperture in the side of the well, and of the ditches carrying off the water, the volume discharged must be at least 50 miner's inches, or one cubic foot per second. We were informed that a short distance up the ravine in which it is situated are two more intermittent springs. Many theories have been advanced, explaining the cause of the interrupted flow from this well or spring, the one most generally accepted being that the outlet acts on the principle of a syphon, emptying a reservoir somewhere in the heart of the mountain whenever the water rises high enough to permit it to flow downward into the channel tapped by the well. This is reasonable and may be the correct explanation.

Geo. W. STEWART.

Prescott, A. T., Aug. 30, 1885.

The Denver Manufacturing Co.

EDITORS PRESS:—The Nichols Manufacturing Company, of Denver, have purchased the Elyrea Mill at Breckenridge, Col., consisting of 15 ordinary stamps of the old pattern, and have just shipped a new plant of machinery, the same being their own Double Giant stamps, whereby the capacity of the mill will be increased 10 tons per day. The company will do some custom work at the mill, but their chief purpose is to treat the ore of the Junco & Buffalo property, situated on the southeast slope of Gibson Hill, about a mile from town, and on which the Nichols Bros. have a lease. That the venture will prove a success there is no doubt, for in addition to being thorough and practical miners and machinists, these gentlemen have a splendid reputation for business judgment and integrity. No concern in camp have ever been so prompt in payment of their men and other liabilities, an example which might profitably be followed by a good many others.

SNAKE RIVER GOLD.—A representative of the Salt Lake Tribune has been shown, in Blackfoot, Idaho, three retorts of Snake River gold from placers two miles below that town. This gold was the product of eighteen days' operations of two men with a machine in which the gold is saved by washing over iron grizzlies and troughs covered with burlap, which fabric catches and retains the fine gold until being washed off in a tank. After this it is collected with quicksilver and then the amalgam is retorted. The product of pure gold weighed forty-six ounces, and will net over \$20 per ounce, or in all, over \$900. This makes a daily average of \$50, which is pretty good for two men. Lowell Holbrook, who is operating the placers, has shipped to the value of \$2200 this season, prior to this last lot. That sent to Boise brought \$18.75 per ounce, while lots sent to San Francisco ranged from \$18 to \$18.75, and for the same quality of gold marketed in Chicago, he has been getting \$20.50 per ounce, making the latter place much the best market for gold bullion. No other placers are being worked near Blackfoot, but at Eagle Rock some machines are operating so successfully as to yield about \$20 per day per man. As the Snake River valley contains broad and deep bars for hundreds of miles along the river, which shows many colors to the pan, mining promises to become extensive in the near future, when it is known to be profitable, and a successful process becomes generally understood.

OPERATIONS are being steadily prosecuted at Reynolds Ferry, by the Stanislaus River Mining Co. The water in the river is very low, which gives a show for working. There has been some sickness among the men, but work has not been materially retarded. The dam will be completed this week, and a new donkey engine has been received from San Francisco, which will be used to hoist gravel out of the river bed into the sluices. If nothing intervenes to prevent washing will commence in another week. Work is still being pushed in the tunnel.—Tuolumne Democrat.

NEW FINDS.—For some time past Mr. Yerrington has been prospecting on claims formerly owned by Jewell & McDonald, northwest from Soda Springs. About ten days ago some very rich strikes were made, the ore running up into the thousands of dollars per ton. What the extent of ore bodies may be is not yet known. Yerrington proposes to put five more stamps into the Garfield mill. The mine continues to turn out hullion at about the same rate as for months past.—Inyo Independent.

The Philadelphia Mining and Smelting Company is having erected at its Ketchum Works, Idaho, first-class sampling works that will have a capacity of 100 tons per day, but will be so constructed that their capacity can be increased to 200 tons per day at slight expense.

Discoveries in Calaveras County.

From a letter in the Calaveras Chronicle we make the following extracts: The Oro Fino mine is about one mile northwest of the Greve ranch. This mine is owned by the brothers William and Aaron Cook, both former residents of Mokelumne Hill, than whom no better or more enterprising men ever lived to benefit a mining camp; and we well know that all their old friends and neighbors will rejoice to hear that their indomitable industry has won its just reward and that they are to-day the owners of the largest and richest ledge of gold-bearing quartz in the county and probably in the State. It was discovered by the Cooks last summer while looking for placers near the Lava Hills, but not until some three months ago did they begin explorations. The formation of this district is porphyritic slate, and so near as we could learn it is very extensive. It is about 6 miles in width and about 18 miles in length. Its southern extremity begins near the renowned "Sheep Ranch" mine and extends northerly some 18 miles to the main Mokelumne river. It is next of the Blue mountain district some 5 miles, lying parallel thereto.

The Cooks have three locations on the vein, each location showing pay in the croppings. On the Oro Fino (the middle location) they have made their development, which consists of a vertical shaft 35 feet in depth and a crosscut at the bottom from wall to wall. This crosscut discloses a vein 23 feet in width between well-defined walls of slate and porphyry. Five feet of this vein (on the foot wall) is solid ore and very rich, average workings made show a yield of over \$100 per ton. The remaining 18 feet is mineral of a low grade. They are now sacking ten tons of the choicest ore to ship to Selby & Co. at San Francisco. The ore is not altogether free in character as it contains much galeua, hence a metallurgical process is required to extract the gold. Seepage of water makes the sinking of the shaft rather tedious. To obviate that difficulty they intend to erect a steam pump in connection with hoisting works. The "boys" feel confident they will have a million dollar mine when 100 feet depth is reached. Several capitalists and experts from San Francisco have been up to see the mine and have attempted negotiations for it, but thus far no deal has been effected. Their price at this time is \$100,000, and they propose to add \$10,000 to that price for every ten feet they sink on the vein. They know they have an extraordinary rich mine and they don't propose to fool it away.

There are many other excellent prospects in the neighborhood of the Cook's, but developments are required to determine their value. The most promising of these is the

Golden Harvest,

Located about one mile west of the Cook's. It is a recent discovery, owned by T. J. Sevrans & Co. The ledge is well defined on the surface, is about eight feet wide and yields \$100 ore. The owners seem to think that it will prove a companion bonanza to the Cook mine. As meager as are developments the owners aver that no \$100,000 ever coined could buy their "Golden Harvest." The next mine we visited was the

Fine Gold Mine,

Situated in the same belt, about three miles west from the Cook property and on the south side of the South Fork stream. This mine belongs to two French gentlemen, the Messrs. Gilman. It was discovered by them two years ago. It is a north and south fissure vein, averaging four and a half feet in width, and presenting smooth, unbroken walls wherever it is opened. The entire fissure is filled with most beautiful quartz and sulphurets. For more than a year the Gilmans have been working the ore in a small adit, getting an average yield of \$20 per ton. We were told that this property was bonded through Mr. T. J. Sevrans and Mr. Harvey to San Francisco parties for \$60,000. A remarkable feature of this vein is its great extent. Extensions are being made along the vein continuously for a distance of three miles, and in all of them the vein is found to be well defined and presenting pay quartz. We prophesy for this mine a future of prosperity and a record of production unsurpassed by any mine in the State.

The next mine we visited was the Cape Horn, owned by Mr. Fred. Greve. This mine is a north and south ledge, in slate, about four feet in width. It is situated near Allen's ranch, about two miles west of the Gilman mine. It lies between the Licking Fork and the South Fork of the Mokelumne river. It is an old discovery, work having been done and ore produced at intervals during the past twenty-five years. The explorations have, however, only been to a shallow depth, and until now no systematic plan of development has been inaugurated. Messrs. Seaman & Co. have bonDED the property of the owners and are opening the ledge to a great depth by a tunnel system of work.

From the Cape Horn mine we wended our way some six miles to the village of West Point, once the active center of vigorous mining. West Point is famous for its many quartz veins and their phenomenal richness. The ores, however, are considered very rebellious, which has been a serious obstacle to the development of the camp. Two reduction works—Russell & Co. and Symson & Co.—have been established and both have recorded a success. How-

MECHANICAL PROGRESS.

Bridge Walls and Boiler Explosions.

A correspondent of the *Age of Steel* writes, in regard to the use of "bridge walls" under boilers, as follows:

I wish to say a few words about horizontal boiler furnaces, such as are used on steamboats under stationary boilers cased with brick work.

The greater number of modern boiler furnaces are constructed with what is called a bridge wall—a wall made of either clay or brick at the aft end of the grate bars. In some furnaces these walls are built perpendicular from the grate bars, and come close to the bottom of the boilers, with the bottom of the furnace bed lower at the aft end of the boilers.

This manner of constructing a furnace, with bridge wall at end of grate bars and close to the bottom of the boiler, is, in my opinion, after thirty years' experience, the cause of fully 90 per cent of all boiler explosions, and I offer the following items of proof for the belief that is in me: Engineers in general recognize the fact that the first place a boiler will "give out," "burn," "blister" or "bag down" is right over the bridge wall. By the elevation of this bridge wall the intense heat of the grate is concentrated in volume on the plates immediately above and the water evaporated so rapidly that the plates frequently become heated beyond the limit of their strength, and give way.

Not only are bridge walls built at the aft end of the grate bars injurious and very dangerous, but also an impediment to natural draft, causing the furnace bed and flues to gather full of ashes and soot. There is a remedy for these ills. Tear out bridge walls and do not put grate bars more than 12 or 14 inches deep from the bottom of boiler. Let bottom of furnace bed be on a level with aft end of grate bars. Furnace bed should gradually rise, so that the space at the aft end of the boiler is half the depth at the aft end of the grate bars. Between back wall and aft end of boiler, in the bottom of furnace bed, should be a pit one foot deep and extending across furnace to catch ashes, the pit being right where the volume of the flame returns to go through the flues, and will surely catch all heavy ashes. The pit can be constructed with a door so as to be cleaned out at any time.

A furnace constructed on the above plan will have better draft, will equalize the heat and distribute it to all the lower boiler plate, and enable the boiler to generate more steam with less fuel than is possible with a bridge-wall furnace. Besides, burned or hag down sheets will be unknown and liability to explosion will be reduced to the minimum.

Experienced engineers well know that where the heat strikes the boiler plates with greatest force there the sediment will gather and settle, frequently in such quantity as to burn out the sheet in a very short time. To prevent sediment settling in boiler locate boiler with mud drum parallel therewith, and let the mud drum extend from aft end of grate bars to aft end of boiler, with leg connections to each sheet of the boiler. Have a cross mud drum under parallel mud drum at aft end of boiler. Let feed water come into the cross mud drum gradually, rising through these legs which are surrounded with heat, which will attract the sediment, causing it to fall back to the bottom of the drum. The sediment can be blown out of these drums at any time.

Cast-Iron Cutlery.

This title, says London *Ironmonger*, may appear anomalous, but cast iron cutlery of certain forms is far more common than its purchasers generally imagine. And it is not necessarily of a poor quality, although made of nothing but cast-iron. In the writer's family is a pair of scissors of cast-iron that has been used for three years, and that has been several times sharpened. The writer has shaved with a cast-iron razor, which did excellent work for months. There are in Connecticut two extensive establishments which reckon cast iron cutlery as among the important products of their work. This allusion to cast-iron shears and scissors does not refer to the combined cast-iron and steel articles which are usually considered superior to the forged ones. These have a steel inner plate cemented on each blade by the fused iron when it is poured into the mold; but the cast-iron shears and scissors are wholly and entirely of cast iron, and they are finished for the market precisely as they come from the molds. The quality of the iron used is the same or similar to that used in casting for malleable iron, and for cutlery it is cast in chills. When broken the crystallization is very similar to that of hardened cast steel, and, except for lack of elasticity, it serves the same general purpose. But although this cast-iron is not adapted to tools which work by blows, it is sometimes made into ice picks and axes, hatchets and steak choppers. The manufacturers of cast iron shears and scissors make no secret of the material, and sell their goods for just what they are. Of course they are sold cheaper than forged work of steel can be sold. Retailers also, know that this cheap cutlery is not steel, and usually—unless dishonest—they will truthfully answer questions.

TEMPERING STEEL WITH LOW HEATS.—Some curious statements on tempering steel are made

in a paper published in *Dingler's Polytechnic Journal*, Vol. 225, on the "Influence of Annealing Temperature upon the Strength and Constitution of Steel." Hitherto it has been generally considered that to obtain a specified degree of softness it is necessary to heat the hard steel to a particular annealing color—that is to say, to a definite temperature—and then allow it to rapidly cool. Thus, for example, that steel might anneal—be tempered—yellow, it had to be heated to 540°, and the supposition was formed and acted upon that it must be allowed only a momentary subjection to this temperature. Herr Jarolimiek says the requisite temper which is obtained by momentarily raising the temperature to a particular degree, can also be acquired by subjecting the steel for a longer time to a much lower temperature. For example, the temper which the annealing color—yellow—indicates can be obtained by exposing the hard steel for ten hours to 265° deg. of heat; in other words, by placing it in water rather above the boiling point.

WIRE-BUILT VS. ORDINARY CANNON.—Siege guns, built of wire, are the newest description of ordnance adopted for the English service. A very tough steel wire is used, having a breaking strain of 100 tons to the square inch, which is wound over a steel tube as tape may be wound on a reel, being frequently fastened off to secure its cohesion, and so neatly put together as to look precisely like solid metal. An experimental howitzer has been made upon this principle, and passed a satisfactory proof at the royal arsenal. It has a caliber of 10 inches, but weighs only about 70 hundredweight. In its trial this howitzer threw a shell of 360 pounds with a charge of 28 pounds, and attained a velocity of 1000 feet per second. The trial weapon seems in no way impaired by the strain to which it has been subjected, and although there will probably be some mistrust in setting so light a gun to fire projectiles which have heretofore been assigned to monsters of over 20 tons, it is thought that they may be safely used with such small charges as are necessary to "lob" large shells into beleaguered places, for which work only sufficient velocity for a fair range will be needed by the besiegers. Another gun is, however, being built of wire for battering purposes; and, although starting on the same principle, will necessarily differ materially in details from the 10-inch howitzer.

TO TEMPER STEEL ON ONE EDGE.—Red hot lead is an excellent thing in which to heat a long plate of steel that requires softening or tempering on one edge. The steel need only to be heated at the part required, and there is little danger of the metal warping or springing. By giving sufficient time, thick portions may be heated equally with thin parts. The ends of wire springs that are to be bent or riveted may be softened for that purpose by this process, after the springs have been hardened or tempered.

LEAD-HEADED NAILS.—An improved lead-headed nail for use in putting on corrugated iron roofs has made its appearance in the English market. The shank of the nail is round and sufficiently sharp at the point to enter the wood readily, and may be driven home in the usual way. The head flattens under the blows of the hammer, or a punch may be used which will give it a conical head. The lead of the head comes in contact with the sheet-iron in such a way as to lessen the chance of leaking.

THE METAL OF THE FUTURE.—A prominent mechanical engineer says the metal of the future is aluminum, and that in a few years it will displace iron and steel and revolutionize the industrial arts. He says the world contains ten times as much of it as of iron—every clay bed being an aluminum mine. It is three times stronger than Bessemer steel, will not corrode, and the raw materials for making it are not worth \$20 a ton.

STEEL RAILROAD SLEEPERS.—Great activity is manifested in Germany in the improvement of steel sleepers—transverse and longitudinal—for railroads, and their use is extending; the transverse being generally preferred, but it does not appear proven, even with European prices for wood and steel, that there is any economy in the use of the latter for the purpose.

HARD OR SOFT STEEL FOR RAILS.—As to the relative merits of hard and soft steel rails, the latest testimony in Germany leaves the matter of wear indeterminate, with the conclusion that the wear of rails depends more upon the impurity of the steel than upon its hardness or softness—a decision in favor of soft steel, since it is unquestionably safer.

A NEW BUILDING MATERIAL.—A mixture of cork, silica and lime is coming into extensive use in Germany. It has the advantage of keeping out heat and cold, and is also claimed to be an excellent preventive of damp and defender of sound. It is substantial, light and durable, and seems to be especially adapted for ceilings and wall linings.

CEMENT FOR RESISTING STEAM.—A cement for resisting water at steam heat may be made by mixing common commercial glycerine with dry litharge into a tough dough and applying the same to the parts to be covered. This composition is said to answer very satisfactorily for uniting the joints of steam pipes.

SCIENTIFIC PROGRESS.

Immortality of Modern Thought.

(By JOSEPH LE CONTE in Science.)

It will be admitted, we think, that the tendency of modern science is materialistic. This is especially true of biology. In fact, to many the doctrine of correlation of vital with physical forces, and the doctrine of derivative origin of species, seem little short of a demonstration of materialism. Thus materialism has become a fashion of thought; but, like all fashions, it has run into excess, which must be followed by reaction. We believe the reaction has already commenced. Science sees now, more clearly than ever before, its own limits. It acknowledges its impotence to bridge the chasm between the physical and the psychical. We pass from physical to chemical, and from chemical to vital, without break. All is motion, and nothing more; also, in the region of the vital, we pass from sense-impression through nerve-thrill to brain changes, and still we find only motions. But when, just here, there emerge consciousness, thought, will, the relation of these to brain changes is just as unimaginable as the appearance of the genie when Aladdin's lamp is rubbed.

It is impossible to emphasize this point too strongly. Suppose a living brain be exposed to an observer with infinitely perfect senses. Such an observer would see, could see, only molecular movements. But the subject knows nothing of all this. His experiences are of a totally different order, viz., consciousness, thought, etc. Viewed from the outside, there is nothing but motions; viewed from the inside, nothing but thought, etc.—from the one side only material phenomena, from the other only psychical phenomena. May we not generalize this fact? May we not extend it to nature also? From the outside we find nothing but motion. On the inside there must be consciousness, thought, etc.—in a word, God. To bridge this chasm, whether in nature or in the brain, science is impotent. As to what is on the other side of material phenomena, she is agnostic, but cannot be materialistic.

Admitting, then, in man a world of phenomena, which cannot be construed in terms of motion, and which for convenience we group under the name of "spirit," is the group permanent? Is the spirit immortal? On this subject, Science can say absolutely nothing. The field is therefore open for evidence from any quarter, and of any degree. Some of these evidences, though not given by Science, are at least suggested by lines of scientific thought. A few of these we briefly mention.

1. We have said that consciousness and thought lie behind material phenomena, in nature and in the human brain. In the one case we call it God, the divine Spirit; in the other, the spirit of man. Now, does not this identity, or similarity of relation to material phenomena, imply, or at least suggest, similarity of nature, and therefore immortality for the spirit of man?

2. Individual human life passes through its little cycle of changes, and quickly closes in death. If this be all, then for the individual, when all is done, it is precisely as if he had never been. "Yes," answers the Comtist, "for the individual, but not for humanity. Every human life leaves a residuum which enters into the life and growth of humanity. It is a glorious and unselfish religion thus to merge one's self into the only true object of worship,—humanity." But, alas! the cycle of humanity also closes; and for humanity too, when all is done, it will be precisely as if it had never been. "But the earth—the cosmos—abides." Yes, but only a little longer. Science declares that the cycle of the cosmos must also close. And then, when all is done, after all this process of evolution reaching upward to find its completion in man, after all the yearnings, hopes, struggles, triumphs of man, what is the outcome? It is precisely as if the cosmos had never been. It is all literally "a tale told by an idiot, full of sound and fury, signifying nothing." Not only heart, but reason, revolts against such a final outcome. If we believe that reason underlies the phenomena of the cosmos, we cannot accept such a result. We cannot believe that the cosmos has no intelligible end. But what intelligible end is there conceivable, unless something is finally attained which is not involved in a cycle, i. e., unless man is immortal?

3. There are three primary divisions of our psychical nature, viz., sense, intellect and will. There are three corresponding processes in making a complete rational philosophy, viz., (1) intreating off impressions of the external world through the senses (facts); (2) elaboration of these into a consistent whole by the intellect (knowledge); (3) outgoing of this knowledge in activity (conduct). Now, a true working theory of life must satisfy all these. But scientific men are inclined to think that only (1) and (2) are necessary; that true facts elaborated into consistent theory is all we need care for. Theologians, on the contrary, seem to think only (2) and (3) necessary: they elaborate a theory of life consistent with itself, and apparently satisfactory in its application to conduct, but are less careful to test its harmony with facts derived from the sense. But all three are necessary. The first furnishes material; the second constructs the building; the third tests its suitability for human habitation. All admit that successful application to art is the

best test of true theory. But conduct is the art corresponding to our theory of life, and therefore the test of its truth. Now, is not immortality as an element of our theory of life in the highest degree conducive of right conduct? Is it not a useful, yea a necessary, element in a working hypothesis?

4. But it may be objected, animals, too, have brains; in them, too, we find evidences of something like consciousness and thought. Are they, too, immortal? If so, where shall we stop? We pass down by sliding scale, without break, to the lowest verge of life. Shall we stop here? No: for vital is transmutable into physical forces. There all is immortal, or none. Thus, hope of immortality vanishes, as it were, by evaporation.

This objection, though serious, is, we think, not fatal. To make our view clear, we use an illustration taken from biology. May we not imagine that in animals spirit is in embryo in the womb of Nature, unconscious of self, and incapable of independent life; and that in man it came to birth—a separate spirit—individual, conscious of self, and capable of independent life, on a new and higher plane? According to this view, geological time is the period of gestation, evolution is the process of development, and the appearance of man the act of birth.

Variable Stars.

There are some stars that exhibit periodical changes in brightness, and for this reason are called variable stars. More than a hundred such stars are now known to be variable to a greater or less extent, the periods in some cases embracing a few days, in others many years. The variation in most of these stars is slight, and only a practised eye can detect it. But there are two stars in which the variation is so marked that it may be seen by an intelligent observer. The stars are Algol and Mira. Algol is in the constellation Perseus. It alternates from the second to the fourth magnitude in a little less than three days. For two days and fourteen hours it is of the second magnitude, the succeeding six hours and three-quarters it decreases to a star of the fourth magnitude, and then returns to the second, after which the same process is repeated. The observers of ancient times called this star the Winking Eye and the Demon, on account of the changes they detected but could not comprehend.

Mira, the Wonderful, in the Whale, is a still more remarkable variable. During most of the time the star is invisible to the naked eye. But, at intervals of eleven months, it shines in the heavens with the brilliancy of a star of the second magnitude. It retains this bright phase for about fourteen days, then for about two months gradually grows dim until it fades into invisibility.

The most interesting member of the class is our own sun, a variable with a period of about eleven years. We know that in the case of the sun the variation in brightness is caused by the immense spots sometimes covering millions of square miles that are at times found on his disk. We infer that the same reason may cause other variables to present similar appearances.

Astronomers living on some planet circling around one of the nearest fixed stars—for they are all suns—may thus classify our glorious orb: "Star of the third or fourth magnitude; variable, with a period of about eleven years; color, yellow." It is difficult to imagine the King of Day, reduced to a shining point, only one of the eighteen million suns that form the Milky Way!

TOUGHENED GLASS IN THE LABORATORY.—The results of eleven months' use of toughened glass beakers are thus summarized by Mr. K. F. Friswell, in a paper read before the Chemical Society: "Of 20 beakers, two burst spontaneously, = 10 per cent; one burst on hot water being poured in, = 5 per cent; six became useless from fissures and enfoliation, = 30 per cent; eight are in good condition, = 40 per cent; three have been broken by unknown means, = 15 per cent. Taking into consideration the loss of confidence caused by the high percentage of spontaneous bursting, it may be said that toughened glass is a complete failure in the laboratory."

IS THE SUN BLUE?—Prof. Langley, of Alleghany College, Pa., in his late interesting address before the Royal Institution of Great Britain, in alluding to the effect of the atmosphere on the color of the sun remarked that he had "years ago conceived that the color of the sun must be blue, and would so appear were it not for the thick covering of atmosphere which envelops the earth and changes the color of our luminary from blue to golden yellow." The professor also concludes that but for the power of the atmosphere to hold the heat of the sun like a great blanket the world would become utterly uninhabitable.

CEMENT FOR RESISTING SULPHURIC ACID.—A cement for resisting sulphuric acid even at boiling heat may be made by melting caoutchouc at a gentle heat and adding, with constant stirring, from six to eight per cent of tallow. Then mix therewith enough dry slacked lime to make the whole the consistency of soft paste; finally add thereto about 20 per cent of red lead, whereby the mass immediately sets hard and dry. A solution of caoutchouc in twice its weight of linseed oil, aided by beating and the addition of an equal weight of pipe-clay, yields a plastic mass which will likewise resist most acids.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.30 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... .2.00 6.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday, September 5, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Dillenburg's Pipe Couplings; Copper and Lead Smelting in Australia; Cable Roads; The V. Notch Watch Gauge, 161. Passing Events; Our Ship Building Interests; Talc; Copper; Foundry Notes, 164. The Rickard Patent Oxidizing Furnace; Auriferous Gravels in Placer County, 65.

ILLUSTRATIONS.—Dillenburg's Improved Coupling; Gauge for Measuring Water, 161. Map Showing Auriferous Gravels of Placer County, 165.

CORRESPONDENCE.—Northern Arizona Mines; The Denver Manufacturing Co., 162.

MECHANICAL PROGRESS.—Bridge Walls and Boiler Explosions; Cast Iron Outlets; Tempering Steel with Low Heats; Wire-bulk vs. Ordinary Cannon; To Temper Steel on One Edge; Lead-headed Nails; The Metal of the Future; Steel Railroad Sleepers; Hard or Soft Steel for Rails; A New Building Material; Cement for Resisting Steam, 163.

SCIENTIFIC PROGRESS.—Immortality of Modern Thought; Variable Stars; Toughened Glass in the Laboratory; Is the Sun Blue; Cement for Resisting Sulphuric Acid, 163.

ENGINEERING NOTES.—Bridges; The Baltic Ship Canal; An Elevated Railway for Montreal; Telegraph Lines; Cable Roads for New York, 167.

USEFUL INFORMATION.—Durability of White Lead; Two Towers; A New Use for Asbestos; Rectifying Rancid Oil; Durability of Paper Water Pipes; Calling for Industrial Schools; The Gulf Stream; Another Premium; Finding the Length of Axes; The Stereoscope Not New, 167.

GOOD HEALTH.—Sunstroke or Thermic Fever; The Sexes; The Art of Rising Early; Office-Seeking a Disease; Appetite; Machine Shop Dust in the Lungs, 167.

MISCELLANEOUS.—Discoveries in Calaveras County, 162. Mechanics' Institute Fair; Management of Mines at Butte, 166.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 168-69.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 172.

Business Announcements.

Plug Closet—Joseph Biddle, S. F.
Artificial Limbs—Menzo Spring, S. F.
See Advertising Columns.

Passing Events.

The season is now so far advanced that placer work and what little hydraulic mining has been going on has been stopped. The reason has been a poor one, as the water has seldom been lower in most of the streams of the State.

* The lead market seems to be in a state of fluctuation, but the tendency is upward, after a long period of depression. Those who hold good sized lots of lead are much encouraged, and the owners of mines, which have been run without profit for a long time, now look for ward to a season of prosperity again.

The Pine Creek mines, in Oregon, are attracting considerable attention just now, and many miners are now going there. Some of the prospects found are panning out well, but the signs are that the camp is already overcrowded.

THE MECHANICS' FAIR.—The fair is an established success and is very largely attended. The machinery exhibit is attracting more attention than usual. The Pacific Rolling Mills among other home establishments, is arranging a very complete display. Although not complete in all details there is very little more to do to make this probably the fullest exhibit of Pacific Coast industries we have ever had.

A PROPOSAL to apply workmen's insurance risks to accidents at sea, will be submitted to the next German Reichstag.

Our Ship Building Interests.

The ship building interests of this coast are more extensive than most persons imagine. Although the coast line of California and Oregon is pierced by few harbors, comparatively, those few do an extensive trade. Of course the great bulk of the foreign trade is done at San Francisco, which is the center of population and of commerce of the coast. In fact, San Francisco stands third on the list of sea ports of the Union, with regard to magnitude of tonnage entered from foreign countries.

It is but natural, therefore, that there should be a great deal of shipping owned here, and this shows a gradual increase year by year, an evidence that our vessel owners have found the business profitable. The following table exhibits the growth of the navigation in interests of the coast, showing, as it does, the tonnage of vessels belonging to California, Oregon and Washington Territory during each year from 1869 to 1884 inclusive.

Year.	California. Tons.	Oregon. Tons.	Wash'ton. Tons.	Total. Tons.
1869.....	148,776	10,972	24,827	184,575
1870.....	156,788	10,712	29,525	197,025
1871.....	133,301	9,201	24,553	167,055
1872.....	141,314	14,635	24,082	180,031
1873.....	147,866	19,828	28,279	195,973
1874.....	166,434	20,496	34,342	221,272
1875.....	181,287	23,479	34,200	238,966
1876.....	204,535	25,815	22,000	252,350
1877.....	200,076	32,373	28,927	261,376
1878.....	183,280	37,079	31,001	251,360
1879.....	200,319	38,492	29,954	268,765
1880.....	202,114	39,658	29,030	270,802
1881.....	202,907	43,501	33,018	284,426
1882.....	211,126	52,569	37,072	300,767
1883.....	230,168	52,965	43,782	326,915
1884.....	233,440	50,798	49,950	334,188

Within the past few years our whaling and fishing fleet at San Francisco has largely increased. Steam whalers have been built and equipped, and sailing vessels have been bought here for the same business. The codfishery also employs many vessels.

As far as the building of vessels is concerned, the Pacific Coast makes a rather satisfactory showing, though this industry has been for a time depressed. The following table shows the progress of ship building on this coast, as it gives the tonnage of vessels built in California, Oregon and Washington during each year ending June 30th from 1869 to 1884 inclusive.

Year.	California. Tons.	Oregon. Tons.	Wash'ton. Tons.	Total. Tons.
1869.....	11,549	1,782	2,043	15,379
1870.....	10,316	988	1,369	12,664
1871.....	2,450	2,705	169	5,324
1872.....	853	959	464	2,276
1873.....	2,987	1,648	800	5,435
1874.....	7,081	1,430	2,343	10,859
1875.....	6,748	4,498	3,184	14,430
1876.....	8,557	5,926	5,509	19,992
1877.....	4,785	4,941	2,993	12,719
1878.....	5,824	4,865	637	11,326
1879.....	3,860	6,356	966	11,182
1880.....	5,795	2,466	682	8,943
1881.....	4,556	4,331	2,531	11,418
1882.....	6,998	4,836	3,987	15,771
1883.....	9,047	3,740	3,951	16,738
1884.....	4,992	1,290	2,230	8,512
Total.....	95,396	52,761	30,609	178,766

The merchant marine of this State during the fiscal year 1884 consisted of 875 vessels, the aggregate tonnage of which amounted to 233,440 tons. There were engaged in domestic commerce 683 vessels, amounting to 116,074 tons, and in foreign commerce 192 vessels, aggregating 117,366 tons. There were 39 vessels built in this State during the fiscal year, the tonnage of which amounted to 6301 gross tons. These were all wooden vessels. This year one steel steamer was launched—our first effort in this direction. The total tonnage of vessels entered at sea ports of California from foreign countries during the fiscal year 1884 amounted to 934,430 tons; the tonnage entered at San Francisco was 95 per cent of this, the other five per cent being at other ports.

Talc.

We have received from near Colfax, Placer county, some specimens supposed to be a fine talc, and the owners of the deposit considered it a valuable find. The specimens were submitted to Mr. Henry G. Hanks, the State Mineralogist, for analysis. He pronounces the substance a foliated serpentine, allied to picroilite. It has no special value, a fact which will doubtless disappoint the locators of the deposit.

Talc is not rare in this State, having been found in various parts of it. The following localities are represented in the State Museum: Soapstone, Placer Co.; talc, seven miles from Mount Hamilton, Santa Clara Co.; talc in quartz, Yosemite gold mine, Mariposa Co.; Yuba Co.; eight feet thick, Tholmne Co.; 14 miles below San Pedro, Los Angeles Co., on the coast; Wall Rock, Maryland mine, Grass Valley, Nevada Co.; Fresno Co.; soapstone,

two miles northeast of Jackson, Amador Co.; soapstone, Stockbridge Soapstone Works, near Colfax, Placer Co.; Taylorville, Marin Co.; Soapstone mountain, Kern Co.; soapstone, Tule river, Tulare Co., cut in the form of bricks and suitable for fine bricks, Lewis, Mariposa Co.; talc, much resembling French chalk, Pine, Flat Sonoma Co.; talc foliated with chalc-pyrite, San Diego Co., near Murphy's, Calaveras Co.; Rock Island Hill, Plumas Co., and Lone Pine, Inyo Co.

Talc is also called steatite, soapstone and French chalk. The State Mineralogist describes it as a soft mineral, generally foliated, except where it occurs in rocky masses as soapstone, when it is granular or crypto-crystalline. When pure it is of a green-white or yellowish color, with a greasy or soapy feeling. It is practically infusible and is not decomposed by acids. It is usually found associated with serpentine chlorite and talcose schists, and forms an important constituent in some rocks. Talc is a hydrous silicate of magnesia and iron, sometimes containing alumina and other bases. Talc schist is an aggregation of scaly talc, with frequently quartz, feldspar, magnetite, mica and other minerals. The massive variety of talc (soapstone) is used as a fire-resisting material, in place of brick for lining stoves and furnaces. It is easily sawed into the forms required, and answers the purpose when the greatest extremes of heat are not used. The fine-grained talc is used for marking on cloth by tailors, and for dusting into tight shoes and gloves. It is used to some extent as an anti-friction material, and in the manufacture of paper.

Steatite is used to some extent for boiler felt and for fire-proof paint. It can be employed for a variety of purposes, such as soap-making, dressing leather, gloves, etc. In the Eastern States about 30,000 tons a year are mined, worth about \$12 per ton. Some \$20,000 worth of the mineral is also imported into this country annually from Italy, Austria and France. The principal producing center in this country is Pennsylvania.

Copper.

The low price of copper does not, of course, affect only our home mines, but all those abroad as well. The effect of the depreciation on the value of copper is very apparent in the balance sheets of two of the largest foreign producers, recently issued—the Cape Copper Company and the Quebrada Copper Company. The net profit of the Cape Copper Company for the year 1884 shows a diminution, as compared with that of 1883, of £76,246, and with that of 1882 of £108,100, being £60,688 on 19,400 tons of 29½ per cent ore, or 5674 tons fine copper produced. The average price realized in 1884 was 9s. 3d.; in 1883, 11s. 11d., and in 1882, 13s. 2d. per unit, the value now being 8s. 3d. The cost of production in 1884 was 7s. 1½d. per unit, against 8s. 0½d. in 1883.

The accounts of the Quebrada Company show a loss of £30,953 on last year's working, or £7 15s. per ton of copper produced, viz., 4000 tons. The directors of both of these companies have decided to curtail their production.

There has lately been a notable falling off in the production of copper both in Arizona and Montana. The import into Liverpool of copper from the United States for the month of July has been only 1282 tons fine, against an average of 2787 tons per month for the previous three months, while into France it was 745 tons in July, against an average of 960 tons in the previous quarter.

The result of the low prices paid by English smelters for furnace material, in comparison with the value of Chili bars, is seen in the almost entire cessation of shipments of regulus from Chili, smelters there having found it more profitable to ship their copper produce as bars and ingots rather than in the form of ore and regulus. Furnace material is now becoming scarce, and commands relatively higher prices than were obtainable a short time ago.

The statistics for the half year show an increased English consumption of 5818 tons of copper, but a decreased export of 4539 tons. In the French consumption there is little change. Imports into England and France were 12,432 tons more than in 1881, but stocks increased only 5254 tons. Stocks now on hand in Liverpool and Swansea are 32,240 tons fine copper.

The increase of the copper business of this

country is well shown by the figures of the imports into Liverpool and Swansea for the first seven months of the year. For the first seven months of 1882 we sent there only 301 tons; same period in 1883, 3948 tons; same period in 1884, 7846 tons, and same period this year 14,553 tons. This shows a wonderful increase in export of fine copper. Chili sent to the same places the first seven months this year, 18,452 tons, so we are ahead of all other countries except Chili.

James Lewis & Sons, of Liverpool, compile some very interesting statistics of the copper market for the first six months of the year, which show the following results: Imports into England, 66,088 tons fine; exports from England, 29,752 tons; British production, 1100 tons; English home consumption, 32,425 tons; imports of all kinds into France, 8592 tons; exports of English copper to France, 1674 tons; French consumption of copper imported direct, 8336 tons; French consumption of English copper and of copper imported direct, 11,010 tons; English consumption and French consumption of copper imported direct and from England, 42,448 tons; English consumption, English exports and French consumption of copper imported direct, 70,526 tons.

Foundry Notes.

The Pacific Rolling Mills.

While the Pacific Rolling Mills at the Potrero are not employing as many men as they usually do, there is some considerable work going on, especially in steel-making. They are working on some 400 or 500 tons of steel angles for the new dry dock of the Union Iron Works. They are about to cast a 5000 pound steel cylinder for Gharadelli & Co. Steel cylinders weighing 21,000 pounds have already been cast for the California Oil Works. These cylinders are made for pressing oils from castor beans, cocoanuts, etc., and are made to stand a pressure of 7000 pounds to the square inch. With the iron cylinders made for this purpose considerable trouble from breakage has been experienced, but by making them of steel they are reduced in weight 25 to 30 per cent, and can be worked under any desirable pressure.

The mills are also making very fine steel cams and tappets for quartz mills, gears, pinions, plow-shares, cable railway grips, etc. They find a great demand for all kinds of steel articles, and in fact intend enlarging the steel foundry to accommodate orders. It seems as if everybody wanted steel to the exclusion of iron. The demand is much greater than was expected. The output of the mills is 35 tons of steel a day, of which from one to five tons are in the form of castings. Two castings a day are made. Shoes, dies, etc., are made in the mornings and other work in the afternoon. The molds take about three days to dry, a peculiar preparation being used. The steel works are run entirely by gas furnaces, which are found very efficient, in fact no more furnaces will be built except those in which gas is used. The higher the price of coal the more economical are the gas furnaces.

A lot of rails are being made at the mills for the San Gabriel Valley railroad, near Los Angeles. They have also the contract to build the outer end of the California Street Railroad, on which they have been at work for a few months. The Rolling Mills Company do the whole work under specifications, make the yokes, concrete work, adjust tracks, excavate, pave and all, the railroad company paying a lump sum. A peculiar point in the contract is that the road must be kept running all the time. All this outer end of the road was built in a temporary way, and the new work is to put it in first-class shape, like the other end of the road. Therefore the cable cars have to be kept running while the rebuilding is being done. A mechanical mixer is used for the concrete, which is not shoveled or handled at all, the mixed material falling into the carts which are kept moving to and fro between the mixer and the section on which they are at work.

This is the first roadbed ever built while the cars were running, but the Rolling Mills Company are making a good job of it, notwithstanding the difficulties experienced.

A fine exhibit of products of the mill is being made at the Mechanics' Fair. It is nearly complete, and shows a great variety of articles.

BUTTE, Montana, claims a population of 14,000.

The Rickard Patent Oxidizing Furnace.

This furnace was designed and erected in Maidanpek, Servia, in 1876, with a view of reducing the cost of calcining the low grade (2½ per cent) copper ores (pyritous with about 15 per cent sulphur) of the Servian Copper and Iron Co., the ordinary reverberatory having been found too slow and expensive.

After a successful run of some months, and the difficulties of the operation had been surmounted, the following vote of thanks was passed at a board meeting of the company and forwarded to the inventor.

Maidanpek, Servia, July 10, 1876.

W. T. Rickard, Esq.—DEAR SIR: I am directed by the Board of the Servian Copper and Iron Co. to convey their thanks to you for your skill and energy in bringing into successful operation a process for the reduction of the ores of Maidanpek. I remain, dear sir, yours sincerely,

BRENTON SYMONS, Resident Director.

The grand defects in the old reverberatory consist in the time required to oxidize or burn off the sulphur, the air or oxidizing agent having to pass through the fireplace where it is deprived of the greater part of its oxygen before it can attack the sulphur; and the amount of hard labor required to rake and turn over the charge from time to time, in order to expose fresh surfaces to the oxidizing action of the air.

New, as sulphur requires its own weight of oxygen, and iron 30 per cent, to convert the former into sulphurous acid gas, and the latter into peroxide, it follows that a minimum of 130 per cent of oxygen must be introduced before these results can be obtained; and, as a cubic foot of air contains but one-fourth of an ounce of oxygen, it is obvious that an enormous volume of air must pass through the furnace before perfect calcination can be secured; and as only the excess of air passing through the ignited and oxidizing fuel, as applied in the ordinary reverberatory furnace, is available, the operation is necessarily slow, tedious, expensive and unsatisfactory in the extreme.

This difficulty has been completely overcome in the "Rickard" furnace by supplying it with a strong current of pure, hot air (in addition to that passing through the fireplace) which burns off the sulphur with great rapidity, and at the same time, by means of the force with which it is injected, keeps the charge in motion, presenting continually fresh surfaces for oxidation and thereby dispensing (except in discharging) with the expensive and laborious process of raking, so indispensable in the old reverberatory.

This hot air is supplied without any additional cost for fuel, from a pan or any other good blower, and brought up to the temperature of the furnace by passing it through the fire bridge and flues bordering the hearth till it reaches its discharge outlet in the throat, where it encounters the powdered ore as it is continuously introduced at the rate of 30 lbs per minute, or 1800 lbs per hour (more or less, according to the amount of sulphur to be got rid of) by means of a screw working in an external hopper, the amount of ore introduced being regulated by the speed of the screw.

The oxygen of this heated air, uncontaminated by the products of combustion thus introduced in excess of the requirements of the sulphur and iron, instantly attacks the finely divided sulphuretted ore presented to it, and carries off the sulphur as sulphurous acid gas, the lighter portions of the ore being carried by the force of the blast into the upper hearths of the furnace and from thence to numerous dust

chambers prepared for its reception, the number of which can be regulated by the character of the ore to be operated on. A little water sprinkled into the last one will prevent any less through the chimney. The ore collected in these chambers is the most thoroughly roasted, coming out almost, if not quite free from sulphur, or "sweet," as it is technically termed. Ten to 30 per cent of the ore will find its way into these chambers. Thus one frequent objection, viz., loss of dust, is made a prominently successful feature of this new arrangement.

The heavier portion falls on the bottom hearth, where it is attacked by supplementary blasts of hot air from the side flues and fire bridge, which keeps it in constant motion and prevents agglutination while the sulphur is being carried off.

As the charge is ready for discharging every half hour, there is never more than about half a ton on the hearths at a time, thus affording room enough for a thorough motion of the particles and consequent oxidation. The discharge is effected in the customary manner, by raking through openings from one level to another.

A high degree of heat is thus developed by the rapid combustion of the sulphur and iron

of wood in 24 hours, at \$1 a cord—\$14. Labor, four men, at \$3—\$12, or, in all, \$26, and calcines 10 tons imperfectly (leaving 10 to 15 per cent sulphur behind)—\$2.60 per ton.

The "Rickard" will burn but two and a half cords of wood—\$10. Labor, four men at \$3—\$12, or, \$22 in all, and calcines 20 tons perfectly—\$1.20 per ton, being a direct saving of \$1.40 per ton, in addition to the gain effected in the production of a higher grade of matte or black copper, which may be estimated at 16 per cent and would be saved in freight to market. When it is considered that some of our large copper works are calcining several hundreds tons of ore per day, the saving to be effected by the introduction of this furnace of Mr. Rickard's is obvious, and the present low price of copper should, we imagine, induce all engaged in this business to examine into the economical advantages claimed for it.

The tailings of Grass Valley might also be very advantageously treated by this method. Although patented in 1879 through the agency of the MINING AND SCIENTIFIC PRESS, the furnace has not yet been introduced into this country in consequence of its inventor's other engagements having prevented him giving it his per-

canyon of the North Fork of the American river on the south.

The mining towns of Gold Run and Dutch Flat, and the extensive placer mines in their vicinity, are on this "divide," which is traversed by the railroad. Between the North Fork of the American river and Shirt-tail canyon is the Iowa Hill "divide," and between Shirt-tail canyon and the Middle Fork of the American river is the Forest Hill "divide." These two unite above the sources of Shirt-tail canyon, and together with several smaller and less important divides, joining on the south, where they lie between tributaries of the Middle Fork of the American river, and form one main ridge, which runs far toward the summit of the mountain, and is known as the "Forks House divide."

In the lower foothills the country rock is granite. Shallow auriferous placers have been worked extensively all over this granite section, but are now entirely worked out and abandoned.

There is also one range of deep gravels, in some places capped with lava, commencing at a point about one mile west of Auburn and running thence southwesterly to a point about 12 miles southwest of Rocklin. These deep grav-

els seem to be the detritus of a very large dead river. They have been prospected and have been worked by drifting and hydraulicking at several points to be referred to farther on.

On the summits of the ridges, between the canyons, are found the remains of at least two great trachytic lava flows, varying from a few feet to several hundred in depth. In some places the lava has been entirely eroded off, while others it seems never to have covered.

Lying between the slate and lava, and in some instances between two lava flows are found the gravelly detritus of ancient buried river systems, varying from a few inches to 300, and

even 400 feet in depth. These gravels are more or less auriferous, and have produced the greater portion of the gold yield of the county. The auriferous gravels, both as regards extent and richness, are found concentrated in lines of depression in the underlying country or bed rock, as it is termed by the miners. These depressions are evidently old river channels, which, as a more correct knowledge of them is gained, seem to have been made by streams larger than those at present flowing through these grounds. Occasional quartz lodes are found, but the general character of the mines is placer.

The accompanying map of a portion of this placer mining district from the Mint Directors' report will give a better idea of the relative position of the mining claims and the boundaries and extent of the gravel deposits. The shaded portions show the limits of the lava flow.

The Oakland Express is a new evening paper published at Oakland, Alameda county. Dr. W. W. McKaig and Mr. Allum are the principal conductors of the journal. Its typographical appearance is excellent, and the contents bright and newsy. Dr. McKaig is an experienced editor, and knows what the Oakland people want, so the enterprise can hardly be other than successful.

ARRANGEMENTS are being made to start up the ten stamp mill at Bristol, Nev. During the first month the mill will be run on tailings, of which the company have quite a pile, after which it will work on ore from the Mayflower mine, a few miles distant from the town.

PLACER and hydraulic mining is at an end for this season.



(which is not available by the slow combustion of the old reverberatory), and thereby a very considerable saving of carbonaceous fuel is effected, the operation approximating, in fact, to that of the "Hollway" patent, by which, under certain conditions, the sulphur and iron of the ore or matte are the only fuels used. This beautiful process has, after many failures, been recently brought to a successful issue at "Parrott Copper Works," Butte, Montana, in connection with the Bessemer converter. The large amount of oxygen thrown in by the blower also burns up every atom of carbonaceous fuel used in the fire place. It is claimed that no loss of fuel can possibly take place, the extensive dust chambers utilizing all waste heat before it reaches the chimney. In practice it was found that two and a half cords of wood was sufficient to calcine 20 tons of ore with 15 per cent sulphur nearly to sweetness in 24 hours.

Speed, economy and efficiency having been the objects in view, everything in the way of complicated machinery has been carefully avoided, and old ideas of proved success retained as far as possible, the furnace being, in fact, nothing more than a modified reverberatory with hot blast and dust chambers so arranged as to produce the maximum chemical results with a minimum expenditure of fuel and labor.

The advantages derived from its use may be seen in a comparison of its results with those of the common reverberatory at present in use at some of our largest copper reduction works. The reverberatory burns three and a half cords

sonal attention. He is at present in Anaconda, Montana, and will be glad to communicate with parties desirous of using it.

Auriferous Gravels in Placer County.

The placer mines of this county were among the earliest discovered and worked in this State, and in permanence, richness and gross aggregate of yield in the years since they were first operated they compare well with the mines of any other section of the State.

Placer county is peculiarly well situated for the development of deposits of its precious metals. The old overland emigrant road crosses the summit of the Sierras in the eastern portion of the county, and descending toward the Sacramento valley crosses the higher deposits of deep gravel that form the great drift and hydraulic mines, and then on to the lower foothills, reaching the extensive shallow placers worked by the more primitive mining methods. The main line of the Central Pacific Railroad runs through the county, rendering the greater portion of the mining districts directly accessible. Comparatively short wagon roads from the railroad towns give communication with other mining sections.

The western part of the mining section consists of low rolling hills, intersected by numerous ravines and narrow valleys, lying between Bear river on the north and American river on the south, the highest elevation not exceeding 1500 feet. The northern of these ridges, or "divides," as they are locally termed, lies between Bear river canyon on the north and the

Mechanics' Institute Fair.

Lack of space prevented, in our last issue, the publication of the address of Henry C. Dibble, at the opening exercises of the Mechanics' Institute Fair, but we now give it, as it is well worthy of perusal:

MR. PRESIDENT, LADIES AND GENTLEMEN: The annual Industrial Exhibitions of the Mechanics' Institute of San Francisco are intimately identified with the marvelous growth and phenomenal development of California. A collection of the reports of these exhibitions, running through twenty years, would form ample material for a history of the industrial and mechanical progress of the State for more than half the period of its existence as a commonwealth. It is not surprising, therefore, that the enthusiastic and energetic people of this city and vicinity, as well as many from a distance, should regard this fair with warm sentiments of affection. That they do so is not only evinced by the hearty co-operation of the public press, but also by the generous support given to the Mechanics' Institute, in aid of this beneficent enterprise, by the intelligent industrial classes of San Francisco and surrounding country. This generous support, which is shown by the annually increasing number of visitors, has yielded its golden harvest to the institute and has enabled it to yearly improve the exhibitions by furnishing better facilities to exhibitors by more extended advertisements, by adding to the lists of premiums, by offering new attractions and by numerous other devices which the worthy Board of Managers so clearly understand.

And so, year after year, the mechanical and industrial classes and all the good people of our State who are interested in its material prosperity, have had opened to them an annual exchange, as it were, of its industrial and mechanical resources. Here at this fair, each year, the manufacturers, merchants, inventors, artists, machinists and skilled laborers of all grades have been enabled to meet and take note of the further progress which may have been achieved in the line in which each, respectively, is most interested; and, bringing their own wares and work, they have entered the generous rivalry offered by the premium lists, as to the superiority of their manufactured products or handicraft. What higher commendation could any industrial institution receive than the expressed desire of the manufacturers and mechanics to obtain its certificates of "Best." And, taking a broader view for a moment, what incalculable good to the whole State must result from the better work of the manufacturers and artisans in their efforts to excel each other.

Character of The Opening Exercises.

The opening of the fair, has, according to the custom of the country been made a day of ceremony, and the observance of this custom by the institute has served to enrich its records. The printed annual reports during the years past, contain many interesting, instructive and eloquent discourses delivered on opening days. These discourses, thus printed in the reports of the institute, have been widely distributed and have aided in arousing a further interest in the Expositions. Many of these addresses are filled with valuable facts relating to the industrial progress of the State; with profound and philosophic discussions of great economic questions; with model disquisitions upon the dignity of labor, upon the relation of mechanical industries to the progress of civilization, and upon the sovereignty and dominion of man over nature. Indeed, in looking over the reports of the Exhibitions for only a half-dozen years past, it would seem that the subjects suitable for discussion on this occasion had been elaborately exhausted by the able and eloquent gentlemen who have spoken from this rostrum. A few years ago, for instance, a talented and much beloved citizen who is an honor to the State, and whom the people delight to honor, for they have sent him to Congress, gave a comprehensive review of the growth of the agricultural, mining and manufacturing wealth of the State, and a history of the important mechanical inventions made in California. On a more recent occasion an eminent journalist, whose vivid and graphic style is familiar to every reader on the Pacific Coast, and of whom all Californians are proud, however much they may abuse him, discoursed eloquently upon the important influence which artisan and mechanic classes have had upon the progress of society and civilization. Another, a distinguished divine, exalted the dignity of labor in such eloquent and beautiful terms, that there is nothing left to be said upon that subject. And, again, on an earlier occasion than any yet mentioned, an honored citizen of California, who has been often called to the councils of the nation, and who has served the country in high diplomatic position, in the course of an address devoted to a discussion of the dignity of artisans, as exemplified in several international expositions, laid special stress upon the advantage of these fairs as great schools of object teaching.

Thus it may be seen by a mere reference to the subjects treated by a few only of the speakers, that the speaker of to-day is left without much scope unless he should repeat. In view of these considerations, it seems necessary to devote the brief time allowed to an examination of one or two general laws whose operations are to be observed in the progress and development of social life and industrial prosperity.

A Study of Human Nature.

In one of the addresses mentioned, delivered from this platform, the orator said: "The tendency of modern civilization is to honor the inventive worker and to bestow upon him the praise heretofore reserved for the successful warrior." Without doubt, this is the current belief as expressed by public men of the day, and in modern literature. And yet, the magnificent procession of sorrow which was witnessed in New York a few days ago at the burial of a great soldier; which was repeated across the continent and here at this Golden Gate on a smaller scale, but with no less sincerity or solemnity—the profound and universal sorrow thus expressed by the American people over the death of their greatest general might seem to throw a doubt upon the statement quoted and the belief referred to. Has there been such a change in the world's estimate of greatness? Is it true that as modern civilization has advanced, men have come to hold a victorious soldier in no less esteem than other successful men? Is it a fact that the industrial captains of this iron age have taken the place in the hearts of the people once held by the warrior chieftains who were beloved and honored for glorious victories and patriotic deeds? These inquiries present an interesting study of human nature. Let us pursue it a moment. Human nature is the same to-day as in the past ages; it does not change. Men are exalted and honored and revered to-day, for the same reasons as in all times past. But what is it that causes the people to follow men as their leaders; to exalt them as chieftains; to honor them above their fellows; to revere them as heroes? Is it not because such chosen few have wrought results which have been as have seemed to be of value to their race? What is hero worship but the worship of success? What is the measure of human greatness but the net product of a man's life valued by his fellow men? And the world has always delighted to honor men who have achieved greatness, whether as soldiers, as statesmen, as builders of cities, as teachers of philosophy, as poets, as musicians, as painters, as sculptors and yet no less as artisans. Stephenson and Watt, and Fulton, and Arkwright were esteemed and honored by the world for the same reasons that Fabius Maximus was honored by ancient Rome, that Count Cavour is esteemed by modern Italy, that Washington and Grant are revered by their countrymen. There may seem to be exceptions to this rule: Aristides was driven from Athens. Galileo was persecuted, and the wisest and best of all times have been maligned. Grant, as Bishop Fowler said in his memorial oration, "was the best abused man of his day." But such incidents are temporary aberrations of public opinion. Aristides was recalled and named the "Just;" Galileo was honored and respected by the whole world as a great discoverer, and the character of Grant has become lovingly and indelibly impressed upon the American heart. In the end public opinion rights itself.

Evolution Determines Social and Industrial Progress.

After all is said, the heroes of any age are the products of the laws of development and growth which determine the evolution of society and the progress of civilization. It is but trite to say at this day that no one now disputes or doubts the universality of law. And it is scarcely less disputable to say that this intelligent world has now accepted the doctrine of evolution as pronounced by modern philosophy. All that in the world is, was produced under the operation of God's universal laws of growth, development and progress. This is no less true of society, in its broad and comprehensive sense, than of animal and vegetable life. Nations are the results of the law of evolution. Nations are not formed or created or established, in any proper meaning of those terms; they grow; are the results of growth, as are all other living entities.

Lawyers and philosophers of the past have talked and written about the "Social Compact," assuming the existence of an entirely fictitious and imaginary so-called natural state of society, where men have voluntarily entered into the social relation, agreeing then and there to surrender portions of their natural liberty in consideration of future protection.

This idea runs through much of English, French and American literature of the present and past centuries. It has absolutely no historical justification and is out of all harmony with the doctrine of evolution. In truth, man never existed in any other condition than in the social relation. Not that his earlier state was in that higher condition of development into nations; but the unit of all social and political movement and progress has ever been a social group. The line of social and political advancement and development is from the family and tribe to the nation. In the Divine economy of the world, the nation was designed to be the highest product of Nature's laws. It is God's plan for making greater homes for His children on this earth.

A Special View of Evolution.

There is an aspect of the law of evolution that should be here noted. Progress by evolution is ever from the homogeneous to the heterogeneous—from the simple to the complex. But the operation of this law produces an invariable resultant—that is to say, organic life. This is observable in the animal and vegetable kingdoms, but no less so in the social and political order. Thus nations are formed, and, having achieved organic life, they become self-conscious, organic beings. They develop definite tendencies and manifest specific historical purposes. As growth and progress proceed under the

operation of the law of evolution in all phases of life, there is produced what is termed a differentiation of functions—this thing is set apart to do that thing, that to do another, and so on. In the social and political order this law is manifested by the development of different callings and industrial pursuits in life, and by the segregation and distribution of the powers and duties of government. And it is to be noted that the tendency to the differentiation of functions in the process of development and in the course of progress is only limited by the necessities of the organic life which is the ultimate object and product of evolution, but that at the same time the law of differentiation of functions relates solely to such organic life and to nothing beyond.

The Nation and National Economy.

Under the operation of evolution, development and progress in the social and political order proceed, as we have seen, to the construction of the nation, which is the ultimate design of Nature and of God. In the course of such progress this law of differentiation of functions is ever operative—these men are set apart to do one thing, those to do another. We call it a division of labor. But it is not the design of this grand economy that this differentiation of functions or separation of employment should relate to the welfare of others than those who have been associated as a nation, and who are bound together by the instinct of patriotism and passion of loyalty. In a word, in God's economy for the welfare of the human race, it was designed that each nation should perfect itself and to that end should accumulate wealth for itself. And it was designed that the nation developed and constituted, as we have seen, should become a source and means of protection to its constituent members in their efforts to achieve further material and industrial progress. Up to a certain point, the law of evolution in society may be said to be unconscious in its operations, but with the attainment of organic national life, unconscious evolution gives place to conscious development, so that national protection to the industries of a country should become the defined and determined policy of the nation. And such has been and will be the policy of the American Republic.

The English school of political economy, founded by Adam Smith, which has its representatives in France and America, has claimed and claims the exclusive right to furnish the only safe rules and true methods for the production of wealth, and for the development of material prosperity throughout the world. We are told that it is the A, B, C of social science; that, in the production of wealth, the welfare of mankind demands that the law of differentiation of functions must have full and untrammelled play throughout the earth: these people should manufacture, those raise raw material, others should produce food, and so on. And here, without pausing to argue it, will suffice to say that in this proposition is found the ultimate justification of their theory.

But may it not be possible that in this very proposition lies the fallacy of the argument? May it not be possible that an understanding of the natural limit and true scope of purpose in the Divine economy, of the application of the law of differentiation of functions, already suggested, would furnish a refutation of the economic doctrine which is opposed to national protection?

Justice to Our Industrial Classes.

There are no people in our country so much interested in the maintenance of our American system of national economy as the manufacturing and artisan classes throughout the land. They are the bone and sinew of the nation. Intelligent, progressive, and intensely patriotic, they vie with each other and with their countrymen engaged in other pursuits in efforts to advance the prosperity of the country and the glory of the Republic. They help maintain the schools; they aid in the enforcement of the laws; they contribute taxes and they stand ready to bear arms in the defense of the flag. Why should they not have such protection from the nation as their just interests demand? And reciprocity of interests among the different industrial classes of the country renders it to the advantage of all that such protection should be given to each. The agriculturalist finds a sale for his products, the tradesman his opportunities, in the great manufacturing and industrial centers, which are built up through the effect of national protection.

As we contemplate the future of the Republic what a magnificent vision rises before the imagination. A nation which must soon reach in numbers a hundred millions, inhabiting a land of infinite productive power, extending from ocean to ocean, and from the frozen lakes to the sunny shores of the great gulf. A land of incalculable riches, blessed with unbounded liberty. A people enlightened by education, and inspired by a reverence for that God whose laws produce their happiness. A self-conscious nation with a defined purpose to protect its citizens in every political and civil right and privilege, and to protect the industrial classes, capitalist and laborer alike, whether against the insidious attacks of an antagonistic economic policy from England, or the dangerous encroachments of an Asiatic horde.

Nor shall there be in America less of that beautiful sentiment which, in other lands and in all ages, has led men to look up and cling to the heroic and noble characters who have arisen to lead or command, or instruct, or inspire. Who can say what shall be the ultimate fate of

this mighty Republic? That it will not be overpowered goes without saying. Whether its destiny may be demand an extension of its dominions, who can now know? That that destiny may require that it shall present itself as a barrier to some onslaught upon Christian civilization is possible. But whatever its trials, whatever its future, whatever its destiny, whatever its glory, this we know: That the man for the occasion will be found, as, when the nation's life was in danger, Grant was found.

Management of Mines at Butte.

The mines of this camp, says the Butte (M. T.) Miner, at least the majority of them, are better managed than any other mining properties in America, or even the world. If some of the old-time mining superintendents, the duds, reckless, incompetent class of men whose only experience in mining was that the properties (mis-) managed by them were owned by their rich relations and friends, if these should come to our mining camps and inspect mine workings of the present day, they would be greatly surprised and disgusted at the changes time has wrought. The magnificence of the mining superintendent has departed, and the palatial offices, fat teams and fast companions are no longer to be encountered. A mine superintendent of the present day is something more than a mere disbursing officer, and in a majority of cases is a practical miner. The last "dude" superintendents that we have heard of flourished in Nevada, the wrecked condition of the Alhion, Eureka Tunnel, Wales Consolidated, and many other mines of that unfortunate State, are

Standing Warnings

To mining companies not to place their affairs in the hands of men whose only recommendation is their ability to give a grand dinner or drive a fast team. But this class of men is not found in the average mining camp of to-day. They have been buried and the only regret is that their virtues and accomplishments were not forgotten at a much earlier date. A comfortable room in which to transact business and a comfortable team in which to scour the mountains in the interest of his company, now constitute the outfit of a mine superintendent, and

The Work of One Such

Man is more beneficial to the mining industry than the accumulated labors of his predecessors. Underground developments and the surfacing of ore in quantity is now the rule in all well regulated mining camps. Mine owners depend more upon ore showings and less upon the style of the surface improvements, and mine failures are of less frequent occurrence.

The mining companies of Butte and surrounding country are to be congratulated upon the class of men they have selected to manage their respective properties in this district. In nearly every instance they are practical miners, men who have swung the pick, twisted the drill, ran the pumps, and who know everything required for the proper working of a mine, from blasting out a piece of ground and putting in a set of timbers to hoisting a car or bucket of dirt from the bottom, to assorting a pile of ore after it is placed on the ore dump. A class of

Men of this Stamp

Are a blessing to any camp that is possessed of any real merit, and this camp to-day is greatly benefited because those old-fashioned, hard-working, far-seeing, practical miners have the control of our mining affairs.

NEW QUARTZ MILL.—The Virginia Chronicle says: Stevenson's new concentrating mill near the Morgan mine at Galena, a short distance from Steamboat Springs, was started up last Thursday. When steam was turned on, the machinery moved along smoothly, and it has been running ever since. In constructing the mill, provision was made for ten stamps, five of which are now in operation. The others will be added as soon as it has been demonstrated that the base ore of the district can be concentrated at a profit. The ore is hauled down hill from the mine, which is about half a mile distant, by one horse carts. The crushing capacity by the five stamps is 15 tons every 24 hours. D. H. Bisbee, the building contractor of the mill, has been appointed superintendent. He is a Comstock mechanic and built the mill for the Moss mine at Kinkead, on the line of the Carson and Colorado Railroad, which has been in operation several months and is said to be a fine specimen of the millwright's art. A good bullion-producing camp is likely to spring up at Galena very soon, if the present experiment proves successful, which is now considered as almost certain.

For the present everything is at a standstill at Candelaria. At hotels and restaurants most of the help is discharged, and several of the latter are closed entirely. Merchants have discharged part of their help, and are closing up accounts. Mine managers have given notice to miners that they can have till the first of next month to decide whether or not they will go to work for three dollars a day; if the miners refuse this proposition, all supplies in store at the mines will be shipped away or sold, and the mines will remain idle for an indefinite time. Many men have already left the town, and more are leaving daily.

ENGINEERING NOTES.

BRIDGES.—Probably the largest bridge ever built (without mentioning trestleworks) was the Tay bridge, 10,320 feet in length; probably the largest bridge now in use is the Montreal bridge over the St. Lawrence, 8791 feet; probably the longest bridge that will be built in a century from now is the Forth bridge, to be 9200 feet long; probably the highest bridge in the world is at Gerabit, France, crossing the river at the height of 413 feet; probably the most wonderful bridge in the world is the Brooklyn bridge, the permanent weight being 14,680 tons; probably the bridge of saddest reflections is the Bridge of Sighs; probably the bridge most celebrated in song and story is the London bridge; undoubtedly the first bridge in the world is the bridge of the nose; in which list may now be added the bridge built recently by the Erie Railway near Passaic City as the quickest built bridge in the world. A rival road had made preparations to build a bridge at the point selected by the Erie to cross the canal for its branch to Passaic, and everybody but the Erie people were astounded one morning a few weeks ago to see a fine truss bridge at the coveted place, where late the previous night there was no bridge at all. The bridge had been quietly built in Jersey City and taken in cars to the place all ready to be put up. The curiosities of bridge making would fill a large book, and who will say that the crank with a scheme for bridging the Atlantic is not a wise man born a century before his time.—*The Stockholder.*

THE BALTIC SHIP CANAL.—News comes from Berlin that the long contemplated ship canal from the Baltic, through Holstein, to the North sea, is at last likely to be made. The cost of the undertaking is estimated at nearly \$40,000,000, of which one-third is to be borne by Prussia, the remainder being distributed over the other parts of the German Empire. The Government are now engaged upon the details of a measure for the furtherance of the whole project, which is spoken of as a work of peace proper to be undertaken in a time of peace. There is already a shoal water canal between the two seas opened just a century since, with only nine feet of depth. The new ship canal will traverse a distance of 60 miles and afford a passage for the largest ships. Such a canal as the one now proposed has long been considered a great commercial necessity, as it was estimated thirty years ago that fully 30,000 vessels passed through the sound annually from sea to sea. Of course, this new commercial highway will work much damage to Denmark, which has heretofore profited largely from this traffic.

AN ELEVATED RAILWAY FOR MONTREAL.—A company has been formed in Montreal for the purpose of building an elevated railway in that city. Not only is the railway to go through the principal streets of the city, but it is also intended to run it around the mountain and to the surrounding villages. The promoters of the above have a task before them of no ordinary magnitude. It will likely be some years before it will be an accomplished fact, owing to the difficulties in the way of such an enterprise. Among the difficulties may be mentioned the disgraceful narrowness of the business and other streets, a fact which to strangers seems wonderful in such a large and wealthy city. Montreal possesses many magnificent buildings, the effect of which is almost entirely lost by this cause. If this and other difficulties are overcome, as no doubt they will through time, the railway, when constructed, will be a great boon to the city, and a remarkable contrast to the single track system, existing at present, of the City Passenger Railway.

TELEGRAPH LINES.—The United States has more than three times as many miles of telegraph line, double the number of telegraph offices, and forwards twice as many telegrams annually as any other country on the globe. Russia comes next. France, Germany, Austria and Australia rank ahead of Great Britain in miles of line, having 45,878, 45,070, 31,121 and 27,831 miles respectively, though Great Britain, with 31,345,861 telegrams forwarded, sends a few more than one-half the number sent last year in the United States.

CABLE ROADS FOR NEW YORK.—A large organization has been effected to build about seventy miles of cable roads in New York City—the first six miles of which has just been completed and put in operation. It is said that 100,000 tons of steel and iron would be required, and that it would take two years to complete the lines. The capital of the Cable Company is \$42,000,000, and will, it is said, be all expended in the work of construction.

THE RAILROAD SYSTEM OF JAPAN has attained a length of 225 miles and is increasing steadily. It has been mainly built by the Japanese Government with native capital. The business results up to the present time have given no cause for dissatisfaction.

PORTABLE RAILWAYS ON STEAMERS.—A novel use has been found in England for portable railways, and they are now laid upon the decks of steamers while in port, to aid in moving coals and cargo.

USEFUL INFORMATION.

Durability of White Lead.

Why is it that white lead does not wear as well as it used to? is a question that is frequently asked by painters and consumers. They also add: We used to be able to obtain an article that would wear for years, while now its durability is much less. The important reason for this is found in the difference between the methods of manufacture employed now and a few years ago. Formerly, white lead was corroded by immersing it in vinegar acidulated with acetic acid, which is only concentrated vinegar. The process required about eight weeks before the carbonate was ready for use. This process, however, was found too costly, and the production was too limited to supply the demands. Then, too, a process requiring so long a time would compel corrodors to invest a large capital from which they could realize no return for a long period. They could not afford to produce lead in this manner at a cost sufficiently low to meet the demand for a low priced article. Accordingly their ingenuity was taxed to invent some method whereby the carbonate could be produced much quicker and at a much less price. Thus they adopted the present process whereby the lead is now corroded by means of a stronger acid in a month, or even in a few days. The result is that the pure article is much less durable when applied to buildings. Speed in the manufacture of some articles, it is true, does not sacrifice quality, while in others the greater celerity in manufacture the less durable the products. Not only is this seen in the production of lead, but another branch of manufacture where it is especially noticeable is that of leather. Formerly it required 15 months to thoroughly tan a hide. Now the process has been shortened and a month and a half at the longest witnesses the completion of the work. As in the case of white lead, the result is lack of durability, and people constantly complain that leather soon cracks out and lacks its original durability.—*The Painter.*

TWO TOWERS.—"The Center of Civilization"—Paris—is to have two gigantic towers. One, the first projected, will be used as a sort of place of resort, where, for a small sum, an elevated view can be obtained of the great city and its surroundings. The other will be more especially devoted to scientific purposes. For this latter M. J. Bourdais has presented to the French Society of Civil Engineers a project for the erection of a masonry tower 984 feet in height. After an examination of the different geometric profiles realizable, M. Bourdais has adopted the column as being more apt than any other form to satisfy the rules of aesthetics, and as also being the most stable. In fact, the highest chimney in the world—that of St. Rollox, near Glasgow, 433 feet in height—has been submitted to numerous storms without suffering from them, and as other chimneys exposed to great wind pressure have never given rise to any accident, it would seem that a cylindrical form is the one that should be adopted. M. Bourdais' structure would consist of a base 216 feet high, in which is to be established a permanent museum of electricity. Above this would rise a six-storied column, surmounted by a roof, forming a promenade and capable of accommodating 2000 persons. The central granite core, 60 feet in diameter, would be surrounded with an ornamental framework of iron faced with copper. This would be divided into six stories, each containing sixteen rooms, 16 feet in height and 50 feet square, designed for aerotherapeutic treatment.

A NEW USE FOR ASBESTOS.—In the processes connected with dyeing and printing of cotton cloth it is frequently necessary to hang the fabric in loops from parallel rods for the purpose of exposure to steam, air or ammonia. In order that the cloth should hold upon the rods without slipping or being strained, it is necessary to wind rope of strips or cloth around the rods, but this only mitigates the difficulty without accomplishing its removal, for the heat and corrosive action of the vapors rot any covering in a few weeks, and the first notice of any deterioration is generally the appearance of small pieces of roll covering among the cloth in process of finishing. Recently asbestos rope and asbestos cloth has been used for this purpose, and proves to be very durable. Larger ropes of this refractory material have been used for the transmission of power over places exposed to heat.

RECTIFYING RANCID OIL.—Oil which has become rancid, or which contains impurities, can be rectified, according to Viallis, by being filtered through charcoal which has been soaked with a soda solution. For large quantities casks can be used for this purpose whose bottoms have been perforated. The bottom of the cask is covered with flannel, and over this a layer of impregnated charcoal, 20 centimeters thick, is placed, to which another layer of animal charcoal may be added if the oil has to be rendered colorless. The oil becomes pure after passing through two or three such casks.

DURABILITY OF PAPER WATER PIPES.—Water pipes made of paper have stood the test of practical application remarkably well. Dr. D. Lewis says that some years ago he laid 1000 feet of paper pipe, two inches in diameter, to convey water from a spring to his house and

harn in the country. It has never leaked, and has never imparted any perceptible taste to the water. This pipe is made of strong paper wound into pipe form, and thoroughly soaked with tar. It becomes so hard and strong that it will bear a pressure almost equal to iron.

CALLING FOR INDUSTRIAL SCHOOLS.—The Southerners are calling for the organization of industrial schools. With all their fine forests they say they are making out of their wood nothing but logs and boards. They ship lumber north and buy much of it back in the shape of staves, handles and shuttle and bobbin blocks. They sell walnut logs for \$50 and buy them back in boards for \$200. The same is largely true of iron and many other materials.

THE GULF STREAM.—From recent observations, Captain Pillsbury finds that the strength of current of the Gulf Stream is invariably on the Florida, instead of the Bahama side of the stream. He has found the temperature of the stream to range from 42 degrees to 81 degrees. The greatest velocity of the stream at the surface is about 4½ knots, but the fluctuations are frequent and great.

SOFT SOAP. with half its weight of pearlash, one ounce of mixture in about one gallon of boiling water. This is in every-day use in most engineers' shops in the drip-cans used for turning long articles bright in wrought-iron and steel. The work, though constantly moist, does not rust, and bright nuts are immersed in it for days till wanted and retain their polish.

ANOTHER PREMIUM.—The National Planters' Association proposes to raise, through voluntary donations from the planting, manufacturing and commercial interests, \$200,000, to be offered two years hence in various premiums for the development and improvements of farms and of the implements and machinery used in their cultivation.

A SOLUTION OF INDIA RUBBER in benzine has been used for years as a coating for steel, iron and lead, and has been found a simple means of keeping them from oxidizing. It can be easily applied with a brush, and is easily rubbed off. It should be made about the consistency of cream.

FINDING THE LENGTH OF AXLES.—Measure from the back end of the hub to the face of the spoke, then double the length and subtract it from the width of the track. If dodging spokes, measure half the dodge. This gives the length between the shoulders.

THE STEREOSCOPE NOT NEW.—The principle of the stereoscope was known to Euclid, described by Galen, 1500 years ago, and more fully in 1599 A. D., in the works of Baptist Porta.

GOLD INK, as it is called, is made of gold leaf crumbled into gum arabic water. When dry it will take a fine polish by gentle friction, a fact not generally known.

GOOD HEALTH.

Sunstroke or Thermic Fever.

No error can be fraught with more dangerous consequences than that of failing to discriminate between heat exhaustion and true sunstroke. The former is comparatively a mild affection, which does not differ in symptoms from any other form of acute exhaustion. It is characterized by dilated pupils, a cold, pale and perspiring skin, a quick but feeble pulse, with great general prostration, and a tendency to syncope. Recovery ensues within twenty-four hours under rest and the administration of stimulants.

True sunstroke, or *coup de soleil*, is a far more terrible affection. It is characterized by contracted pupils, a hot, dry and flushed skin, rapid and forcible pulse, throbbing carotids, labored or stertorous breathing, with profound coma, or delirium and convulsions ending in coma. In the fulminant cases that have been observed, the unfortunate persons have dropped dead as if struck a mortal blow by an unseen hand. Contrary to the popular opinion, it is not necessary that the patient should have been exposed to the direct rays of the sun. For, as was noticed by many distinguished observers, and practically demonstrated by Dr. H. C. Wood, Jr., in his experiments on animals, excessive heat, and heat alone, is the essential factor in this disease. Many of the worst cases have occurred at night, in houses, in tents, and in narrow defiles, where the sun never entered, but where the atmosphere was hot and stifling. It is, therefore, a true fever, and, as suggested by Dr. Wood, should be designated thermic fever, as expressive of its exciting cause.

The treatment, which must be instituted promptly, can be summed up in three words—reduce the temperature. It is the extraordinary high temperature which is burning up the patient, and which, unless speedily reduced, will cause death by paralysis of the heart. He should, therefore, be at once removed to a shady place in the fresh air, his head slightly elevated, and his whole body, especially his head and chest, kept deluged with ice water. An ice cap, in addition, should be applied to the back of the head, until his temperature and pulse have fallen. Aconite internally will also probably be found beneficial in controlling

the circulation. Morphia, hypodermatically, has been found to be of great value in cases characterized by restlessness and convulsions. If the attack has come on shortly after a meal, there can be no doubt of the propriety of at once unloading the stomach by an emetic. If the patient is insensible, apomorphia, gr. one-tenth, may be given hypodermatically. The Australian physicians produce emesis in these cases by the rectal injection of twenty grains of ipecac. They have always noticed an abatement of the symptoms as soon as vomiting began.—*Medical Bulletin.*

The Sexes.

The Hebrew women are the longest lived and the colored men the shortest. It appears from the gathered statistics of the world that women have a greater tenacity of life than men. Nature worships the female in all its varieties. Among insects the male perishes at a relatively earlier period. In plants the seminate blossoms die earliest, and are produced in the weaker limbs. Female quadrupeds have more endurance than males. In the human race, despite the intellectual and physical strength of the men, the woman endures longest, and will bear pain to which the strong man succumbs. Zymotic diseases are more fatal to males, and more male children die than female. Deverga asserts that the proportion dying suddenly is about 100 women to 700 men; 1680 men in the United States, in 1870, committed suicide to 285 women. Intemperance, apoplexy, gout, hydrocephalus, affections of the heart or liver, scrofula, paralysis, are far more fatal to males than females. Pulmonary consumption, on the other hand, is more deadly to the latter. Females in cities are more prone to consumption than in the country. All old countries not disturbed by emigration have a majority of females in the population. In royal families the statistics show more daughters than sons. The Hebrew woman is exceptionally long lived; the colored man exceptionally short lived. The married state is favorable to prolongation of life among women. Dr. Hough remarks that there are from two to six per cent more males born than females, yet there are more than six per cent of females in the living populations, from which statistics we conclude that all women who can possibly obtain one of those rapidly departing men ought to marry, and that, as men are likely to become very scarce, they cannot be sufficiently prized by the other sex.

THE ART OF RISING EARLY.—The proper time to rise, says the *Lancet*, is when sleep ends. Dozing should not be allowed. True sleep is the aggregate of sleeps, or is a state consisting in the sleeping or rest of all the several parts of the organism. Sometimes one and at other times another part of the body, as a whole, may be the least fatigued, and so the first to awake, or the most exhausted, and therefore the most difficult to arouse. The secret of good sleep is, the physiological conditions of rest being established, so to work and weary the several parts of the organism as to give them a proportionately equal need of rest at the same moment; and to wake early and feel ready to rise, a fair and equal start of the sleepers should be secured; and the wise self manager should not allow a drowsy feeling of the unconsciousness or weary senses, or an exhausted muscular system, to beguile him into the folly of going to sleep again when once he has been aroused. After a few days of self-discipline, the man who resolves not to doze, that is, not to allow some sleepy part of his body to keep him in bed after his brain has once awakened, will find himself, without knowing why, an early riser.—*Popular Science Monthly.*

OFFICE-SEEKING A DISEASE.—President Cleveland recently called office-seeking a disease, and he thus explained to a friend why he made use of that expression: I go to bed after a long day with a feeling that I must be the meanest man in the world, for I seem to say only no where I would be only glad to say yes. But this office-seeking is a disease—I'm entirely satisfied of that. It is even catching. Men get it and they lose the proper balance of their minds. I see them here as undoubtedly crazy as though they were in a lunatic asylum. I can't account for it, but it is clearly a disease. I've known men come here to Washington on other business, with no thought of office; but when they had been here a couple of weeks they caught it. They seem suddenly to get a mania, and such men have come in here for a place when I knew that before they left home they hadn't thought about office.

APPETITE.—The *Lancet* says that appetite is a most misleading sensation, only remotely related to the actual demands of the organism. If we only ate deliberately we should find half our accustomed quantity of food sufficient to satisfy the most eager cravings of hunger, and hence save ourselves from the evils of dyspepsia, or on the other hand, a tendency to over-increase in weight.

MACHINE SHOP DUST IN THE LUNGS.—At a late meeting of the microscopical society in London was shown a section of a Sheffield saw grinder's lung, the irritation from the steel dust inhaled having gradually obliterated the lung structure and rendered it perfectly useless for breathing. Sections of lungs showing carbon deposits from London smoke were also exhibited.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

FROM SUTTER CREEK.—At the Lincoln operations are being prosecuted on a small scale, owing to the water supply being short. Only five stamps of the mill can be kept going, and but little prospect of an increased supply of water until the rainy season sets in. The Iowa mill will commence crushing in a few days. There is a large quantity of ore on the dump, which is estimated to be of the average high grade.

THE NEW YORK MINE.—Amador *Dispatch*, Aug. 29: Work at this mine has been progressing rather slowly for some time past owing to various circumstances, but Mr. W. G. Anderson, the superintendent, informs us that they will commence sinking again in a few days on a more lively scale. He also says that arrangements have been made for putting up a ten-stamp mill, and that work on the same will be commenced in about two or three weeks. A ledge of sufficient magnitude has already been developed to warrant the company in going to the expense of putting up the mill, and they have decided to do so without unnecessary delay. The mines situated along the gulch between Jackson and Middle Bar seem to be keeping up their lick in the way of producing good rock, and rich strikes now appear to be the rule and not the exception.

MATSON.—Amador *Ledger*, Aug. 29: This mine is located at Butte City and is owned by D. D. Matson, J. W. Brown and P. Fleming. On Thursday of last week a strike of unprecedentedly rich rock was made at a depth of only 25 feet from the surface. A specimen was left on exhibition at Ginochio's store, Jackson. It is the finest sample of gold ore we have ever seen. It is literally covered with free gold, and the disposition of these outcroppings leaves no room to doubt that the seams of gold run, in most instances, clear through the specimen. Altogether the piece of rock does not weigh over five or six pounds, but it is estimated to contain over \$100 in gold. The ore carries no sulphurets. The size of the vein from which this sample was taken we have not heard, but we are informed that a considerable sum has already been extracted.

EL DORADO.—Work on this claim, which joins the Median, near Amador City, on the north, is being prosecuted as energetically as the capital of the owners will permit. At the depth of 290 feet one drift has been run 80 feet, another 35 and 10 feet of crosscutting. A ledge four feet wide has been found on the hanging wall with excellent gouge matter. Free gold is frequently met with in the ore and its general character is good. They are now crosscutting toward the foot-wall, where they expect to meet with important developments.

MISCELLANEOUS.—Work on the Spanish mine near Enterprise was abandoned on the 12th of August. W. H. Martin & Co., of San Francisco, have expended over \$40,000 during the past 18 months in prospecting the ground, without meeting with any encouraging indications. There is no prospect of work being resumed under the present ownership. Operations were temporarily suspended on the Median, near Amador City, two weeks ago, pending final arrangements regarding the purchase of the property by the bondholders. When these matters are fixed, as they no doubt will be in a short time, the mine will be started again and the erection of a mill commenced at once. At the Loyal Lead mine, near the Gover, in crosscutting east, a fine body of quartz has been discovered. They have penetrated the ledge four feet, but its exact width is as yet unknown. The ledge throughout shows free gold to the naked eye. At the South Spring Hill the work of building to additional stamps to the mill will be commenced next Monday. A large proportion of the lumber is on the ground. R. B. Reed has moved the five-stamp mill from his claim near Pine Grove, on to the St. Louis mine near by, and expects to start crushing in a short time. The Lambing gravel mine near Lone is again in full blast. Sixty men are employed and work is prosecuted day and night.

Calaveras.

WEST POINT.—Calaveras *Chronicle*: The Cook Bros. are shipping this week to Selby & Co. a lot of 10 tons of the richest tellurium sulphuret ore that ever went out of Calaveras county. Dr. Wright, it is reported, has struck a fine prospect about two miles east of the Cook Bros.' Bonanza. The Virginia mine, a northern extension of the Gilman Bonanza, is opening up splendidly, we hear. Clark & Co. are putting up first class hoisting works on their Anderson Flat mine, which is in the Fred Greve district. Experts are sampling the Reed & Hillary, Lone Star, Texas and Riverside mines, near West Point, with the intention to purchase if satisfactory and they can make terms with the owners. The Russell Reduction Company at West Point have contracted for the cutting of 3000 cords of wood to carry them through the approaching winter. This looks like business.

El Dorado.

SLATE MOUNTAIN.—Georgetown *Gazette*, Aug. 28: Twenty men are now at work on the Slate Mountain mine. The ore continues rich, and the five stamps kept continually engaged pounding out handsome dividends for the lucky owners. The Josephine mine and ten-stamp mill is booming right along with a large force of men. The Idaho mine has finally been placed in good working order, and 13 men are now at work. Sinking on the ledge is going on, and some very rich ore is being brought to the surface. It is plain to judge that the next clean up of the five-stamp mill will be a good one. The new management of this mine is evidently going at it right.

Inyo.

REPORTED STRIKE.—Inyo *Register*, Aug. 27: Mr. Frank White, just arrived from Madera, brings with him a specimen of silver ore from a late discovery, near Mt. Gibbs, at the head of Bloody canyon. The ore looks as rich as any we have seen for many a day, and, we are assured, assays something over \$500 per ton. The ledge is over 19 feet in width, and in five different places has been opened to a

depth of 20 feet in each. One of these in particular is said to show a body of splendid ore. The owners, whose names we did not learn, are wonderfully pleased with their prospect. There are three 1,500-foot locations of the ledge.

SHIPMENTS.—The last of 80 tons of Cerro Gordo ore, belonging to Tom Boland, also five tons of bullion from Fitzgerald's Modock furnaces, were shipped to the Selby works this week. Teams are landing ore almost daily at Keeler from Cerro Gordo and Lee district.

HAS IT IN SIGHT.—*Independent*, Aug. 29: One of the old timers at Kearsage mine has a good thing in sight; the lucky man is Mr. Robert Burnham. Last Monday a carload of ore was shipped from near Soda Springs to be worked at Belleville. The mine is called the Lucky Baldwin, and is a few miles east of the C. & C. railroad a short distance north of the station named. The ledge is two feet wide and at least one-half of the ore goes \$200 a ton; the rest of the ore goes over a hundred dollars. The mine is well opened up, and there is plenty of ore in sight to warrant the building of a 10-stamp mill. This the owners propose to do soon.

SAN CARLOS.—Many years ago a mining location was made in the Inyo range opposite Camp Independence and named San Carlos. A little prospecting was done and several small veins found, but no large ore body; then the claim was abandoned. Lately S. A. Densmore relocated the claim and worked it. A number of the small veins were traced till they ran together and now make a well defined ledge two and one-half feet wide. The ore contains 56 ounces of silver per ton and 39½ per cent lead. The mine is near the C. & C. railroad; a tramway from the mine to the road would cost but little. A shipment of two carloads of the ore will be made in a few days to test its quality.

Plumas.

CHEROKEE MINE.—Greenview *Bulletin*: We are informed by a mining man that there is a good prospect for the Cherokee mine being started up soon. The property has been idle during the past two years, much to the detriment of the owners and the community. It was operated for years, and we learn that over half a million dollars was taken out. It is considered a good property, and it is too bad that a mine capable of yielding the returns which have been obtained from it should be permitted to remain idle. Mining men inform us that there is a large vein of good ore, such as is capable of returning a handsome profit. It is to be hoped that the owners will not permit it to longer remain idle. It is situated in a good mining locality. Near it is the Green Mountain mine from which good pay ore is now being milled at the rate of 95 tons per day. At the Indian Valley, another mine near by, the shaft being sunk is in very rich quartz.

TAYLOR-PLUMAS.—Yesterday we were shown a letter from the secretary of the Taylor-Plumas Mining Co., which stated that arrangements were being perfected by which operations in that mine would be resumed.

Placer.

FOREST HILL DIVIDE.—Correspondent *Placer Herald*, Aug. 29: Having had another interview with our friend and mining expert, Mr. J. H. Ritchie, in relation to various mines, I think it would be interesting to your readers to give a synopsis of his visits and opinions, as he is an experienced miner, and has been superintendent of various prominent mines west of the Rockies. He has been on a tour of inspection over the Divide mines and speaks of that region very highly, says it is the best mining district ever discovered, and being, as it were, nearly obliterated from the mining record, and miraculously turning up in its immense magnitude in richness and space, that the mind can scarcely conceive its importance. One party says he saw panned out in one pan in the Mayflower 32 ounces of gold; but this is not all—as the Queen of Sheba said of the greatness of Solomon, "half of it was not told." He first visited the Spring Garden mine, and speaks highly of it. He did visit all, but next came to the Mayflower, superintended by Mr. Chapellet, who kindly gave him information as to the richness and facilities for working. The facilities are not in ratio with its immense richness, but they have it surveyed to run a tunnel into the works so as to run the gravel out on cars, instead of as they are now doing, hoisting to the surface and pumping water. Thus the tunnel will insure an increase of the product of gold 50 per cent. The working force is 120 men. The Washington mine is situated about a mile from Forest Hill. They are sinking a shaft and working in a scientific manner with splendid machinery—the superintendent showing experience and workmanship. The Baker mine is superintended by Mr. Dodge. Their tunnel is in 300 feet and they calculate to put on more machinery soon. Did not visit the Breece & Wheeler mine, but was told it prospects from \$1.00 to \$2.50 to the pan. It is situated at Bath. All seem to work with confidence of success. The Hidden Treasure mine, at Sunny South, was next visited. The superintendent, Mr. Win. Cameron, is running it with 80 men. This is one of the most practically worked mines, with the finest kind of apparatus, showing great facilities and good management. It is a first class mine. And the great bonanza, known as the Derby mine, is certain to be one of the most valuable on the Ridge. J. M. Bardwell and others are the lucky owners. They have it entered in the Land office for patent. It contains 140 acres in Sections 26 and 35 in Township 15. The rock was very hard to tunnel and has cost the company about \$30,000, the tunnel is in now 1800 feet, and is in to the pay gravel, which looks very favorable for being one of the greatest mines out. They are making calculations to commence on a large scale, so you may hear of them building a vault to keep the dust safe. Mr. Bardwell was speaking of the form of these channels with bars, coves, etc., in those ancient river beds being similar to the present rivers on surface to all appearance. A few miles further up is what is known as the Dam claim. It is worked on an economical scale by the owners, who are nine in the company. They are in about 500 feet, drifting out in a large breast and piling back the cement and rubbish, filling up behind as they go ahead. And the beauty of it they need no timbering, which, you are aware, is a great saving in expense—it is equal to free water in hydraulicking. I have not seen half the tunnels that they are to work on, but I will say that the "Divide" is certain to be the richest, and with such an immense area, the largest mining district ever discovered in California.

MAYFLOWER.—Placer *Argus*, Aug. 27: Forest Hill is livelier than it was at the time of our last visit six or seven months ago. This improvement is due, doubtless, to the "strike" in the Mayflower, made last May, and heretofore noted in these columns. Business is rather better than in most other towns in this county or in the State. The merchants are doing a better business than is usual at this time of year, and altogether a better feeling prevails. Of course, we visited the one great center of attraction at "the Hill," and that is the Mayflower mine. We were surprised to find so much of a settlement there—quite a town in fact, and a busy town too. In addition to the many substantial structures already existing there, we noticed a fine large two-story building going up. It is to be used as a lodging house for the workmen. Work in the mine is being pushed forward energetically by Mr. Chapellet, the superintendent, nearly 100 men being employed there at present. The superintendent and his foreman, Jake Kelton, were so kind as to pilot us through the labyrinthine works of the mine under ground. We saw enough to require columns to describe it, if we were writing for people who did not know better than we do what mines and mining are. Suffice it to say, the works are among the finest and most extensive of any on the coast. The top of the hoisting works is 106 feet above the surface. The mill has had its capacity increased from ten to twenty stamps, and the appliances for ventilating the mine, for conveying the steam from the main engine above to a donkey engine below, for draining the tunnels, etc., are all of the most practical and satisfactory kind. We were shown some of the richest kind of gravel on the bedrock of the channel of the ancient river, 350 feet beneath the surface. But we have not the space nor the time for an exhaustive and accurate description, even were it in our power to give it. We have it from the best authority that the mine is "paying big," though we did not take time to obtain figures. With all that has been done there during the past seven or eight years, never yet has a man lost his life. Thanks are due to Mr. Chapellet for the thorough system and code of signals, regulations, etc., which obtain.

Shasta.

LEASED.—Shasta *Co. Democrat*, Aug. 26: S. H. White, of Lower Springs, has leased his mines to Merithew & Pushaw. Those gentlemen purpose to have a Huntington mill turning out the yellow metal within thirty days. Since Whitton & Small started up their horse arastra on the Squaw creek claim about a week ago they have been grinding out between \$50 and \$60 a day. They crush about 1500 pounds in 12 hours. N. J. Pehrson, O. Anderson and a Mr. Berg are sinking on a splendid prospect lately discovered on Rock creek, about one mile east of Shasta. It is a three-foot vein; much of the rock shows free gold and prospects way up. Mr. Clark informs us that Monday he struck the richest kind of ore in the Harrison mine, now his property. Decomposed rock is perfectly yellow with gold, and the sulphurets are worth several dollars to the pound. Such a prospect is rarely seen in the State. Jake Hudson and a German immigrant have struck an encouraging gold and silver prospect across the river near the Sinaloa mine and about 600 yards south of the Buckeye and Waugh ferry road. The German thought first he would cultivate the land, but sad experience has made him a miner. Lem Williams says the new smelting furnaces at Copper City will be running by the 10th of next month. It is reported that a large San Francisco company is negotiating for the Northern Light and Extra mines, which, if consummated, will make that burg boom as it did in its palmy days.

THE MAMMOTH MINE.—Redding *Independent*, Aug. 28: Located in close proximity to Redding is one of the finest mineral deposits that we have ever had the pleasure of feasting our eyes on. It is situated just about a quarter of a mile west of town, near the old Shasta road, and on what is known as the Breslauer grant. The parties owning and at present pushing developments on this rich claim are Messrs. B. F. Slater and George Bassett, two energetic and well-known citizens of this place. Through the courtesy of the former gentleman, a representative of the *Independent* had the pleasure of visiting the mine last Tuesday afternoon. We were surprised beyond a doubt at the size of the ledge and also at the richness of the ore. The ledge is encased between two solid walls, and is twenty-five feet in width, which runs north and south. They have dug a trench across the ledge east and west to the depth of thirty feet, which exposes the ledge matter so that even a farmer's heart would gladden if he got sight of it. The ore assays from \$20 to \$500 a ton. They have in the neighborhood of a hundred tons on the dumps, and most of it is similar to the Shearer & Rattler ore. At present they employ seven men and are working steadily day and night, and as soon as machinery can be obtained and placed in position to treat the ore there will be over a hundred men employed.

A GOOD DISTRICT.—Republican *Free Press*, Aug. 23: The Old Diggings mining district is gradually making for itself a name as a reliable and permanent one. There are many well developed mines there of gold quartz and rich sulphurets. The quartz is similar to that taken out on the French Gulch and Deadwood districts, and as easily worked, and so far as known, of equal depth. There are several locations which we could mention that have paid well by arastra and small mills. One ten-stamp mill—Reid & Co.—is in operation, and Reuben Clark, of Colusa will soon have another in operation. O'Neil, Flemming, Ebersole, Luce and others we might name, are and have been for some time past making a good living. A little capital is all that is necessary to give the Old Diggings a boom.

Sierra.

PHOENIX QUARTZ MINE.—Tribune, Aug. 29: The Burleigh drill together with the pipes, engine and boiler, formerly used at the Savage placer mine, have been purchased by the parties who are to operate the Phoenix mine and they will be placed in position there at once in order to commence work on the tunnel. The proposed tunnel will be run so as to tap the vein 500 feet below the bottom of the shaft, which shaft is down 300 feet. The length of the tunnel will be 500 feet and it is calculated that five months will be required to run it. It is mainly through the efforts of Mr. A. C. Busch that parties have been prevailed upon to take hold of this property. If the ledge proves to be as good when struck in the tunnel as it is in the bottom of the 300-foot shaft, which there is no doubt it will from all

indications, the Phoenix will then be one of the biggest mines in the State. The outlook for Sierra City is getting brighter every day.

A NEW ENTERPRISE.—Antoine Demartine gave a *Tribune* reporter the following particulars concerning the Cleveland mine, of which claim he is one-half owner: Eight stamps of the Hitchcock mill, at the Sierra Buttes mine, have been purchased and will be erected at the Cleveland mine and run by water power. Ten or twelve men will be put at work at once to build a road to the mine, the distance of which is about one mile. It is expected to have the mill built and running in a month and a half. A force of men was put to work Tuesday on a tunnel which will give 250 feet depth on the ledge.

MILL STARTED UP.—The 10-stamp mill at the Young American mine was started up last Saturday and our informant states that it runs like clockwork. We expect to be able soon to chronicle some handsome bullion yields from this mine.

THE MARGUERITE MINE.—Supt. Myers, of the Marguerite mine, came up from below a few days ago. He can not state anything definite as to when operations will be resumed at the mine. We are sorry to say that the company is in litigation at the present. It is unfortunate that the mine should be closed down, even temporarily, just at a time when it was gotten in shape for working successfully and with such splendid promises of paying well.

STRINGERS.—Two men comparative strangers in that place, are reported to have struck a fine looking quartz ledge not far from Sierra City. Theodore Smith has taken out about \$2,000 to date, from the "pocket" he struck in the Osceola ledge, at Alleghany. Good gravel has been encountered in Lowell's claim at Alleghany.

POKER FLAT.—Correspondent *Mt. Messenger*, Aug. 29: Belmont Consolidated Company mill is not running on account of scarcity of water. The upper tunnel is in about 70 feet, and connects with the middle tunnel by a shaft about 80 feet in length. The quartz thus far has averaged about \$30 per ton. The Forbes quartz pulverizer will be started again as soon as water comes. The average width of the ledge, between the two walls, is about thirty feet, including three stringers of quartz, 3000 long with 600 feet, usual width of location. Sierra Phoenix Co. have a ten-stamp Huntington quartz mill, running night and day, with eight men at work. Silver plates are used. The ledge has been traced for 6000 feet in length, and is exceedingly wide. The lower main tunnel is in 100 feet and delivers ore to the mill chute from above, 75 feet, connecting there on a line with the ledge. Prospecting tunnels have been put in at various places for 3000 feet, with satisfactory results. There is available 150 feet pressure of water—all that of Canyon creek—to run the mill and drain the mine so that the ledge can be worked to a great depth. A new ledge is being prospected that shows up much gold at Deadwood.

David Ross is building a house there. Ross, O'Donnell and Mr. Wood are running a bedrock tunnel in their drift mine, and expect to reach pay gravel this fall. Work has been temporarily stopped on the Grand Prize on account of need supplies. Rock in main tunnel still has to be blasted but is growing softer. A McIntyre and M. McFarland, owners in the Ballarat, will soon resume extending their main tunnel, and pay gravel is expected three hundred feet ahead. Bonanza Extension Co., will extend their main tunnel, in fifty feet, toward the pay channel in the Grand Prize this winter. Three hundred feet is expected to tap gravel and 700 feet good pay. Sunnyside Co. have their tunnel in near 500 feet, with face in prettiest kind of soft grey and light blue slate rock, similar to that in the North America. An upraise is being made for the channel. Bunker Hill Co., whose ground is mostly in Sierra, near Pilot Peak, obtained a prospect of 20 cents to the pan the other day. Soft slate rock in main tunnel.

PORT WINE.—Mountain *Messenger*, 29: Quite a number of men are working at the Queen drift mine. Good pay will soon be reached. The other mines hereabout have done very well this season. The public school has been closed for two weeks. Ninety-six and a half ounces of gold was cleaned up for last week's run at the Sutherland quartz ledge, owned by the Sierra Phoenix M. Co., Poker Flat.

Tuolumne.

TIOGA MINES.—Correspondent *Tuolumne Independent*, Aug. 29: Tuolumne county bids fair, by the present outlook, to be once more the scene of another mining excitement. This time it is silver; and there is no end to it—native and horn silver—in an unbounded quantity. The first grand strike was that of K. A. Sawyer, on the "Consolidated" and "Deer Lodge." He has got a twelve foot ledge all full of "black metal," and streaks through it of the "simon pure." There are four shafts on the two claims, all full of "black metal." The shafts are from 15 to 20 feet in depth. A gentleman who was here this week, says that it will assay at least five or six thousand dollars to the ton; and, in the language of Col. Sellers, "there's millions in it." These claims are situated on Mt. Gibbs, near the center, on the western slope, and are in the Tioga district, Tuolumne county, and about four miles from Bennettville, almost due south. Everybody is excited, and claims are being located all around. There is quite a number of prospectors here, doing assessment work, and all feel elated. This "rich strike" will benefit Sonora to some extent, as it will be the starting point for the new El Dorado, and before two months the camp will be booming. It will be a second Virginia City, only on a larger scale, as the ledges can be traced from Mt. Conness, about seven miles north of here, to about four miles south—the whole distance being about eleven or twelve miles. I have seen the ore from Sawyer's claims, and although not an expert in silver ore, can truly say that he has got a "big bonanza."

NUGGET.—We saw a fine nugget of gold, weighing about \$18, which John Coffee found in his claim, near Kennebec Hill. Gus Wickelind, got a piece at Pine Log last week. This was worth, in gold, about \$30. Both of the pieces contained quartz.

Trinity.

NEW RIVER.—Cor. Yreka *Union*, Aug. 29: We have passed the season of quietness consequent upon the rush to New River last winter and spring, and for the last three weeks a constant dropping in and commencement of work by men of some means insures us a steady development of the mines of this district from this time out. In the past the prosperity of this camp has been gauged by the number of

stores, hotels and saloons that have been supported. From this on it will depend upon the output of gold from the mines now prepared and in a fair way of being ready when the water season commences. The San Francisco Company (three men employed) are running 30 tons of good rock through an arrastra as a prospect, to warrant or discourage the erection of a mill to work the good-looking ore from their ledge located near the Mountain Boomer mine. The Mountain Boomer mine is being opened and ore taken out to run in their first-class arrastra, which ground out \$11,000 last fall. Four men are employed in this mine. The Tough Nut mine, two to four men employed, are getting out ore to keep their two arrastras running. The Hard Luck mine employs six to eight men, taking ore from an incline 180 feet deep, where the ledge is three feet wide. This mine has a first-class water-wheel and arrastra and has ground out over \$30,000 since February 1st. Next to the Hard Luck mine is the Ridgeway, employing from two to five men. Their new water-wheel and arrastra is ready to run upon a dump of at least 50 tons of ore, and over 200 tons are in the stopes ready to be taken out when wanted. Mr. Healy, of the St. Elmo mine, has two to four men employed in running a tunnel and constructing a first-class water-wheel with which to run two arrastras. The Sherwood mine, employing four men, has been leased by parties paying a royalty of \$2 per ton of ore ground. This ore is to be crushed in the five-stamp belonging to the Uncle Sam mine. The Grover Cleveland mine, employs five men, has one arrastra ready to run upon a light increase of water. Two hundred tons of good ore are in sight, three and a half tons of which yielded \$225 of gold. The above may be classed as mines of permanence and value, having a good amount of rock that will work from \$30 per ton and upward, and as soon as water comes each mine will have its own means of reducing the rock. There are at least five more ledges being prospected and developed with a showing equal to most of these named.

DEADWOOD.—Cor. *Trinity Journal*, Aug. 29: All of the mines in operation are doing well. Wm. Blagrove has out about 20 tons of ore which will go at the best—\$100 per ton. Lamb & Co. have a very good prospect shaft down to the depth of 45 feet shows up a vein of nice paying ore. Jud. and Walter Van Matre have closed down on their mine for a time in consequence of starting up their reduction works which will only continue for a few weeks and then work will again be resumed. The Vermont mine purchased a short time ago by Minear & Co. are doing lively work. We live in hope to see a bonanza opened in that section of Deadwood. McDaniel on the Enterprise location has a very nice pile of ore upon the dump, and a very nice healthy vein of rock at the end of a 100-foot tunnel. Mr. P. Varnum has struck the west extension of the Black Bear, and judging from the appearance of his dump pile and the size of the vein we have every reason to believe his find to be a bonanza. Samuel Hulbert of Eastman gulch passed through Deadwood the other day. Sam reports his vein on Shooter gulch as looking better than ever and if such be the case it is not necessary to go beyond the boundary line of Trinity to see the richest specimens in the State. C. Blakemore has out about 124 tons of splendid ore and plenty more in sight.

NEVADA.

Washoe District.

CON, CALIFORNIA AND VIRGINIA.—*Enterprise*, Aug. 29: On the 1750 level about 125 tons of ore are being extracted, on company account, of the average assay value of \$22 per ton. From the Jones lease section above the 1550 level, about 60 tons per day are being extracted, and assaying about \$15 per ton. The northwest drift on the 1050 level was extended 37 feet during the week, and is now running in good working ground, having passed through the broken material of the old workings. During the past week the air has been bad in some of the ore breasts of the 1200 level, proceeding from foul gas coming, it is thought from some of the old burned out workings below. Better ventilation, however, has obviated this difficulty during the last day or two. Rumors have been prevalent the last few days that a largely increased force of men was to be put to work in the Jones lease section of the mine, but this will not be the case for a few weeks, or until better milling facilities are given than exist at present. The Jones lease terminates a year from next November.

HALE AND NORCROSS.—Work is concentrated upon the opening of the station in the deep winze for the 3100 level. It is being made 15x10 in the clear, and the first set of timbers is in place, and the second set soon will be. Some good ore is met with in chambering out the station, giving assurance that when the drift is fairly started on its southeast course to connect with the drift now advancing to meet it from the Combination shaft, it will pass through the good ore vein thought to lie in that direction, east of the winze. The ore in the bottom of the winze itself, however, indicates the possibility that the main ore body may really lie to the west of the winze. This will be easily demonstrated, however, when the 3100 level is fully opened and connected with the shaft by running a crosscut west which can then be done without fear of tapping more water than can be handled. During the coming week good progress will be made with the northeast drift toward the shaft.

CROWN POINT.—The thorough overhauling of the machinery continues, and will be completed before the first of September, when it is rumored that work will be resumed in the mine and also in the Belcher to some extent, in case the milling facilities on the Carson river will allow. The Mexican and Santiago mills are being put into a first class state of repair for active work as soon as an increase of water in the river will permit. The Eureka mill, also under the Jones management, is to be thoroughly overhauled and put in repair by sections, as there is water enough to keep one-third of its stamps running on ore from the Consolidated California and Virginia mine.

UNION CONSOLIDATED.—The main north lateral drift is being steadily pushed ahead at the rate of 55 feet per week, and has reached within 100 feet of the Sierra Nevada south line, running in vein porphyry and quartz. The formation and ore indications are favorable for this drift running into an ore body before long. The quartz met with is of a very favorable character, and increases in quantity and quality with

further advancement. It was rumored yesterday on the street that a valuable strike of rich ore had been made at that point, but "there's nothing in it."

YELLOW JACKET.—The daily yield is now a little over 200 tons from the 1200 level and the levels above up to the 400. Good ventilation and air circulation is given through the old shaft and incline and the imperial incline. The Brunswick mill is working finely and doing better work even than was expected when it started up with the auxiliary steam power arrangement.

ALTA.—The station chamber for the west drift on the 700 level is now completed, and advancement toward the ore body developed by the upraise from the 900 level is inaugurated. The distance is about 500 feet. The ground is favorable for a good rate of advancement.

BEST AND BELCHER.—On the 1000 level west crosscut No. 2, recently started, 200 feet from the Consolidated Virginia south line, is now in 96 feet, 44 feet having been made during the past week. The face of the drift is in vein porphyry, with streaks and bunches of quartz.

OPHIR.—The upraise from the 500 level being completed to its connection with the old Mexican shaft, that shaft is now being cleaned out and put in a thorough state of repair, from top to bottom, for ventilation and prospecting purposes.

ANDER.—The work in this mine is confined to drifting west on the 175 and 375 levels. On the 175 the drift is in 40 feet, principally in vein porphyry, and that on the 375 is in 500 feet, and running in quartz of a very favorable nature.

SIERRA NEVADA.—The west crosscut on the 520 level has been advanced 60 feet during the past week, making a total length of 580 feet. It continues in dry, hard porphyry, with no favorable changes to report.

JUSTICE.—About twenty tons per day are being extracted from the southern portion of this mine, on the 450 level, through the Woodville shaft, and reduced at the old Thompson mill above in the canyon.

GOULD AND CURRY.—Crosscut No. 1 west on the 1000 level has been advanced 48 feet during the week, giving it a total length of 249 feet. Face in vein porphyry, clay and quartz seams.

MEXICAN.—The middle crosscut, recently started east on the 500 level, is now in about 60 feet in wet, heavy ground, with clay and quartz in the face of the drift.

KENTUCK.—The regular extraction of low grade ore from the upper levels continues, which is hauled by teams to the Rock Point mill on Carson river for reduction.

Aurora District.

THE SITUATION.—Carson *Free Lance*, Aug. 24: In contrast with the palmy days of Aurora, when she contained eight or ten thousand inhabitants, at the present time all told, the town does not contain more than seventy-five persons. The courthouse is locked and barred, and is fast becoming ancient ruins. Large brick buildings two stories high are fastened as tight as if hermetically sealed, by heavy iron doors closed by day and night waiting for Aurora, the goddess of morning with her rosy fingers, to shed redolent light into those mining regions. Just now the eastern horizon seems to be growing brighter, and the watch-word already is being passed from lip to lip that the morning dawneth. The \$10,000,000 which has been taken from the mines is not forgotten. The report has gone across the water and reached London. An English company there is now considering the proposition made by Messrs. H. M. Yerrington, H. G. Blasdel and George Coulter, and it is expected will give their final answer by the fifteenth of September next. Just at what price it is not known, but the owners have all combined and have offered to sell to this company the Del Monte, a combination of ten claims, the Junieta, Humboldt, New Esmeralda and other mines. The latest news is to the effect that the company will accept the proposition, and that a large number of men will soon be put to work. Of the so-called outside claims, the Antelope, owned by Judge Sewell, of Nevada, and Judge McKinstry, of California is said to be looking well. Messrs. Simult and Donahue are now taking out some very rich ore from the Bright Star. The Grand Truck mine owned by Justice Field, Colonel A. C. Ellis, Mr. Neidy and others, has just been leased to Carson parties, and a force of men will at once be put to work. A rich streak of gold ore two feet wide in the ledge was struck which contains free gold and which assays about \$100 per ton. The last ore from this mine milled \$43, and there is now about 40 tons of ore of the same quality on the dump. This mine has cost the company in making development, a great many thousands of dollars, and is still a great pet with Justice Field and Colonel Ellis.

Como District.

ORE FROM COMO.—Virginia *Enterprise*, Aug. 28: The hauling of forty tons of ore from the North Rapidan mine, near Como, to Dayton for reduction was commenced yesterday. It is said to be fine looking ore, giving excellent assays, and is expected to pay well. If it does, good works will be put upon the mine immediately, with a view to practical development of the mine and the regular extraction and milling of the ore. The mine is owned by Dr. Hazlett and Senator Westerfield, of Dayton, and other men of means and energy.

Reese River District.

THE MANHATTAN MINES.—*Enterprise*, Aug. 29: The following report of Superintendent Curtis, of the Manhattan mines, Austin, gives an idea of the style of mining, number of men employed, etc.: At the Paxton incline the 870 drift has been cleaned out and a chute is being raised to connect with the Isabella cross-cut, and when completed the waste and ore will be removed through the Paxton incline. On the 1440 and 1500 levels tributaries are extracting considerable ore. No work is being done at present below the 1850 level. At the Lander shaft the 700 west drift is being continued, the formation being split up into several stringers. A cross-cut is being run into the west wall to prospect the ground south of the ledge on the 740 level. The cross-cut run into the hanging wall cut a good six-inch ledge of average ore, and drifts since run show considerable ore. A winze will be started to prospect the ground. Most of the tributaries on the 700, 740 and 800 levels are doing well. At the Union shaft the ledge cut in the south cross-cut has been drifted on about 60 feet each way; the ledge in the east drift has carried good

ore most of the distance; on the west side the ledge carries ore in bunches. During the past week the following men have been employed: Surface men on days pay, 38; miners on days' pay, 16; miners on contract, 38; miners on lease, 59; miners on tribute, 121; total 241.

THE MANHATTAN DIVIDEND.—Relative to the dividend of 25 cents per share declared by the Manhattan Mining Company, Reese River district, the San Francisco *Bulletin* says: It is the first declared by that company since February, 1877. The mine paid eight dividends up to that time, aggregating \$400,000. There have been three assessments, the last in August, 1879, the total being \$150,000. The mine is in Lander county, Nev., and has been a regular and large producer of silver bullion, but owing to expensive working and heavy discount on silver, there has been nothing to divide up among stockholders in the last eight years. It is so long since there was a dividend from this mine, that the one just declared will be a real surprise to many. The dividend will inspire hopes from some other claims that have appeared to be unprofitable in the past decade.

Taylor District.

QUIET.—Cor. *Eureka Sentinel*, Aug. 29: Our town is rather quiet at present. Yet there are over 100 men at work in the two principal mines here. The future of Taylor never looked as well as at present. Large chambers of ore are to be seen in both the Argus and Monitor ground, from which good sized quantities are being daily extracted and shipped to the mills in the valley. Rumor has it that the Monitor is about to change hands.

ARIZONA.

HUMBURG.—Prescott *Courier*, Aug. 29: T. W. Cochran, the superintendent of the West Humburg quartz mill belonging to the St. Louis Yavapai Mining Co., is now in Phoenix, his mill being shut down at present for want of water. We learn from the *Herald* that the company have let a contract for sinking 100 feet on the Gold Hill. Mr. Cochran has recently devised a plan by which base ore may profitably be handled for \$15 per ton, and on the strength of this the company is now purchasing such ores at 80 per cent of the total value per ton.

QUJOTOA.—A special to the *Times* of the 24th of Aug., states that the first car of ore from Mount Ben Nevis came down to the mill yesterday morning at 9 o'clock over the company's tramway. Everything is working nicely. Nick Warlamont is in charge of the brakes at the top of the hill. Mr. W. S. Lyle, president, has been here for several days. Mr. Arentz and Mr. Boss, will be here by Wednesday to witness the maiden milling of the Peerless Mining Co. Superintendent Smith is rushing everything through at a lively rate. Heavy rains and cool weather for the past two days.

PINAL.—Two miles of ledge from 80 to 100 feet wide and carrying ore of exceptionally high average is being developed by Judge Reymert. The Tucson *Star* devotes two columns to the description of this property, describing it as a second Comstock. The ledge is a contact vein between slate and syenite and pays from \$8 to \$400 per ton, two of the claims very much exceeding this. The owner has expended over \$50,000 in developments and has refused an offer of \$150,000 from the Bonanza company. The Specie Paying company's mill is now running on the ores from these mines and works it up to 90 per cent of assay. The *Star* pays a high compliment to Judge Reymert for his energy in paying all the heavy expense of developing this handsome property out of his professional earnings as a lawyer. The Tombstone M. & C. Co., paid \$23,500 for the Way Up and Gilded Age mines. Another smelter will be put up on the San Pedro by Judge Reymert.

SALERO.—The Salero camp near Tucson has only recently come into importance as a bullion producer. The *Citizen* states that the Waddell mill and mine are employing 37 men and 50 chloriders get their ore worked there. Large quantities of horn silver are found. One thousand gallons of water a day are supplied from a twenty-five foot well.

COLORADO.

WORK.—Georgetown *Courier*, Aug. 29: But little work is being done on the Dunderberg mine at present, although the results of the operations are good. The mine is in great need of machinery. The Ute creek mines are shipping between 35 and 40 tons of ore per month. Work has been resumed on the Great West mine, near Dumont. The lessees on the Mint vein are reported to be taking out good ore, and making good pay. Several tons of ore are at the mine awaiting shipment. Davis & Co. are making regular and large shipments from their Ute creek property. The average value of the mineral is over \$400 per ton. The last shipment of ore from the Mary Foster returned for first class, nearly \$1000 per ton. Colonel Baldwin informs us that there is an immense amount of development and improvement work being done in the Terrible mine and that the work of extracting the ore has not been fairly commenced. Several lessees, however, have large streaks of mineral exposed, and are making big pay. There is undoubtedly a large amount of ore coming out of the mines, every available burro and every ore wagon in this section are busy conveying mineral to the several ore markets in Georgetown. Shipments of ore are being steadily made from the Cashier mine at Empire. The mineral is improving as development progresses. Several feet of smelting and concentrating ore are exposed. There is a wide field for the prospector in Argentine, Cascade, and several other districts in the county. The mining properties thus far discovered and now in operation in these districts are producing well. The country, however, has not been thoroughly explored. The Empire City ledge is said to show a ten-inch vein of nearly solid copper pyrites, and some of the ore shows free gold. It is being worked by Wm. Moore. A party of men are working a prospect on Lincoln mountain, which is said to carry horn silver and silver glance. Over 9000 pounds of ore from the Queen of the West mine was marketed this week. Roberts & Co., lessees on the Centennial mine, opened up another fine vein of solid yellow copper ore in the breast of the second level from the 100-foot shaft last Friday. The streak varies from 2 to 18 inches, and gives promise of opening out to the width of several feet, as was the case in the first level. Two men are engaged driving the second level ahead. Henry Bates is

stopping above the first level on about a foot of mineral, accompanied by several feet of concentrating ore. The Centennial is constantly improving. Its production is steady and the value of the ore is increasing. Work is going steadily forward in the Moline tunnel, and large quantities of galena is being extracted. The upward tendency of the lead market is causing renewed activity on the lead producing veins. Fourteen tons of ore from the Two Sisters lode, near the Joe Reynolds, were shipped to Georgetown this week. The returns showed from 80 to 250 o.s. silver per ton. We understand that the owners of the Mary Foster have notified their lessees to cease work. The lessees have been making big money. The owners probably intend to take the ore out themselves and reap all the riches. A couple of lessees on the Invincible lode, at Ute creek, shipped over two tons of ore last week that milled upward of \$200. This was the result of only twelve days' work. A great many building improvements, such as cabins, ore and shaft houses are being made at the mines in Cascade district.

NEW MEXICO.

GENERAL NOTES.—Silver City *Enterprise*, Aug. 29: Thomas and Noel, who are leasing on Gilmo's claim, on the hill just west of town, are taking out some very fine chloride ore. The new roaster and rolls recently added to the Flagler works are now working successfully. Sixty tons of concentrates are treated daily. The Peacock mill in the Mogollons will start up to-day, and in a very short time some forty or fifty teams will be engaged in hauling the concentrates from the mill to this place. It is probable that the concentrates will be treated at the Flagler works in this city. The Copper King, in Apache district, is making a remarkably good showing. A shipment of thirteen tons of ore from this property recently made averaged 107 ounces, and it is claimed that all of the ore taken out will average 100 ounces. An average in the bottom of the main shaft returned 250 ounces. The Solid Silver mining company recently purchased a pump from the Santa Rita company, which will be used in the lower workings of the mine. A larger pump will be purchased in the East for the surface. The Black Hawk mine is looking exceedingly well. Word reached this city on Tuesday, that the Cooney mine in the Mogollons, had been closed down. There is an abundance of ore in sight and as the mine for two years past has been paying handsome dividends to its owners, the cessation of work is but temporary. It is learned from a gentleman recently from Carlisle that the company's mill and mine at that place will resume operations some time next month. If the new process now being experimented with should prove a failure twenty more stamps will be added to the mill, and the ore will be concentrated as it was in the past.

GEORGETOWN MINES.—The official figures of the output for the Georgetown district for the present year make an extraordinary good showing thus far, and will do much towards making Grant county's record for this year eclipse that of any previous one by many thousand dollars, notwithstanding the fact that many of the best properties in the county have for various reasons run on short time or closed down for shorter or longer periods. The mines of the Mimbres company have produced from the 25th of January of the present year to date, \$124,616 in bullion, and shipped to the smelter about \$6000 worth of concentrates. To do this they have handled in the neighborhood of 5000 tons of ore, a greater portion of which was broken by leasers for the privilege of which they pay the company one-fourth royalty. The company's mill, under the management of T. B. Pheby, treats the ores extracted by the leasers at about the same price charged by custom smelters throughout the Rocky mountains. The McGregor mine has made a record \$37,774 from January 1st to June 30th, and gives promise of doubling these figures the ensuing six months.

OREGON.

PINE VALLEY.—Cor. *Oregon Sentinel*, Aug. 29: The Pine creek excitement over the new discoveries made this summer, are undoubtedly the best known on this coast. For a permanent camp, it prospects to be one of the best ever discovered yet. Its quartz is of such even nature, and the gold so plainly to be seen with the naked eye that it has astonished the most experienced miner and capitalist. Of what is known as the "Forest Queen mine" which is now bonded for \$40,000 to an Eastern company, a seamless sack of rock and ore was taken out on the 7th, and four men were required to put the sack in a wagon. It was said by many who saw it, that it was almost the pure gold, as chunks were seen as large as a man's hand that were gold only. There is considerable excitement at present in camp over the jumping of claims, and the Princeville law is likely to take effect soon if not stopped. The notice 101 is plainly to be seen tacked in and around camp, with 100 chances to swing to a limb where there is only one chance to get away. There is a daily stage running in to the mines from Baker City and the travel is terrible, an eight passenger coach is loaded daily.

UTAH.

REVIEW.—Salt Lake *Tribune*, Aug. 29: The shipments of bullion and ore out from this city for the week ending Saturday, Aug. 22d inclusive, were 2,216,153 lbs. The receipts of bullion and ore in this city for the week ending Aug. 25th, inclusive, were: Bullion, \$88,510.32; ore, \$8900, a total of \$97,410.32. The week previous the receipts were \$101,342.98, of which \$85,201.99 was bullion and \$16,140.99 was ore. The Ontario shipped for the week forty-six bars of bullion, of the value of \$29,993.77. Total output for the year to date, \$1,002,749.11. The regular monthly dividend of fifty cents a share has been declared, payable in New York on the 31st, the eighth of the year, of \$75,000 each, or \$600,000 altogether. The output of the Stormont during the week was four bars of silver, \$5825. The Hanauer smelter turned out during the week ten cars of bullion, \$23,700. The Germania shipped one bar of fine silver, \$1,377.30, and several cars of bullion, \$72,956.25, a total of \$24,343.55 for the week. Miscellaneous receipts were one silver bar, \$775; Utah gold dust and bars, \$1500; one car copper bullion, \$2900. The Alice, on the 26th, declared its sixteenth dividend of 6 1/2 cents per share,

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

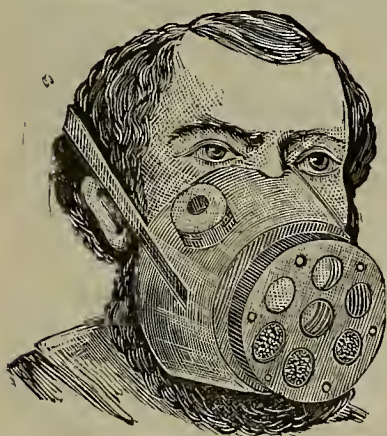
J. A. Fay & Co.'s Woodworking Machinery.
 Frank & Co.'s Woodworking Machinery.
 New Haven M'fg Co.'s Machinists' Tools.
 Bement & Son's Machinists' Tools.
 Bickford's Power Drills.
 Blake's Improved Steam Pumps.
 Perry's Centrifugal Pumps.
 Perin Band Saw Blades.
 Sturtevant Blowers and Exhausts.
 Shimer Matcher Heads.
 Brainard Milling Machines.
 Turbine Water Wheels.
 Bradley Cushioned Hammers.
 Massey's Steam Hammers.
 Schlenker's Bolt Cutters.
 Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
 Atlas Engine Works Engines and Boilers.
 Payne's Vertical and Horizontal Engines.
 Otto Silent Gas Engines.
 Clapp & Jones' Steam Fire Engines.
 Pickering Engine Governors.
 Judson Engine Governors.
 Tanite Co.'s Emery Wheels and Machinery.
 Nathan and Dreyfus Oilers.
 Korting Injectors and Ejectors.
 Disston's Circular Saws.
 New York Belting and Packing Company's Rubber Goods.
 Lane and Bodley Saw mills.
 H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

PATENT
LIFE-SAVING RESPIRATOREntirely Prevents Lead Poisoning
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

JAS. LEFFEL'S TURBINE WATER WHEEL,
The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disassembled from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

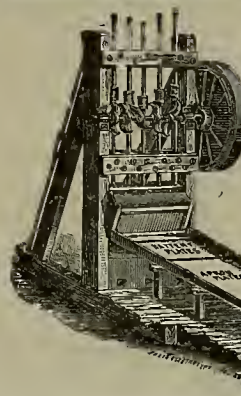
Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,
218 California Street, San Francisco, Cal.GOLD QUARTZ and PLACER MINERS'
SILVER PLATED AMALGAMATING PLATES
FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

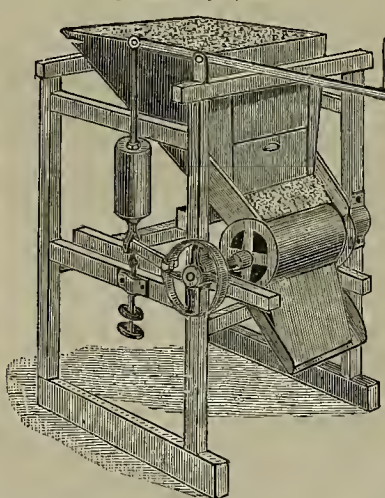
Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,
653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.
Sole Manufacturers,
327 First Street, SAN FRANCISCO, CAL.H. M. RAYNOR,
No. 25 Bond St.,
NEW YORK.ESTABLISHED
1858.PLATINUM
FOR ALL
Laboratory
—AND—
Manufacturing Purposes.
Wholesale and Retail.
Native Platinum and Scrap purchased.

DEALERS IN

Mining Machinery

Can Increase Their Trade

IN NEVADA COUNTY

By Advertising in

THE "TIDINGS"

(Daily and Weekly.)

Published at Grass Valley, Nevada Co., Cal.

THE "TIDINGS" has a large circulation in the best gold mining region on the Pacific Coast.

Write for terms and sample copies.

H. S. SPALDING, Publisher.

N. W. SPAULDING
SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue, 17 and 19 Fremont St., San Francisco.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

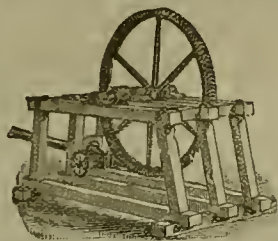
WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Ohluahua, Mexico.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!
All Estimates Guaranteed.
SEND FOR CIRCULAR.
EDWARD A RIX & CO.,
Sole Agent,
18 and 20 Fremont Street, San Francisco.



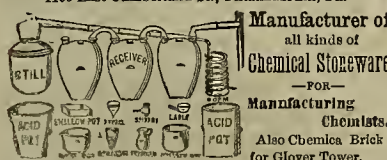
FLOUR AND OTHER MILLS.
Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco.

"CLAYTON" IMPROVED

AIR COMPRESSORS

For CATALOGUES, ESTIMATES, Etc. Address,
Clayton Compressor Works,
Near Brooklyn Bridge, BROOKLYN, N.Y.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.



SOLE AGENTS
"HOYT'S" Pure Oak, Short Lap Leather Belt.
WARRANTED.



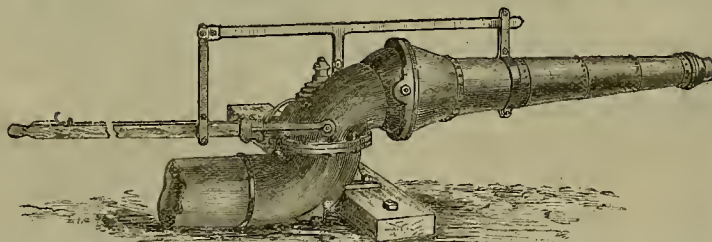
ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to
JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.
HOSKIN & CO., Marysville, Cal.

Chicago Prices Beaten!
ESTABLISHED 1860.
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.
J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smit Mills, Separators, Revolving and Shot Screens, Stamp Batteries, and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,
MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes will be sent upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.

113 Leideedorf Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL.

H. KUSTEL.

METALLURGICAL WORKS,

318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

Market Reports

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.

- FOR WEEK ENDING AUGUST 25, 1885.
- 324,912.—RASP.—Jesse Anthony, Covelo, Cal.
324,917.—BILLIARD TABLE LEG.—M. Cashin, S. F.
324,920.—BORING MACHINE.—J. P. Cobb, College City, Cal.
324,923.—CIGARETTE MOUTH PIECE MACHINE.—J. C. Davis, S. F.
324,935.—SUPPORT FOR WHALING GUNS.—J. J. Haviside, S. F.
324,937.—ROCK CRUSHER.—F. A. Huntington, S. F.
324,952.—BUILDING JETTIES.—R. S. Littlefield, Empire City, Or.
325,127.—SUBMARINE WALL.—Daniel Spangler, Hanford, Cal.
324,954.—VALVE GEAR FOR STEAM ENGINES.—A. J. Stevens, Sacramento, Cal.
325,027.—STEAM BOILER.—G. G. Tindall, Oakland, Cal.
324,901.—PIANO FORTE MUSIC RACK ILLUMINATOR.—Ward & Utes, Stockton, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

OATMEAL MACHINE.—James C. Holloway, S. F. No. 324,556. Dated Aug. 18, 1885. This invention relates to that class of oatmeal mills in which a rotating perforated rim is adapted to cut the oats against an exterior annular series of knives. The object of the invention is to provide a simple, effective and rapidly-working oatmeal mill of great capacity.

HARNESS CHECKS.—Wm. B. Frost, S. F. Assignor of one-half to Geo. S. Ingersoll. No. 324,765. Dated Aug. 18, 1885. This consists of a check rein of either the form known as "side" or "over" check attached to the bit, passing through the usual guides or runners, and thence to a point where it is attached to the reins by which the horse or horses are driven, and an independent guide or terret.

BEDDING KNIFE.—Harry E. Hulbert, Santa Rosa. No. 324,700. Dated Aug. 18, 1885. The hudding knife consists in a blade suitably mounted in a handle, and provided on its cutting edge, back of the point, with a small piece of a section of a cone taken from vertex to base, and laid with its flat side down and point forward, or resembling somewhat the shape of an ordinary flat-iron. The object is to provide a simple hudding knife adapted to be handled easily, accurately and rapidly.

SMOKE-CONSUMING FURNACE.—Chas. C. Carter, S. F., No. 324,532. Dated Aug. 18, 1885. This invention relates to that class of smoke-consuming furnaces in which a suction blower or fan is connected with the smokestack and with the fire box or the chamber below the grate, whereby the smoke and other products of combustion are drawn from the stack and forced through the furnace again. The invention consists in a conical or inverted funnel-shaped mouth piece, located within the stack, and having a diameter at its base a little less than the diameter of the stack. Said mouth-piece being connected with the suction-blower by a metallic pipe, and provided with ports or apertures controlled by valves or gates. The object is to provide the suction pipe with such a mouth-piece as will nearly fill the stack, thereby catching all the products of combustion and at the same time so constructing it with valved ports that it will not interfere with the natural draft.

WIRE SCREEN STRETCHER.—Chas. Ehrenfeld, Pasadena, Los Angeles Co. No. 324,673. Dated Aug. 18, '85. The invention relates to a new and useful stretcher especially adapted for stretching wire screens over doors, windows, etc., though it may be used for other similar purposes and as a clamp for holding articles and tools to be worked upon, such, for example, as a saw which has to be filed. The invention consists in an adjustable frame adapted to straddle the sash or door stile, and provided with clamps for seizing and holding the screen, a bolt and nut for operating the adjustable frame and clamps; a sliding block between the bars of the frame, and adapted to bear against the outer edge of the stile, and a screw for setting the block up, whereby the frame is moved back and the screen stretched to its place.

OBSTETRICAL SUPPORTER.—Joseph T. Surbaugh, Modesto. No. 324,498. Dated August 18, 1885. The invention relates to that class of obstetrical supporters in which certain straps are so united and operate in unison to provide support and assistance to the patient; and the invention consists in the construction of certain shoulder straps, body and leg straps, stirrups, knee straps and handles and a back supporting strap, and in their various peculiar adjustments. The object is to provide a simple and effective device or harness of this character, which can readily be accommodated to different persons, and which will be serviceable in every

part, each part being adapted to perform its function complete, and the whole to give the necessary relief.

RASP.—Jesse Anthony, Covelo, Mendocino county. No. 324,912. Dated Aug. 23, 1885. This invention relates to that class of files which are made up of separate plates, adapted to rock on their bearings, to enable them to be sharpened; and the invention consists in a series of independent plates, pivoted in transverse rows and united by longitudinal strips, which are suitably clamped to hold the plates in position. The object of the invention is to provide a file or rasp, the teeth of which may be ground, and thus preserve the implement long after it would otherwise be considered useless.

SUPPORT FOR WHALING GUNS.—John J. Haviside, S. F., No. 324,935. Dated, Aug. 25, 1885. The invention relates to a whaling-gun and the stand by which it may be supported within the boat, so as to resist the recoil or kick of the gun when fired. It consists of three barrels fixed side by side, the central one being adapted to discharge the harpoon by which the whale is made fast, while the two exterior barrels may discharge bomb-lances, which serve to kill the animal. The lock of the gun contains three hammers, all actuated at the same instant, so that all the barrels may be discharged at once. The apparatus is supported upon a peculiar stand, whereby the gun may be properly aimed and then locked, so as to resist the recoil or kick when fired.

HARVESTER.—Daniel Houser, Stockton, No. 324,697. Dated Aug. 18, 1885. This invention relates to certain improvements in apparatus which is designed to cut, thresh, separate and clean the grass at a single continuous operation, the machine being drawn about the field by a team or other suitable power. It consists of a frame having the threshing, cleaning and sacking mechanism supported upon it, and suitable bearing wheels therefor, a second frame hinged to and projecting from one side of the threshing apparatus and supporting the cutting and conveying mechanism, or the construction of the frame and the manner of supporting its outer end, and in the means of raising and lowering the sickle.

TYPE WRITING MACHINE.—Edwin S. Belden, S. F. No. 324,520. Dated Aug. 18, 1885. This is an improvement in calligraphs, the object of which is to give each letter or other character approximately suitable space, according to the requirements of its width. A previous application has been made by the same inventor for an improvement, the object of which was to make the last letter of a word and the space following it at the same time. This was accomplished by the mechanism operated by the space bar or key, which permitted the paper carriage to move a greater distance than any of the type keys could effect. The present invention embodies a part of that mechanism, conducting to the same end of permitting a varied movement, between suitable limits, of the paper carriage; but the present mechanism is essentially different in the graduated stop and the means employed for calling it into action, as the result to be attained is of a different nature.

COUPLING FOR CONNECTING PIPES.—John J. Lacey, S. F., assignor to Lacey Automatic Coupling Co., of Oakland. No. 324,031. Dated Aug. 11, 1885. This is a joint or coupling for pipes which are supported on structures, one or both of which may be subjected to irregular, transverse or other movements; and it is especially applicable to the coupling of pipes which carry air, steam, water, etc., beneath railway carriages. It consists of adjustably supported pipe ends at the adjacent or meeting ends of two cars, so constructed that one may slip into the other as the cars approach, a means for the automatic opening of a passage of one pipe to any other when they meet, a means for rendering the joint, steam, water or air tight while allowing the pipes a side or end play to accommodate them to the motion of the cars; a protecting cap or cover for the open or hell mouthed coupling end, and an arrangement by which the coupling device may always be used, whichever ends of the cars may come together.

BOILER-TUBE EXPANDER.—Michael Cashin, S. F., No. 324,007. Dated Aug. 11, 1885. In implements of this class, a guard, either in the shape of an annular band or of two short arcs or lips, is generally present. The object of the guard is to limit the insertion of the expanding block of the implement. It bears against the tube sheet while the rest of the implement is being rotated. The inventor considers that both these forms of guards are disadvantageous in confining or limiting the use of the expander. In some boilers the tubes are closer together than in others. An expander provided with a guard of fixed diameter, while adapted for use on boilers in which the separation of the tubes is such as to permit the guard in being seated against the tube-sheet to avoid the ends of adjacent tubes when the expanding block is inserted in the tube then to be operated on, is not adapted for use on boilers in which the tubes are separated by a distance less than the diameter of the guard, as in that case the lips of the guard would come in contact with adjacent tubes. It is the object of Mr. Cashin's invention to provide a guard adapted to be extended or contracted and set where desired, thus adapting it for use in boilers, no matter what may be the separation of the tubes.

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscription up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz:

- | | RETAIL PRICE. |
|--|-----------------------------|
| 1.—World's Encyclopedia, 794 pages, with 1,200 illustrations, worth \$1.75. | Postpaid for 50 cts. |
| 2.—Patent Binder (cloth cover) with name of this paper in gilt. | Postpaid for 50 cts. \$1.00 |
| 3.—To New Subscribers, 12 select back Nos. of the Rural Press. | Free .75 |
| 4.—Any of Harper's first-class periodicals, 15 per cent less than regular rates. | |
| 5.—Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates. | |
| 6.—Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates. | |
| 7.—Pictorial Arizona, 350 pages, in cloth and gilt. | Postpaid for 25 cts. 1.25 |
| 8.—California, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single No. | Postpaid for 3 cts. .35 |
| Per volume, unbound, 5 Vols., Postpaid for 20 cts. | 2.00 |
| Per volume, bound, cloth back and stiff paper sides. | Postpaid for 40 cts. 2.50 |
| 9.—Pictorial California Homes (10 build-ing plans and estimates). | Postpaid for \$1 3.50 |
| 10.—Dewey's Patent Newspaper File Hold-er (18 to 36 inch). | 25 cts. .50 |

NOTE.—The cash must accompany all orders. If too much is sent for any article or publication, the balance will be returned immediately. Address this office, No. 252 Market St., S. F.

P. S.—No. 11 is really a valuable premium to new-comers and others who appreciate the better class of stories and a good standard of California literature.

- | | |
|--|--------------|
| Webster's Dictionary, 634 pages, with 1,500 illustrations. | 50 cts. 1.50 |
| Grant Lithograph, size 24x19. | 50 cts. .50 |
| Cleveland Fine Steel Plate, size 12x18. | 10 cts. .50 |
| Grant Steel Plate, cabinet size. | 5 cts. .25 |
| De Groot's History of Mining in California. | 5 cts. .25 |
| Beautiful Poetic Review, a handsome, enter-taining and instructive souvenir of real merit. | 25 cts. .50 |

Send for any further information desired. Readers will please inform their new neighbors and others concerning our paper and these offerings. On application, sample copies of this paper will be mailed free to the address of any persons thought likely to subscribe.

ORDERS have been received from Wash-ington to resume work at once on the new stone dock at Mare Island Navy Yard. It is anticipated that a general resumption of work will take place in a day or two. The 12 boilers for the dock are to be built by the Steam Engineer-ing Department, and a number of stonecutters, masons and laborers will be given employment about the dock. The outlook for work in other departments is not bright.

TWENTIETH Industrial Exhibition OF THE MECHANICS' INSTITUTE

Opens August 25th, Closes Sept. 26th.

With a most Comprehensive display of MANUFACTURES, NATURAL PRODUCTS AND ART.

Grand Instrumental Concert Each Day and Evening.

SPECIAL FLORAL DAYS Each Week. Over \$1200 offered as premiums floral work.

ADMISSION: Double Season Tickets. \$5 00 Single Season 3 00 Apprentices Season 1 50 Child's Season 1 50 Single admission, 50c; Child's 25c. Season Tickets to Members of the Institute at half rates.

P. B. CORNWALL, President. W. P. STOUT, Secretary.

FOR THE BEST IMPROVED ARTIFICIAL LIMBS ADDRESS MENZO SPRING, 9 Geary St., SAN FRANCISCO, Cal., U.S.A. OFFICE 5, U.S.A. Send for Circular. Send Blank for Self-Measure-ment.

HEALD'S BUSINESS COLLEGE, 24 Post St. S. F. Send for Circular.

DEWEY & CO.'S

Scientific Press Patent Agency. [ESTABLISHED 1860.]

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Wash-ington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY,

W. B. EWER,

GEOR. H. STRONG,

DELINQUENT NOTICE.

Grosh Consolidated Mining Company.— Location of principal place of business, San Francisco, Cal. Location of works, Storey County, Nevada.

NOTICE.—There are delinquent upon the following de-scribed stock on account of assessment No. 1, levied on the 13th day of July, 1885, the several amounts set op-posite the names of the respective shareholders, as follows:

NAME.	No. CERTIFICATE.	No. SHARES.	AMOUNT.
Fleming, A.	11	5	25
Fleming, A.	45	21,985	1,249 25
Fleming, A.	18	11,500	675 00
Fleming, J. B.	7	12,500	625 00
Fleming, J. B.	19	5	25
Fleming, J. B.	46	24,990	1,249 50
Hastings, E. O. F.	40	2,500	125 00
Mcquaid, A. J. Trustee.	14	12,185	624 25
Mcquaid, A. J. Trustee.	49	24,001	1,200 00
Mason, A. J.	51	36,001	1,800 00

And in accordance with law and an order of the Board of Directors, made on the 13th day of July, 1885, so many shares of each parcel of such stock as may be necessary will be sold at public auction at the office of the Com-pany, on Monday, the 31st day of August, 1885, at the hour of 10 o'clock A. M. of said day, to pay said delin-quent assessments thereon, together with costs of ad-ver-tising and expenses of the sale.

A. C. HAMMOND, Secretary.

Office, room 39, Merchants' Exchange, San Francisco, California.

POSTPONEMENT.

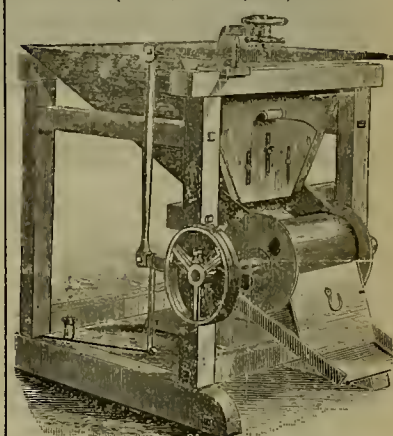
The delinquent sale of the above assessment is hereby postponed until Monday, September 1, 1885. By order of Board of Trustees.

A. C. HAMMOND, Secretary.

Dated August 25, 1885.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

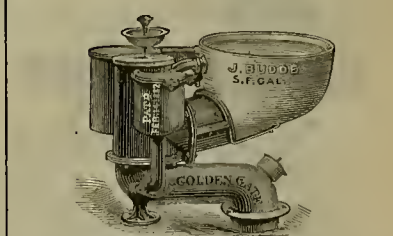
Manufacturers of the Celebrated "Chal-lenge" Ore Feeders for any character of ore; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ore.

#2 Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

THE GOLDEN GATE PLUG CLOSET.



The only secure locking device to keep sewer gas entirely away from dwelling houses.

JOSEPH BUDDE, Manufacturer, 126 First Street, Between Mission and Howard, S. F., Cal.

All kinds of Water Closets, Slop and Waste Hoppers always on hand.

Write for Information.

Iron and Machine Works.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,**WM. H. BIRCH,**

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging MachinesBrodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.Manufacturers of B. E. Henrickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ORDERS SOLICITED.****UNION IRON WORKS,**

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.Front Street, Between N and O Streets,
SACRAMENTO, CAL.**Golden State & Miners Iron Works.**Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board **AMALGAMATORS,**

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

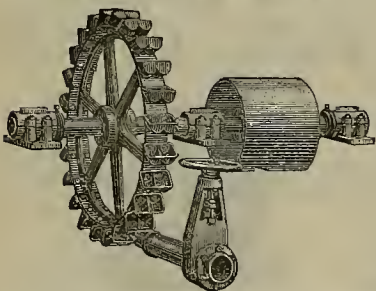
No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam-
boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Coup-
plings and Connections of all sizes and patterns, furnished
with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL

PELTON'S WATER WHEEL.THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.**GOLD MEDAL AWARDED**

— AT —

Mechanics' Fair, 1883 & 1884

— FOR —

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

1883

For Best Hoisting Engine and

Boiler Combined.

W. H. OHMEN,Machine and
Engine Works22 Fremont Street,
SAN FRANCISCO.**INVENTORS. MODEL MAKER,**

L. PETERSON,

38 Market St., N. E. cor Front, up stairs, S. F. Experiment-
all machinery and all kinds of models, tin, copper and brass.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting
that of "Hood's Foundry Coke."This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.The undersigned are the **SOLE IMPORTERS** of the above Coke, which is for sale in quanti-
ties to suit purchasers.**BALFOUR, GUTHRIE & CO.,**

316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

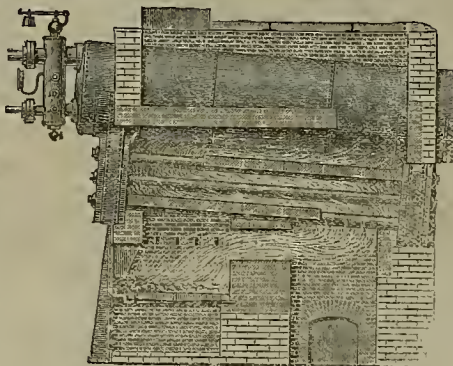
FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.Economy in space and fuel. Safety at high
pressures. Freedom from scaling. Equally
adapted for power and heating purposes.
Especially adapted for mills, factories, hotels,
stores or any place where safety is a necessity.
Will work well with muddy water and any kind
of fuel.

TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

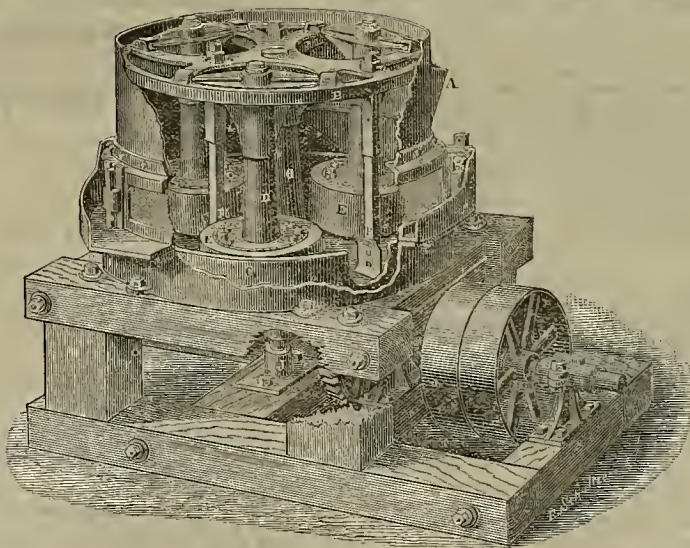
Risdon Iron and Locomotive Works—Gentle-
men: We have had one of your Heine Patent
Safety Boilers in use for four months at our
Borax Works, in Alameda. It does good work
and gives perfect satisfaction. Yours truly,
(Signed) WM. T. COLEMAN & CO.

SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear
Sir: I am using one of your Heine Patent
Safety Boilers in my Candy Factory on Twenty-
Third street, near Valencia. For economy of
fuel, safety and efficiency I have never seen its
equal. Very truly yours,
(Signed) W. S. TOWNSEND.

Send for Circular and Prices.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

Economy in Expense of Plant. Economy in Cost of Working. Economy
in Saving Gold. Economy in Transportation of Machinery.Economy in Cost of Erection of Mill at Mine. Econ-
omy in Time Required to Establish Plant
(one day only being consumed).The Huntington Mill has passed entirely through the experimental stage. Two years of
continuous use at a number of mines in California has enabled the inventor to perfect and im-
prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

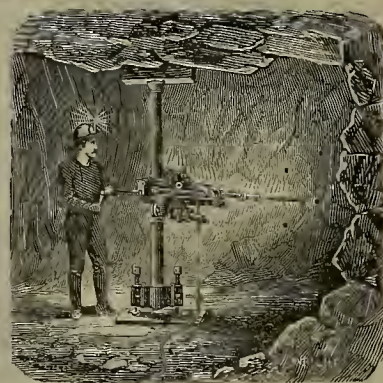
.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.

A. T. DEWEY,) Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED
W. B. EWER,)
GEO. H. STRONG }INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class
Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal
nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original
cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies.
The information accumulated through long and careful practice before the Office, and the frequent examination of
Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled
us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not
new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
Ports, will do 20 per cent more work than
the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.Punching and Shearing Machinery for
Hydraulic Pipes.SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

Smith's Patent Belt Fasteners.

Are positively un-
equalled for fastening
Leather, Rubber,
or Cotton Belting.
THE ONLY FASTENER
that will run under
tighteners, on patent
rolls in flour mills, and
Electric Light machines.
Easier to apply
than Lacing and
far more Econom-
ical.

Patented Sept. 20, 1881; Aug. 15, 1882; June 16, 1884.

PRICE LIST.

No. 1—For large drive belts, per box of 100.....\$2 00
No. 2—For Cotton drive belts, per box of 100..... 1 75
No. 3—For Rubber drive belts, per box of 100..... 1 50
No. 4—For single Leather belts, per box..... 1 25
Combination Punch with guides and nippers..... 1 25
Reamers for taking fasteners out..... 35
TRY THEM! They will save you loss of TIME,
TEMPER and MONEY. Manufactured by**H. D. EDWARDS & CO.,**

Nos. 16, 18 and 20 Woodward Ave., DETROIT, MICH.

Manufacturers of Oak Leather Belting, Agents for J.
B. Hoyt & Co., N. Y. Belting and Packing Co., Eureka
Fire Hose Co., Cotton Belting Mill Supplies. FOR SALE
BY Duham, Carrigan & Co., San Francisco, Cal.

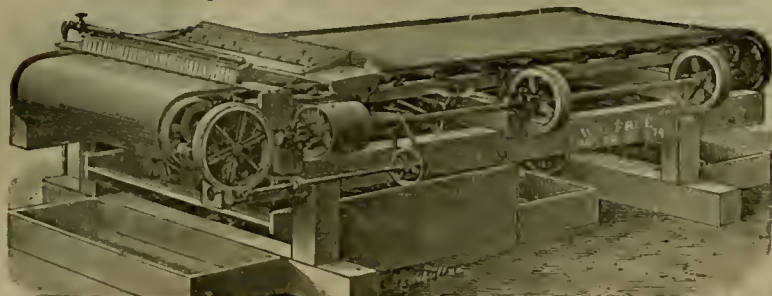
"ACME" DRAWING PAPERS

QUEEN & CO'S

CELEBRATED

PROFILE AND CROSS SECTION PAPERSExtra Fine
Swiss
Instruments**QUEEN & CO'S** Improved TRANSITS and
LEVELS, TAPES, CHAINS, RODS, RULES,
and Drawing Materials of every description. List and
description of our Ten Catalogues sent on application.**JAMES W. QUEEN & CO.,**
224 Chestnut St., Philadelphia.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1860, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

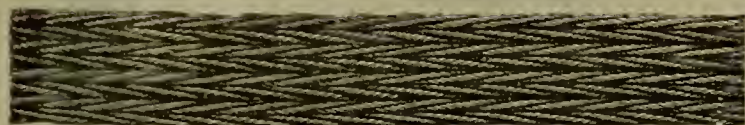
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE



Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Barbed Wire.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

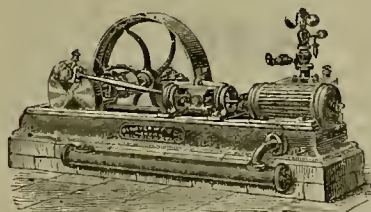
Go to the **CALIFORNIA WIRE WORKS**, 329 Market St., San Francisco, Cal.

JOSHUA HENDY MACHINE WORKS,

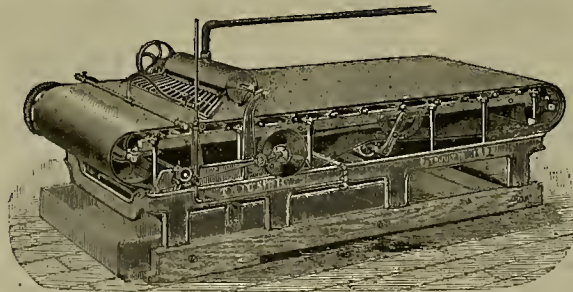
Nos. 49 and 51 Fremont Street, San Francisco, Cal.

DEALERS IN NEW AND SECOND-HAND BOILERS, ENGINES, AND MACHINERY OF EVERY VARIETY.

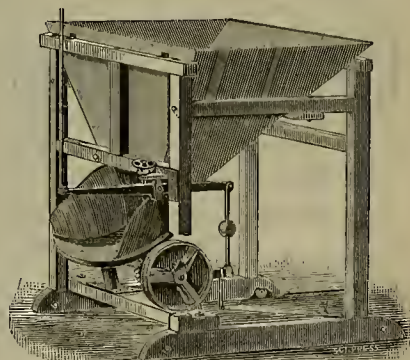
TRIUMPH CONCENTRATORS.



Stationary Engines.



"Challenge" Ore Feeders.



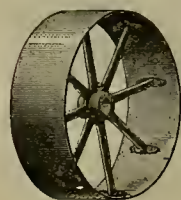
QUARTZ, SAW-MILL, AND HYDRAULIC MINING MACHINERY.

AGENTS FOR THE SALE OF THE.....

Celebrated CUMMER ENGINES, of Cleveland, Ohio,

BAKER ROTARY PRESSURE BLOWERS, WILBRAHAM ROTARY PISTON PUMPS,

HOT POLISHED SHAFTING, and P. BLAISDELL & CO.'S MACHINISTS' TOOLS.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.



THE "DUC" STEEL BUCKET!

Always First Premium in Competitive Trials.

Extra Strong and Very Durable.

Made of Best Charcoal Iron, Only One Seam. No Corners to Catch. Runs with Least Power.

BEST MINING BUCKET MADE.

H. P. GREGORY & CO., Agents, San Francisco.

PRICES GREATLY REDUCED.

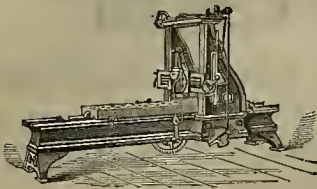
IRON CLAD MANUFACTURING CO.,

22 Cliff Street, New York.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



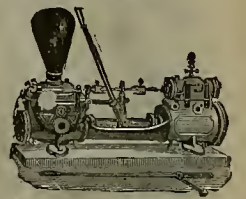
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

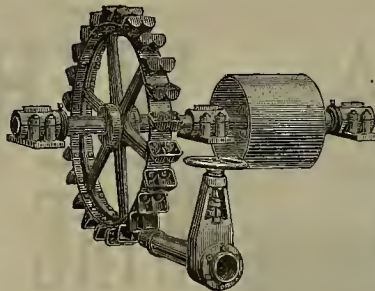
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SOLE AGENTS FOR

SEND FOR CIRCULARS.

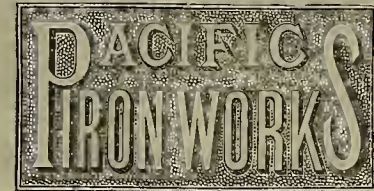
SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850. 1885.
RANKIN, BRAYTON & CO.,
.....BUILDERS OF.....
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

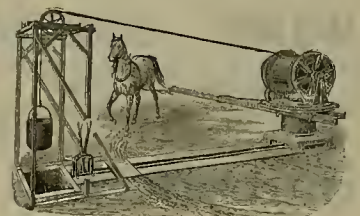
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



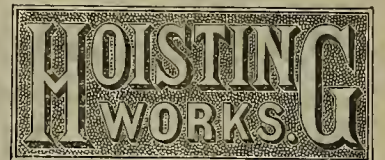
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 12, 1885.

VOLUME LI
Number 11.

Granzita Furnaces.

At the New Almaden quicksilver mine, in Santa Clara county, this State, the ores are classified and the classes of ore are treated in different furnaces specially adapted to them. After the cleaned ores are transported to the ore-chutes and tried at the hacienda, they are still further classified, partly by screens in the ore-chutes, and partly by screens on the top of the ore cars. By this means a new class of ore is introduced, intermediate in size between the *tierras* and the *granza*. This class is called *granzita*. The screens at the ore-chutes are mostly made of cast-iron plates, with 1½-inch square holes arranged in diagonal rows across the plate. These separate from mine *tierras* and *granzas* a certain quantity of coarser fragments (called *granzita*), that has passed the bar screens owing to the shape of the fragments or the spreading of the bars. One of the furnaces for treating this *granzita* is described by Mr. S. B. Christy, before the American Institute of Mining Engineers.

The furnace shown in the engraving is No. 2. Having only two ore chambers its maximum capacity is only half of that of No. 1; its discharging arrangement is simple also, owing to the small number of ore chambers. The figures need no further remark, except that while sections *A B* and *C D* show the pigeon-holes, section *E F* is so taken as not to show them.

The hoppers on top of this furnace are arranged in the same line, and feed into the same ore-chambers; but they are divided into compartments, so as to permit more control over the operation of the furnaces. These compartments are charged with 1000 pounds of ore (when in full operation) every 40 minutes, alternating with each other. This would make the working capacity of the furnace 18 tons per 24 hours. The drawing precedes the charging. In drawing, 250 pounds are taken from each of the two end draw-pits on each end of the furnace, or 1000 pounds (volume) at a time. The drawings, from either end of the furnace, alternate with each other every 40 minutes.

No fuel is charged with the ore of this furnace, but instead, coal is used in the fireplace. The consumption of fuel is 3 cord of wood and 500 pounds of coal per 24 hours.

When this furnace is run alone, there are employed: One charger and 2 fire-or-slag-men per 12-hour shift, or six in all per 24 hours. When No. 1 and No. 2 are both in operation at the same time, labor is economized by running them with the same force. For this purpose are assigned:

One charger; at \$2.50 per 12 hour shift.

Four slag or firemen, at \$1.25 per 12 hour shift.

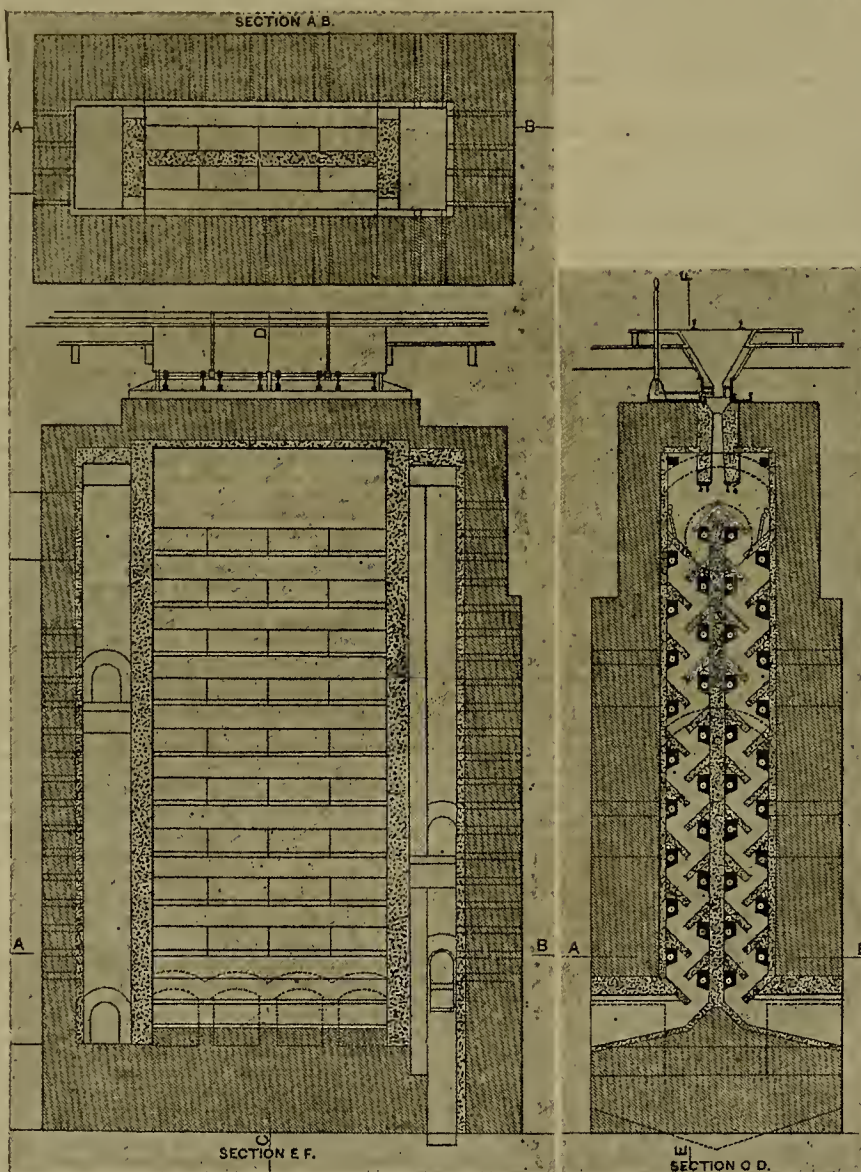
In addition, two men are employed part of the time to bring the ore from the chutes to the furnace-bins. This furnace is not always run up to its full capacity, only enough ore being run through it to make up the desired monthly production.

The placer diggings of Similkameen, B. C., are represented to be very rich, as much as \$50 a day being carved with rockers.

The New River Region.

We had a conversation this week with Mr. Yokum, of Humboldt county, who has recently visited the New River mines, in Trinity county. He is impressed with the fact that the section is one which in course of time will prove a rich one, though at present development is retarded from lack of reduction facilities. There is quite

out may be worked. There is one small 5-stamp mill which worked custom rock for a while, but the owners are now crushing their own ore. Miners have all the way from 25 to 100 tons of ore out on their dumps, but they cannot do anything with it at present. There are many good mines, and in a year or so, when there are mills, the region will be a prosperous one. Mr. Yokum is satisfied that a few



GRANZITA FURNACE FOR QUICKSILVER ORES.

a number of men prospecting thereabouts, and many mines are being opened. Most of the men, however, are not financially able to do much. They have taken out rock from their prospects, but are not able to have it crushed or worked.

About the deepest shaft so far sunk is 80 or 90 feet. The mine that has been most worked is the Hard Tack, and it improves as depth is attained. The ledge is from one to three feet wide. It pays in an *arastra* about \$100 per ton.

What the country needs badly is some little capital for custom mills, so that the rock taken

mills could get all the work they needed for some time to come, with only the ore now out. And, of course, with any encouragement more would be raised. There is a strip of country on the mountain side, four or five miles wide and seven or eight miles long, which is being prospected, and discoveries are also being made outside of this belt.

THE British Museum has just received the great Hume collection of Indian birds. There are 63,000 specimens, of which 50,000 are new, thus making the museum's collection an unapproachable one.

Flue and Chamber Dust.

Leadville being situated at an elevation of 10,000 feet above the sea, the volume of air blown into a smelting furnace with a given blast pressure is far greater than with the same pressure at sea-level; consequently the draught of the furnace is correspondingly increased, and the quantity of dust and fumes escaping by the stack is very large. This would seem to necessitate the employment of a very perfect system of condensing flues and chambers. In point of fact, however, Mr. S. F. Emmons in his monograph on Lead Smelting at Leadville, published by the U. S. Geological Survey, says these arrangements are, with one or two exceptions, very poor, and consequently a large proportion of the dust and fumes is lost in the air.

Their composition is extremely complicated, and is characterized by the presence in considerable quantities of chlorides, iodides, bromides and phosphates. They carry from 25 to 60 per cent of lead, the latter figure applying to the fumes condensed in the Bartlett filter, and from 30 to 40 ounces of silver to the ton, although the Bartlett filter fumes held but 4.3 ounces. The composition of the latter is otherwise remarkable in that they contain over 11 per cent of phosphate of lead, 9 per cent of chloro-bromo-iodide of lead, and 18 per cent of sulphide of lead, and from the further fact, according to Mr. Guyard, that even zinc and manganese exist in their entirety in the state of sulphides.

It must be borne in mind however, that these fumes were condensed at a distance of 200 feet from the furnace. Mr. Guyard has calculated the weight of calcined dust collected from one furnace of 30 to 40 tons capacity during 24 hours at 1400 pounds, and estimates that where the filter is not employed, the loss of lead equals half a ton of silver, 4½ ounces per day of fineness. On this assumption more lead is lost in the air than is collected in the dust chambers. The chamber and flue dust is mixed with lime and thrown over the ore beds to be resmelted. In one smelter the flue dust is prepared for resmelting by melting down in a reverberatory furnace at first with, and now without, the addition of slag. It is then run out, and after cooling it is broken up and mixed with the charges.

THE Elk rapids, Mich., Iron company have received an order for 300 tons of charcoal iron, to be shipped to England, probably the first iron of a Western manufacturing company ever shipped from this country.

ORDERS have been received from the United States Adjutant General's office at Washington, relieving Lieutenant Robert Craig from the Signal Office of this city and ordering him to report for duty at Washington.

THE Indians are leaving Belleville, Nev., on account of some strange disease which is carrying them off. They are much alarmed and are going to new camping-grounds as fast as they can get their ponies to travel.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Why Mines do not Sell.

Bonding Claims.

EDITORS PRESS:—In an article in the PRESS of Aug. 8th, headed "Why Mines do not Sell," "Experience" has mentioned some very good reasons why they do not sell, but mine owners are not to blame altogether.

To begin with, he refers to a gentleman in San Francisco, who he says is always ready to undertake the sale of a mine that can stand an honest test. Now, what need has a mine owner for any one to sell his mine if it will stand an honest test? The trouble is, capitalists have been in the habit of buying mines of middlemen, or, in other words, speculators. The owner of a mine will ask all it is worth; the middleman must have from one to ten thousand dollars or more for making the sale, consequently he must sell it for that amount—more than the owner is really willing to take.

Another trouble in the mining camps is that of bonding mines to men who only want to speculate on other people's labor and are not willing to do a day's work on a mine or put up a dollar for the bond. It should be very plain to capitalists that they can buy a mine cheaper from the owner than they can from the man who has it bonded and with less chance of chicanery and fraud.

The fact is there are many mines in California that would prove valuable properties and can be bought at reasonable prices, if capitalists will buy direct from the owners or through reliable agents. By mine owners I do not have reference to the man who without labor or capital has secured some worthless mine which he expects to sell for a fortune or the man who is sitting over a prospect hole ten feet deep waiting for something to turn up. I have reference to those who go at it with a will and develop their mines sufficiently to show that they have a mine or those who by their good judgment and capital at their command have several mines that are sufficiently developed to show that they are permanent and valuable.

Quite frequently you will see men in the mining camps claiming to be looking for a mine for parties with plenty of capital. They will usually want to bond your mine for six or twelve months. If you tell them you will not give the bond unless they agree to do a certain amount of work or make a small payment, they will most invariably tell you, shortly after, that they are called away on important business, but will be back in a short time and will see you again. Now when they take their departure you had better take a good look at them and hid them good-by, for nine times out of ten you will never see them again.

When men come into a mining camp wanting to bond mines without agreeing to do any work or advance any money on them, or wanting to sell your mine for you for the consideration of a few thousand dollars in case the sale is made, the thing for mine owners to do is to sit down on them, as it is evident capitalists are doing; which, by the way, may be the reason the gentleman in San Francisco referred to by "Experience" has not made three sales in the State in 20 years.

There are also many mines in California owned by men of capital that have not been remunerative, simply because of extravagance in operating them often through superintendents who know little or nothing about mining; or the keeping of a surplus of bosses who fill the place of the fifth wheel on a wagon.

The appearance of things now would indicate that Eastern capitalists think we have but few good mines in California. There could be much said in regard to the way mines are often managed by Eastern capitalists, showing some of the reasons why they have not made a success of mining. However, I will say no more at present.

A MINE OWNER.
Georgetown, El Dorado Co.

Nogales.

EDITORS PRESS:—This little town where your correspondent has for the present the fortune or misfortune, as the result may prove, to reside, is interesting from the circumstance that it is the gateway between the United States of North America and the United States of Mexico, via the State of Sonora.

The town, or village, rather, lies about equally on both sides of the boundary line, which, at this point, is marked by a monument twice determined by astronomical observations, as I am informed, and therefore likely to be permanent.

The population, including the entire village, numbers some two thousand, of whom a majority are Mexicans. The chief support of the place has been the Sonora trade, both legitimate and otherwise, that is, smuggling, the local resources being inconsequential.

The altitude above the sea is somewhere about 4000 feet; the climate is all that could be desired, and the people on both sides of the line are peaceful and law abiding, as a rule.

The rock formation of the immediate locality appears to be a lacustrine deposit, which forms a soft white stone, excellent for building pur-

poses. At some points this deposit is tilted at an angle of about 35 degrees; a little to the northward it remains horizontal. The structure is generally fine-grained, but there are layers of quite coarse gravel. On the surface, in many places is a thin stratum of loose washed gravel among which occur many fragments of heavy, black, non-magnetic iron oxide with quartz gangue, and occasional pieces of gold-bearing quartz have been found.

At a depth of from 20 to 40 feet and more, according to locality, a flow of good water is encountered, and this water comes to the surface, or rather, the surface descends to its level, about nine miles northward from the village, in the valley of the Santa Cruz river, which flows past Tucson. The location of the town is in a narrow valley, bounded on the east by rather high, and on the west by quite low hills. There are no mines in the immediate vicinity, though a prospect has been found seven miles northward, which, beginning with an assay value of 11 ounces of silver to the ton, has steadily improved until of late some very rich containing horn silver has been found.

The recent Yaqui war in Sonora, and increased vigilance on the part of the Mexican customs officials have had a disastrous effect on the business of the place, which, however, shows signs of reviving, despite the Apache scare and the recurrence of yellow fever in Guaymas. The latter circumstance, unfortunately for Guaymas, is expected by some to inure to the benefit of Nogales by making this the chief port of entry for Northern Sonora.

The prosperity of Nogales has been very little, if at all, disturbed by the fact that its title is claimed under an alleged Mexican grant as the "Nogales de Elias Rinch." This grant is claimed to have originated some 150 years ago, yet, up to this time, it has not, so far as I can ascertain, been recognized or confirmed by the general Government of Mexico, and certainly not by the United States Government.

Four men, of whom at least three are Mexicans, claim to represent all the heirs to this estate, of whom a large number are minors, and are offering to sell lots and ranches, to those already in possession, for prices which would, in many cases be high even if they could give title, whereas, they themselves, having neither title nor possession, only offer a quit claim. On the Mexican side of the line, the grant claimants give some sort of warranted deed, but on our side they refuse to do this. About a year ago, the then agent of these men told me that they would contract for the sale of lots at stated prices, but would not accept one cent of payment until they could give title. They have changed all that, however: have appointed a new agent, and are going for all the ready money they can get, which is not very much. A few of the citizens, thinking to obtain peace and security, have yielded to the demands of these people, and are paying them for what will most likely prove to be Government land. The great majority, warned by the experience of Californians, and having faith in the honesty of the present government, have determined that they will not pay tribute to foreign claimants under a foreign title, but will await the decision of their respected Uncle Sam.

Nogales, Aug. 29, 1885. C. H. A.

IDAHO GOLD.—Frank Reed writes from Murray, Idaho, to J. W. Hellsborn amongst other things the following items of interest concerning that country: "I think I have struck a streak of good luck at last, and expect to get away from here with all the money I will want. This is going to be a great mining camp; I have seen more rich ore here than I ever saw before outside of old Bodie. There is a New York company here buying up all the deep channel; they are going to put in a bedrock flume over eight miles in length on Pritchard creek, and they are investing in quartz heavily. I expect to make a big sale as soon as I get my property opened up in good shape. This is a big country and no end to the mineral. The ledges are deeply covered and nearly all are capped over with bedrock or a heavy cement, which makes it very hard for the prospector. Several good sales have been made to Salt Lake, Denver and Black Hills parties. We have a stage now which connects with the steamer at the old Mission, and it makes it a very pleasant trip from Rathdrum, or rather Spokane Falls, W. T., a distance of 100 miles. The hill diggings are good. The great drawbacks to our camp were schemers who got bold of the water right, which kept our camp back very much. It is now coming up on its merits, which is the only thing that makes a mining camp. They clean up gold here by the panful. I have taken as high as \$29 out of one pound of quartz, and have specimens in my cabin that are one-half gold. My claim is called the Buckeye; the ledge is 5½ feet thick. I have run a tunnel in quartz now 58 feet and 70 feet from the surface—that is, from the end of the tunnel. I expect next month to put up a mill on this property."

—Bodie Free Press.

PIONEER EGGS.—A dredger at the foot of the old Vallejo-street wharf, in this city, brought up last week from under twelve feet of mud a number of glass jars with lead covers, which, when opened, were found to contain eggs. As it was in this manner that Eastern eggs were shipped to California in '49 and '50, it is thought these specimens formed part of one of the old-time shipments. The yolk and white has shriveled up into a small hard ball, which rattles about in the shell.

Silver.

"An Allegory."

And now Mr. Geo. H. Southard, of the California Redwood Lumber company, has given his opinion on the silver question. In his own lumbering way he has decided that silver, as money, should be abolished, and that the Constitution of the United States should be so far set aside as to give Mr. Secretary Manning the management of the coinage question. May he that ought to fix the whole business. It is just possible that Mr. Southard has devoted as much as fifteen minutes to the consideration of the question, and that he has determined the business absolutely. He is incensed that silver miners can sell their bullion—not for gold, as he says, but silver—and says in a that-settles-it tone, "Let them send their silver to London." Suppose the same tactics should be adopted toward the business of Mr. Southard, what would he think? Suppose Congress should pass a law excluding these redwood lumber in the building of houses and fences, on the ground that it had a fashion of shrinking endwise. What would this new financial light think about it? Would he not protest and declare that pine shrunk worse than redwood, and that the chief uses of the lumber were for house and fence building? Probably he would, but the answer to that would be, "No matter; the chief use of silver among men was money for these thousand years, before the first saw-mill was invented, while yet men lived in tents and caves and fissures of the immemorial rocks. What are Mr. Southard's troubles to the Government of the United States? Is it not true that redwood shrinks endwise, and does not that fix the business? With that decree in force, redwood lumber would be apt to shrink somewhat in value, would it not, and pine would rapidly advance? How would it strike Mr. Southard should some grave financier come along and say to him: "I know that for a hundred purposes this redwood board is a better material than pine, but the intrinsic value of the pine board is sixteen times that of redwood." Would not Mr. Southard in righteous wrath cry: "You are a hopeless fool. Can you not see that the falling off in redwood is due entirely to the most stupid and wicked legislation that was ever inflicted upon a suffering people?" Would he not go on and explain that just at a time when the market was short of pine and the people needed lumber for building the law was passed; that as a result the price of pine had advanced clear beyond their means to purchase, and that now women and children were suffering for want of shelter, and that half-grown crops were being overruled because the farmers could not fence their fields? Would it help his peace of mind to know that the law was suggested and urged to a passage by a combination of men who had some stocks of pine lumber on hand, and that their purpose was to secure a corner on lumber? There is just one question to decide about silver. Is there gold enough in the world to make a full and sufficient standard of value? If there is, why then silver is merely merchandise. If there is not, then the miners are not to be the men who will suffer most when silver shall be discarded as money. It will be the men who carry on the world's work, who have to borrow money and overdraw their bank accounts sometimes, and the class who never have any bank account, but who have to depend upon their daily work to gain for themselves daily bread.—Salt Lake Tribune.

DEEP MINING IN BUTTE.—The fact that the Hale and Norcross Mining Company, of Virginia City, recently shipped \$5000 worth of bullion milled from ore extracted at a depth of 3000 feet, is noteworthy in the history of Western mining. From no mine on the American continent was such a shipment ever made before. It seems to illustrate the grand possibilities of deep mining. There is no reason known to science why the precious metal ore should not be found as rich and abundant at a depth of 3000 feet as 300, and experience shows in the Hale and Norcross that the silver deposits are practically without limit in depth. What is true of the Comstock may reasonably be expected to prove true of Butte. In no mining camp in the world are the silver ledges so extensive, so uniform in dip and strike and so regular as to width as are the great fissures of this district. At times the ore may be a little lean or refractory, but in no case do the walls come together. In the Alice, in the Lexington, in the Moulton, and in all the copper mines, whether the ore bodies are 10 or 50 feet wide, the walls are always uniform. Faults and displacements do not occur to mar their regularity. They descend generally at an unvarying angle straight into the earth. Ore bodies may "make" or may "pinch" but cross-outs will always find the walls in the mines of Butte. They are as true as the needle to the pole. It is this fact that renders the problem of deep mining at Butte so full of promise. The geology of the camp favors the theory of regular walls with plenty of room between them for mineral deposits as far as modern machinery can sink. The *Inter-Mountain* is firmly of the conviction that before many years it will be called upon to chronicle the shipment from some of the silver mines of Butte the bullion product of some 3000-foot ore, and that sinking will still be in progress.—*Inter-Mountain*.

Soda from Owens Lake.

Very little attention, says the *Inyo Independent*, has yet been bestowed upon the project for getting soda by the evaporation of Owens lake water. A little investigation made recently reveals the fact that this work now going on is one of the most gigantic projects ever undertaken. The value of the material to be secured is so enormous that the figures are startling. The area of the lake is 110 square miles; taking the average depth at only 10 feet—and this is too little—and it is easy to calculate the value of the matter held in solution. From a multiplicity of tests already made the proportion of the various salts contained in the water is well known. From the data given above, and on the basis of the average of the tests referred to, the quantity of carbonate of soda contained in the lake is 22,000,000 tons. This article is worth \$30 per ton; total value of carbonate of soda contained in the lake, \$660,000,000. Surely these are startling figures. But this is not all; the water also contains 5,000,000 tons of sulphate of potash, worth \$20 per ton; total value of sulphate of potash \$100,000,000; value of carbonate of soda and sulphate of potash combined, \$760,000,000. Surely these are startling figures. The lake also contains about 20,000,000 tons of chloride of sodium—common salt—and 6,000,000 or 7,000,000 tons of sulphate of soda; no value is placed upon these. The annual evaporation of the lake averages five feet; if Owens river were turned aside the whole water of the lake would therefore evaporate in two years. There is land enough in Owens valley on which all the water of the river could be used for irrigation. It is now well established that an annual supply of 24 inches of water on each acre of land is an ample supply for all kinds of crops. But say that 30 inches would be required; then the water now flowing into the lake would irrigate 140,000 acres of land. Every acre of that amount is within easy reach of water from Owens river. If supplied with water this land, now valueless, would be worth \$20 an acre; here is another value of \$2,800,000. The work of securing these enormous values is already begun; the conditions for success are all there; the prize is so great to be relinquished, and nothing short of some terrific convulsion of nature will prevent the realization of the scheme. No one will be injured by the success of the projectors; the world will be enriched just as effectually as if the values had been called suddenly to existence by creative power.

SALE OF IRON MOUNTAIN.—It affords the *Democrat* great pleasure to chronicle the transfer of the Iron Mountain silver mines to San Francisco parties of wealth and experience. The trade was closed in the city last week, and as we are informed the purchase price of \$200,000 was paid into the Bank of California on Saturday. Mr. James Sallee, one of the late owners, came up from the city on Friday evening, and Mr. Sharp, late foreman of the mine, followed him on Monday. We learn that Mr. Sallee has secured the contract from the new owners of the property to build a road from the mines to Copley, and to put up a saw-mill at the mine for the purpose of getting out mining timbers and heavy foundation pieces for a 20-stamp mill. He begins work at once on the road. This is the best thing for Shasta county that has happened in a long time. While the old owners of the mine appreciated its value they did not work it on a very large scale and never employed many hands. Under the new management we can look for an active mining campaign, as the mines will be opened in a careful and business-like shape so as to produce billion and pay dividends. This sale will open the eyes and call the attention of other capitalists to our vast mineral region, and we firmly believe that other transactions will follow in the wake of this big transfer. From Iron Mountain to the Balaklava, a distance of nearly four miles we have a belt of gold and silver ore of astonishing dimensions. In some places the croppings of the lode are exposed on the surface for a width of 100 feet and over. This big lode is a mineral wonder. Now that capital with its magic wand has attacked it we can confidently look for an out-turn of bullion that will surprise the mining community.—*Shasta Democrat*.

SWEETWATER DISTRICT.—The mining prospects at Sweetwater are just now looking bright. On the Patterson Consolidated, says the *Carson Free Lance*, there are at work eight men, with the prospect of a much larger force to be put to work in a short time. Mr. Kilpatrick, a one half owner in the mine referred to, said to the writer the other day that they had every reason to believe that within six months Sweetwater would have such a boom as hitherto she has never known. In fact, he said if the public knew of the present developments of the mines in the camp, there would now be a great excitement and a rush thitherward unprecedented. In the mine referred to, in which he is the largest owner, they are going through a ledge, already found to be 12 feet wide, which average assays are \$70 per ton. Mr. Kilpatrick, formerly connected with the foundry of Virginia City, is a gentleman of intelligence and plenty of pluck, and well deserves a handsome remuneration for his large outlay of money in prospecting there. Colonel A. C. Ellis was formerly interested in one of the mines there, but a short time ago sold his interest to Mr. Kilpatrick for \$1000.

MECHANICAL PROGRESS.

Does Vibration Affect the Balance of Machines?

A machine is said to be in balance when it moves harmoniously and without visible vibration; but this occurs only at certain speeds. That is to say, a machine balanced for one velocity will be out of balance at others. The cause of this is obscure, aside from centrifugal disturbance, and many good observers confess their inability to discover it.

The relative velocities of moving parts of a machine remain the same at all speeds, but the relative vibrations do not. At certain velocities the connecting rod of a steam engine transmits the power without vibration or jar; but urged faster it trembles visibly.

These vibrations do not occur in equal times, but are greater or less according as the rod is approaching or leaving the center, and when it is pushing the load or pulling it. Circumstances also affect the vibration. This want of synchronism affects the balance, in that it transfers the jar of the vibration to the moving parts in unequal times. Vibration is not a force, but is an action caused by it, and is undoubtedly a disturbance to harmonious motion.

Again, it is an oft stated point that a reciprocating mass can not be balanced by a rotating mass. If this be true, what becomes of the notorious fact that engines of all kinds move in equal times, as far as we can see? They do not show any want of balance, though cast loose from fastenings, and held down only by their weight. An engine out of balance should give evidence of it by horizontal motion (supposing it to be a horizontal engine) of the head plate on its supports. Engines, when run at certain velocities, under such circumstances, sway the bed plates to and fro; but at higher speeds remain stationary. What has counteracted this tendency when they remain motionless? Has not vibration entered into the question, and by its infinitesimal swaying of masses—like the beats of a pendulum—acted as a balance?

Our argument is for and against; we do not know what causes the disturbances and erratic action mentioned, but it would seem that the vibration of masses of metal at certain velocities may affect the balance of machines in a marked degree. We do not allude to mere tremor, but to visible movements. Even the former may have its influence when large masses are disturbed.—*Mechanical News.*

COVERING WIRE WITH OTHER METAL.—J. Zeugler, of Ansonia, Conn., has patented a machine for covering wire with metal. The machine is designed to cover that class of wire which is first enveloped by an insulating material, after which metal strips are rolled down around it. Four rolls working at right angles to each other are employed for applying the metal strips, and the object of the invention is to so construct the rolls that their working faces may be interchangeable, to present any desirable shape or size. To this effect the working face of each roll is constructed in four segments, grooved around their periphery and fitted to the body of the rolls by suitable clamping plates. Whatever style of wire is required, that particular style of segments is introduced into the machine. When the work with one set of segments has been performed, another set may be introduced without materially deranging the machine. In this way the number of machines necessary for this kind of work in a shop is claimed to be much reduced, thus reducing correspondingly the cost of manufacture.

SECOND-HAND SHAFTING.—The man who buys second-hand shafting to run in his mill is a fool. The man who sells it to him and tells him that it is "just as good as new," is a knave. If the man also buys a second-hand boiler, he is both a knave and a fool, and will buy second-hand machinery as well. When a saw-mill or factory gets cleaned out by fire, the owner will generally build again if he can get as soft a thing with the insurance folks as he had with the old mill. He will look longingly at the old twisted shafting, and ask the machine shop man if it can be "straightened." The machine man lies unblushingly, and says "he can fix it as good as new." It is sent to his shops, and comes back with a bill long enough to buy half enough of new shafting. When started that shafting runs just as it has a mind to. It is shaky, and will always be so. Every time the owner thinks of his "good as new" shafting he groans inwardly and wishes he had bought new shafting.—*Wood Worker.*

THE REPUTATION OF AMERICAN MACHINERY has not only been sustained in recent years, but has been extended to remote parts of the world. The Philadelphia Press says that a prospector sent out some months ago by the Russian Government with the object of gaining information relative to mines and mining, to be made available in the working of the mines of Siberia, has, after visiting many mining districts in this country and Europe, advised his Government to purchase American machinery and to adopt a very large number of the improvements in which, he says, American miners excel. The machinery purchased will be shipped from San Francisco to the mouth of the Amoor river, from whence it will be transported an average distance of 2000 miles into the interior of Siberia.

THE RYE-STRAW CAR WHEEL.—This paper wheel may be larger than the ordinary iron wheel or it may be the same size. Its perpendicular surface, however, is always studded with holt heads. Its surface is never corrugated nor irregular like that of the iron wheel. The paper of a paper car wheel is nothing more nor less than ordinary brown straw board. That made wholly of rye straw is preferable. The boards are cut into disks, and holes in the center are punched large enough to fit the iron axle shoulder that constitutes the hub of the wheel. Thus shaped, the straw boards are placed one upon another with ordinary flour paste, till a pile of them about five inches high is attained. They are then put under a hydraulic press and squeezed together as tightly as it is practicable to compress matter of the consistency of straw board. The pressure is so great as to generate many degrees of heat in the compressed board. After being thoroughly dried, the paper wheel is turned on a lathe to fit the heavy steel tire and shell into which it is inserted to form the core of the wheel. It is held firmly in its position by an iron plate the size of the inner surface of the wheel, and likewise by bolts. And in short, the paper of a paper car wheel is simply a core or filling in a shell of steel, the outer rim or tire that runs on the track being nearly two inches thick. The virtue of the paper consists in the fact that it gives elasticity to the wheel. The durability of the paper wheel, on account of this elasticity, is computed to be many thousands of miles greater than that of the ordinary iron wheel.

DEADENING THE SOUND OF CIRCULAR SAWS. The circular saw frame should be fixed on a brick or stone bed, and the shaft or hearing kept clear of the wall, so that the sound is not carried by contact into the wall. If the wall is not built we recommend a hollow wall with iron ties, and the space filled with sawdust, no opening of any kind being made. If the wall is built, and of single brick, line it with another single brick wall, inserting sawdust between, or a layer of hair felt. If the wall is of wood quartering, lath and plaster it on both sides, and fill in between with sawdust, or coat over the studding with hair felt, and lath and plaster over the face of it. In fixing the quartering, if attached to wood at the top or bottom, bed the attaching points or parts in hair felt. Sound will travel with air, therefore exclude all connection of air. Sound will travel through glass, wood or stone, except it be of great thickness, therefore intercept it by sawdust or hair felt, which are non-conductors. If you have a circular saw on one side of the wall, and you want a point of silence on the other, you must stop all direct communication and cause the sound-laden air to travel in long and circuitous routes, and give out its vibrations before it reaches that point.—*Ec.*

HAND SAWS.—Stiff blades are made of better material than thick ones, and are less liable to "buckle" or "twist," and are not so apt to break. They require less set, will stand an edge longer, and are not so tiresome to work. They should be hung in plain beech handles with rivets flush or countersunk. The blade should be of dark color and have a clear, bell-like ring when struck with the hall of the finger. Blades of a light, iron-gray color are not so good. Never take a saw that jars or trembles in the handle. The first point is to grasp it by the handle and see that it hangs right and that the handle fits the hand properly. Then try the blade by springing it and see that it bends regular and even from point to butt. See that it has a good crowning breast. Hold it at a distance and get a proper light to strike on the blade and you will see if there is any imperfection in grinding and hammering.

ADJUSTING THE TENSION OF SAWS.—In the present state of art, one way of adjusting the tension of circular saws so that they will run true in operation in a true plane, and not buckle, is by hammering the saw between the center and the periphery until it becomes loose. This process of hammering requires very skillful treatment in order to relieve the tension in a uniform manner. But no matter how skillfully it is done, it is injurious to the saw, as the material is thereby made coarse. Mr. William H. Presser, of East Saginaw, Mich., has invented a process which gives a superior result, does away with the necessity of skilled labor, and which can effectually be applied in less time. This process consists in stretching the saw by a certain application of heat instead of by mechanical force. The process is said to be in use by the Michigan Saw Company with satisfactory results.

IRON VS. STEEL FOR RAILROAD AXLES.—A special committee on railroad axles has reported that iron axles are safer than steel axles; that all cranks should have the webs hooped; that as iron cranks appear to fail after running 200,000 miles and steel after 170,000 miles, it is highly desirable that they should be taken off and never again used on passenger engines, and that crank axles properly constructed are as strong as straight axles.

THE CHEAPEST MACHINERY to buy is the best. It will wear longer, require less repairs, and will give better satisfaction than though cheaper in price because inferior in workmanship.

A **FORGE HAMMER** has been invented in England which is driven by gas instead of steam.

SCIENTIFIC PROGRESS.

Friction.

M. Hirn communicates to the *Académie des Sciences* some observations on friction, with particular reference to machines and motors. He has arrived at the conclusion that there is a great difference between the friction of two surfaces sliding upon the other, according as they are dry or separated by a layer of lubricating material. In the case of those surfaces which are dry, the co-efficient of friction is independent of velocities, areas or load. It is otherwise with the other order of sliding bodies, in which, as is generally the case, the surfaces are separated by an unctuous layer. Here the co-efficient of friction is always a function of the velocity, the load and the extent of the sliding surfaces. It is difficult to arrive at exact laws which regulate the phenomena. The quantity of lubricant drawn under the rubbing surfaces, the movement, the temperature of the lubricant, etc., are capable of modifying the value of the co-efficient of friction many times in the course of a single experiment.

It may be broadly stated that, in the general condition of the ordinary machines, the power necessary to overcome friction is proportional to the square roots of the sliding surfaces and of the load and (when the lubricant is abundant) to the velocity. The influence of velocity is above all complex. With great velocities, or at least when the loads are light in comparison with the frictional surfaces, a great number of liquids, very different from oil or fats, become lubricants. Air, under certain conditions, when brought in sufficient quantity between the sliding surfaces, becomes the best of lubricants; the co-efficient of friction being thereby reduced to one ten-thousandth. When on the contrary, the speed is too low or the load too heavy, the unctuous matter may be expelled and the friction become as when dry with a co-efficient rising to one one-hundredth or one-fifth.

Lateral Movements of the Earth's Crust.

While observations are being made for the purpose of investigating "variations of latitude," it is not desirable that the United States Coast and Geodetic Survey should make simultaneous observations with a view to discover, if possible, whether or not places along our coasts are suffering changes of latitude or longitude, or both, due to lateral movements of the earth's crust? If it is true that during geological history large lateral movements of the earth's crust have taken place, and if such changes are still going on, it would seem inevitable that, in regions where lateral displacement is taking place, landmarks should suffer a change of latitude or longitude, or both, according to the direction of yielding to lateral pressure, and that places located upon regions suffering compression or folding should be moved, to some extent, toward places in adjoining regions toward which the movements take place, but which are not themselves undergoing displacements. Since vertical movements of the earth's crust are taking place at measurable rates, and since, in the past, lateral movements appear to have exceeded the vertical, it might be expected that lateral movements are now taking place at measurable rates. Of course, if the superficial strata are not involved in these movements, the deeper strata only yielding, surface landmarks could not reveal the movement; but in this case, and in case folds of the superficial strata along our coasts are in process of evolution, it would seem that such changes might be discovered by sinking deep vertical shafts at intervals along lines normal to the coast. These carefully surveyed at intervals during one or two centuries, it would seem, should show a measurable warping or tilting if such movements are going on.—*Science.*

PROGRESS IN ASTRONOMY.—When the old astronomers mistook the earth for the center of the solar system, or that of the universe, what were the results of their calculations? When the sun and earth were put in their right places by Copernicus, how astronomy progressed in the right direction, and what splendid advances were made by Sir Isaac Newton and Sir William Herschel! The elements of our solar system were not only determined, but with the telescope they peered into the invisible heavens, unfolding telescopic stars, and nebulae composing and decomposing in the formation of stars. With the spectroscopic they have not only given the elementary composition of our sun, but that of the stars and nebulae, with their speed of motion in approaching and receding from our system in their orbital motions. Such have been the achievements in the strides of science in the microcosm of the universe. What sublimity there is in the conception of all this!

WHAT IS MIND?—Go into the chemical laboratory of your own university and touch the two poles of a galvanic battery. What is it that thrills through your bodies, and perhaps even burns the skin of your fingers; or, if the currents be strong enough, strikes you dead on the instant? Galvanism. What is galvanism? A force. Yes, and so is light a force, and heat, and gravitation. But when I am told this, I am just as far from knowing what any one of the forces is as I was before. All that you

could do, if I persisted in asking for fuller explanation, would be to tell me something of the origin and properties of the force in question, and in this way I should obtain some idea of its characteristics, and should be in no danger of mistaking it for any other force. That is what your professor of physics does for you, and if you have only profited by the instruction you have received, you have a store of facts at your command that will enable you to recognize heat, light, electricity, gravitation, magnetism, whenever you see them manifested. When, therefore, you ask me what mind is, I answer that it is a force possessing peculiar properties, and developed by a substance constituting a part of the nervous organism of man and other animals, and known to antagonists and physiologists as gray nerve tissue. This is similar in all essential respects, so far as its terms are concerned, to the definition that you would give me of any other force. Of course it can be made more precise and extensive, but no enlargement would change its character.—*Dr. Hammond at Lehigh University.*

A CURIOUS EXPERIMENT.—Dr. Gross, a German physicist, has made a curious experiment which is not easily explicable by known facts. He placed two electrodes of iron in a vessel of chloride of iron solution, and inserted a galvanometer in circuit, adjusting the current by the Poggendorf Du Bois Raymond method. One of the iron electrodes was then surrounded by a magnetizing spiral through which a current was passed, and it was found that the galvanometer indicated a new current flowing from the electrode that was magnetized through the liquid to the electrode that was unmagnetized. The magnetized electrode was kept cool by circulation of cold water, and Dr. Gross does not think that the effect was thermo electric. When the electrodes were placed in the plane of the axis of the vessel (in this case a tube) with their ends pointing to each other, the current was observed to flow through the cell from the non-magnetic to the magnetized electrode.

AN OPTICAL EXPERIMENT.—A contributor to *Cosmos* suggests a curious optical experiment which may serve to show the principle of the stereoscope. If we cut out of black paper two similar figures—two crosses, for example—and place them, their extremities almost touching, at about three inches from the eyes, before a sheet of white paper, we shall see three crosses, the middle one being dark and completely separate. This phenomenon is explained by the simultaneous vision of the two eyes, and it is easy to show this by looking at the objects successively with one eye. The experiment becomes still more interesting when, instead of black figures, we employ complementary colors—red and green for example. In this case we must use a dark background, and there will appear a white cross in the middle.

A MINIATURE VOLCANO was recently formed spontaneously at the Macquarie Furnace, in Lehigh county, Pa., on the top of a car of melted iron cinder. As the extreme crust of the slag cooled, and, consequently, contracted, the interior gases, cramped for want of room, burst out at the surface in jets and spurts, as in a natural volcanic eruption, and proportionally quite as high, gradually forming a frustum of an irregular cone, with an opening in the center from bottom to top. Through this opening the melted matter was forced up from the mass below, running over from the top of the cone on all sides, and, dripping downward, cooled into beautiful stalactical forms.

THE RAINFALL NOT DECREASING.—The common impression that the rainfall is steadily decreasing is utterly disproved by the record. The average in the city for the whole 48 years ending with 1883, as reported by the Government Signal Office, was 45.36 inches, and the rainfall of 1884 was 55.34 inches, being 10 inches above the average for the previous 48 years, and 13.38 inches above the average for the 16 years beginning with 1836. In fact, 1884 gave us the heaviest fall of rain we have had for 15 years.

A GLACIAL CURRENT.—The glacial Labrador current is annually protruding farther and farther south, crowding the Gulf stream out of its wonted spring course. So great is the southward sweep of the heavy glacial current that when the buoy attached to the broken end of the Atlantic cable of 1865 got adrift it was found to have traveled nearly due south a distance of 600 miles in 76 days in opposition to the Gulf stream.

FOSSIL INSECTS.—In 1879 only 103 fossil insects from the carboniferous rocks of the whole world were known, but during the last five years a great number have been discovered, including 1400 from Commeny, France, a few from Saarbrück, Kleinopitz, Lugau and other Continental European mines, and a very considerable number from the mines in this country.

ARTIFICIAL SPONGE, made of cotton, rendered absorbent and treated with antiseptics, is a recent English product. A piece of the size of a walnut has absorbed water until it has become as large as a coconut. It is so cheap that it need not be used a second time.

ALTHOUGH a variety of microscopic forms of plants have been found on banknotes and coins in circulation, none known to be dangerous to human life have yet been discovered.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday, September 12, 1885

TABLE OF CONTENTS.

EDITORIALS.—Granizita Furnaces; The New River Region; Flue and Chamber Dust, 177. Passing Events; Mining Ditches; Ammonia; New Amalgamating Pan; Practical Hydraulics; The Mechanics' Fair; Admission Day, 180. Bulling Construction; New Dry Washer for Placers, 181.

ILLUSTRATIONS.—Granizita Furnaces for Quick-silver Ores, 177. Beam or Girder of Combined Concrete and Iron; The Dry Washer, 181.

CORRESPONDENCE.—Why Mines do not Sell; Nogales, 178.

MECHANICAL PROGRESS.—Does Vibration Affect the Balance of Machines; Covering Wire with Other Metal; Second-Hand Shafting; The Reputation of American Machinery; The Eye-Stave Car Wheel; Deadening the Sound of Circular Saws; Hand Saws; Adjusting the Tension of Saws; Iron vs. Steel for Railroad Axles, 179.

SCIENTIFIC PROGRESS.—Friction; Lateral Movements of the Earth's Crust; Progress in Astronomy; What is Mind; A Curious Experiment; An Optical Experiment; A Miniature Volcano; The Rainfall not Decreasing; A Gaseous Current; Fo-sil insects, 179.

USEFUL INFORMATION.—Porpoise Skin Leather; A Wonderful Cure; Settlement of Mason Work; Cleaning Clock and Watch Movements; Thin vs. Thick Gauge Band-Saw Bases; A New Tanning Agent; The Redwoods; Substitute for Bristles; For Polishing Old Furniture; The First Cast-Steel Saw; Origin of the Saw, 183.

GOOD HEALTH.—Rubbing Swellings and Bruises; Healing Properties of Water; Nephritis; Consumption in Chickens; Leeches; Refreshing Drinks for Invalids; A Curious Fact; Shingles; Eighty and Over, 183.

MISCELLANEOUS.—Silver; Soda from Owens Lake, 178. Practical Hydraulics, 182. The Manufacture of Alkalies, 183.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 184-85.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 183.

Business Announcements.

Gold Concentrator—Hitchcock & Hershey, S. F.
Steam Pumps—Dow Steam Pump Works, S. F.
See Advertising Columns.

Passing Events.

The holiday celebrated on Wednesday, in honor of the anniversary of California's birth as a State, was duly celebrated by the Pioneers and the Native Sons, and business was generally suspended.

Both the State Fair and the Mechanics' Fair are now in full progress and well attended. Were it not for these annual fairs, we would hardly be in a position to recognize our material advancement in industrial progress; but they place before us, in a practical way, the results of the labor of our artisans and agriculturists, so that we may see how fast we are growing.

There is little new to report concerning mining matters aside from the current news in our summary. The Pine Creek mines, in Oregon, continue to attract considerable attention, and a good many have gone there.

A COAST SURVEY has left, under the direction of James Lawson, to work northward to meet another party under E. F. Dickens, which goes southward from Salinas.

THE Prussian authorities prohibited the use of cast-iron pillars in building, and the Munich professors immediately demonstrated that cast iron was safer than wrought.

WASHINGTON TERRITORY claims to have an active volcano in the mountains of Kititas county.

Mining Ditches.

The system of artificial water channels, made necessary by the requirements of hydraulic mining, and serving also to supply placer mines not worked by the hydraulic process, as well as quartz mills and other works, has become of vast extent and importance. There are now over 10,000 miles of ditch lines in the United States, which, with their flumes, pipes, reservoirs, etc., represent an investment of \$27,000,000, exclusive of the purchase of water rights.

The following table, compiled by the officers of the census shows the extent of plant of mining ditches reported upon in detail in the United States:

State or Territory.	No. of ditch lines.	Total length, including flumes, etc., Miles.	No. of reservoirs.	Length of flumes, Feet.	Length of pipes, Feet.
Total.....	175	3,494½	173	715,921	266,816
Alabama.....	1	1	.....	600	.....
Arizona.....	3	19	1	637	\$5,880
California.....	65	1,707	83	387,218	152,700
Colorado.....	8	583	3	8,424	600
Dakota.....	6	01½	5	145,360	2,000
Georgia.....	8	149½	7	12,490	20,662
Idaho.....	17	396	11	20,457	876
Montana.....	11	160½	9	42,828	1,700
Oregon.....	56	615½	54	89,047	2,400

In the construction of these several lines many novel problems have arisen, demanding the exercise of a high degree of engineering skill. California contains by far the most extensive system of artificial water channels in the United States, including six-tenths of the total length of ditch lines in the whole country. The relative importance of the California ditch lines is, however, inadequately represented by the mere standard of length; their other dimensions, capacity, more costly construction, and economic bearing placing them still higher in rank. Since the beginning of hydraulic mining an immense amount of ditch construction has been carried on. Thousands of miles of now idle and useless ditches were built in camps long since deserted, and in localities where placer mining is still profitably prosecuted there are also many idle ditches which have been supplanted by newer and larger ones at higher grades. In Boise basin, Idaho, it is estimated there are no less than 800 miles of old abandoned ditch, costing \$85,000, and more than double the length of those now in operation. Many such cases exist in California also. Some idea of the magnitude of the water interest in the United States may be gained from the following exhibit:

Total length of ditch lines..... (miles)...	10,788
Total length of ditches proper.....	10,183
Total length of flumes.....	450
Total length of pipes.....	150
Greatest length of miles under one ownership.....	200
Average length of ditch lines reported, including feeders, etc.....	26
Average length of all California lines.....	12½
Maximum capacity of ditch lines (gallons per 24 hours).....	7,500,000 00
Total cost of plant, including reservoirs, etc., and excluding cost of water rights.....	\$27,056,942 11
Average cost per mile, including reservoirs, etc., of lines reported.....	3,900 60
Average cost per mile, including reservoirs, etc., of all lines.....	2,509 22
Highest cost of plant reported under one ownership.....	2,100,000 00
Nominal capital stock of 13 corporations, exclusive of mining companies, owning ditches.....	\$8,805,000 00
Working capital of 27 lines.....	1,451,300 00
Total annual expense of maintenance.....	\$27,280 41
Annual cost of repairs.....	200,288 66
Annual cost of attendance, exclusive of repairs.....	626,991 75
Average length of season of lines reported (days).....	211

There are other particulars concerning the mining ditches in this State, which are not included in the census returns, and these are shown in the following table:

Name.	Length.	Capacity.	Cost.
Miles.	Inches.	Dollars.	
Total.....	498½	21,500	\$3,609,912
North Bloomfield, including reservoirs.....	157	3,200	708,544
Milton, including reservoirs.....	80	3,000	391,579
Eureka lake and Yuba.....	103	5,800	723,342
Smartsville ditches.....	.....	5,000	1,000,000
Hendricks.....	46½	.....	136,150
La Grange.....	20	2,700	500,000
Blue Tent.....	32	1,800	150,000

Ammonia.

Among the by-products of the San Francisco Gaslight Company, one of the most important is ammonia in its various forms. For household and washing purposes large quantities are made. The company has just put in improved appliances for the manufacture of this product, although they are not yet in working order. Their object is to produce the best article on an economical basis, and offer it to the public at a figure which will make it an object to use

no inferior article. The ammonia made by the company is of a standard strength, regularly maintained. Of course if water is added, the strength is reduced and the substance thus diluted can be sold for less money; but there is no economy in this. While the inferior article sold is not an imitation, of course it is of such a weak nature that twice the quantity will have to be used to accomplish the object the purer article would.

The washing ammonia put up by the S. F. Gaslight Co., is sold in bottles ready for use, with directions as to quantity, etc. They have no object in furnishing it below the standard grade, and have taken out a trade mark, which is shown in our advertising columns, to protect consumers from buying an inferior article of less strength and of less economy.

New Amalgamating Pan.

Mr. M. P. Boss, the well-known millman, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improvement in amalgamating pans, consisting of a steam chamber or space for the base and cone of the pan, and a peculiar bottom. The object is to provide the greatest possible heating surface.

In order to provide a steam chamber or space of as great an extent as possible to obtain a large heating surface, Mr. Boss has a plate-piece or casting, formed with an annular plane surface, a cone center and a tubular extension. This is fitted to the under side of the pan, its cone extending upwardly within the cone of the pan, and its tubular extension projecting through and beyond said cone into the head and forming the bearing for the shaft. A space is left between the plate-piece described, and the bottom and cone of the pan, forming the steam chamber, a packing being placed in an annular rib under the pan, and a rust or other steam-tight joint being formed between the top of the cone and the base of its tubular extension.

This lower plate-piece is tightened to its seat by screws. Steam ports communicate with the space between it and the bottom and cone of the pan. It will thus be seen that both the bottom and cone of the pan are adapted to be heated and that its construction is simple, practical and enduring.

Of course Mr. Boss is aware that steam chambers have been heretofore provided for the bottom of a pan and also for a cone, separately, but his idea is a continuous steam chamber in a single pan for both bottom and cone.

In addition to forming the seat for the packing ring, the rib or connection with an inner and concentric rib and the bottom of the pan, serve another purpose. When the shoe and dies are not fitted accurately in the same vertical plane, it is not unusual for the edges of the former to be worn into a point and those in the latter to be beveled or rounded down. This brings the shoes into contact with the bottom of the pan, which, being of much softer iron, wears through, but by having these ribs at this point of wear the pan cannot be worn through.

Practical Hydraulics.

In this number appears the first of a series of articles on "Practical Hydraulics," written specially for the MINING AND SCIENTIFIC PRESS, by P. M. Randall, author of "The Quartz Operator's Handbook," and a recognized authority on this and kindred topics. The articles will be found useful to both engineer and miner. For the engineer the necessary formulae are given, and for those not skilled in mathematics tables will be provided with the necessary explanations for their use, so that no calculation need be made.

It is the object of this series of articles to give in the simplest form such information concerning hydraulics as is needed in every day work in mining and irrigation enterprises. The measurement of water, its flow through pipes, ditches and flumes, the various conditions under which it is used, etc., will be treated. Mr. Randall is thoroughly versed in the details of the subject and can handle it in a satisfactory manner.

The conditions under which we use water on this coast are different from what they are in most other parts of the world. We have high heads and large quantities. We carry water very long distances, and our storage reservoirs are of great extent. The problems of proper management in the purchase and sale are in some respects peculiar. Of all these things Mr.

Randall will write more or less, and we feel certain that the series will be of great interest and practical value.

The Mechanics' Fair.

No one who walks among the exhibits at the Mechanics' Fair can fail to be impressed with the varied forms which illustrate the industrial interests of this State. It is a revelation to many people to see what a number of things are manufactured in our midst, and how excellent are the products. The first thing that strikes the observer on entering is the elegance and variety of the carriages in the displays, all showing fine workmanship and finish and beauty of design. Then the agricultural implements claim attention, showing as they do not only great inventive faculty but skill in construction. Scattered about are numerous smaller articles of household and industrial uses, each of which has an important place in modern and civilized life.

In the machinery department are pumps, steam engines, machine tools, printing presses, electrical apparatus, and all sorts of mechanical appliances. The mining machinery exhibit, is, however, small. Probably the exhibit which shows our industrial advancement most is that of the Pacific Rolling Mills, where are shown steel castings, forgings, bolts, iron in various forms, a large crank shaft, and a miscellaneous collection of the products of the mills. The collection of native woods is varied and excellent. On the other side of the Pavilion are the natural products of different counties of the State in great profusion, and many miscellaneous exhibits.

Up stairs the art gallery claims attention, with its collection of paintings, drawings, etc. And the other galleries contain the great organ, pianos, furniture, lounges, bric-a-brac, stained glass and a profusion of articles too numerous to mention.

The attendance at the fair continues large. People who seldom at other times give a thought to industrial matters are here shown what our mechanics and artisans are doing. California manufactures are rapidly extending their scope in many directions with the result of maintaining among us a class of settled population which is of the greatest benefit to the State. It behooves us, then, to encourage these men, and to purchase, wherever practicable, the articles which are made in our own communities. The fair is doing a good work in bringing before the public such articles as are made here, and showing what strides we are making in industrial advancement.

Admission Day.

The anniversary of the admission of California into the Union, was appropriately celebrated by the California Pioneers in this city, and by the Native Sons of the Golden West at Santa Rosa, on Wednesday last. The celebration at Santa Rosa was particularly brilliant. There was a reception, procession, literary exercises, an address by the Governor of the State, and in the evening there was a grand ball.

The anniversary of the admission of California into the Union, celebrated this week, brings to the mind of all old Californians the stirring times of early days, when they were laying the foundation of the "Empire of the Pacific." Few who were not here in the "days of 49" can appreciate the struggles and hardships of the pioneers of our noble State. Still these hardships are now forgotten, and those who experienced them remember only the excitement of those "days of gold," when everybody was getting rich, and when every day brought forth events which are now of historical interest.

The history of the discovery of gold in California is well known. Before that discovery California was merely a vast cattle range and in a state of semi-civilization. Its population was scant, and made up mostly of Mexicans and Indians, the few scattered missions established by the Catholic priests being the only settlements of note. San Francisco, known then as Yerba Buena, Monterey and San Diego, were the seaports, where a few hide-droghers occasionally called. The population was mainly near the coast, the interior being occupied by wandering tribes of Indians.

Space forbids our indulging in even a brief retrospect of the doings of these early days. The rush of thousands of adventurers to the

golden shores of California immediately succeeded the announcement of the discovery of gold, and before long the sleepy shores teemed with busy, excited men, and the building of a State was begun.

The anniversary of the day California became a State is now a legal holiday. Banks and places of business are closed and recreation is indulged in, while the California Pioneers and the Native Sons, by appropriate ceremonies, keep alive the remembrance of the day.

Building Construction.

Construction of Iron and Concrete.

Some tests were made last week, at the iron works of McTormick Bros., on Beale street, near Folsom, with an improved form of girder for building purposes, introduced in this city by P. H. Jackson. A number of prominent architects, builders and engineers were present at the trial, and watched the progress of the gradual bending and final breaking of the beam, the object being to see what load it would carry.

This improvement in building construction is in making the part to be supported aid in its own support, instead of the ordinary application requiring the use of supporting iron beams or girders of ample strength to sustain the entire structure. This new construction is the patented invention of Mr. Thaddous Hyatt, who found that iron or steel bars with a roughened or holding surface may be combined with hydraulic cement or concrete as tie metal, capable of furnishing all the tensile strength needed to balance the compressive force of the other materials, when the structure is subjected to a bending stress.

In the ordinary application for the support of a structure, as a wall of a building, or a sidewalk with the vault beneath, iron beams and girders are used, and are required to be of sufficient strength to support the entire load: but by the discovery of Mr. Hyatt, after years of study and by many experiments, it was found that all the metal of supporting beams may be dispensed with save the tie only; also, that baked bricks and concrete possess in themselves cohesive power and strength sufficient to perform the functions ordinarily performed by a metallic web. Therefore, all structures made of brick, stone, concrete, artificial stone and the like, may aid in their own support so far as resisting the one force of compression when united with a base of hydraulic cement or concrete combined with iron or steel ties, which will resist the other force-tension. The resisting of these two forces is all that is required in a beam or girder in sustaining a load. These ties may be of any shape. Steel or iron bars or rods, and may be used singly, several in the cement or concrete body and disconnected, or may be connected together in a gridiron form, with their surfaces roughened, corrugated, serrated, or other than the regular smooth surface common to metal bar or rods, or may have pins or cross ties in the manner of a gridiron. Mr. Hyatt found that when the structure was subjected to a severe bending stress smooth bars pulled through, even when the ends were fastened,

For a row-stress girder a tie may be made to depend on the two end fastenings only, but a beam proper must be qualified to resist cross strains at any part, and equally well. The tie must of necessity be attached to the web practically throughout its entire length, and as firmly at one point as at another. The application of this invention may be in two ways: one as a separate beam or girder made of sufficient strength to sustain the entire structure as that of any other beam or girder which will have to resist both compressive force and tensile strain. The other is in forming at the base of a wall to be erected, or other like material structure to be supported, having the property of adhering to hydraulic cement or concrete, a sufficient quantity of iron or steel ties to resist tensile strain embedded in the bottom of a body of hydraulic cement or concrete, as a holding power to the ties; and the top of the cement or concrete body which surrounds and holds the ties unites with the brick or stone that forms the wall or other structure to be built on its top. The whole wall or structure, when the cement or mortar holding the bricks or stone has become hard, is united with the hydraulic cement or concrete holding the ties at its base, and from the ties at the bottom to the top of the wall, bears that relation for strength as the depth of a beam or girder, the upper part of the wall above the neutral axis resisting compression, and the ties at the bottom resisting tension, as in that of the bottom flange of a wrought-iron girder.

In case of an artificial stone sidewalk a floor or roof of a building resting on arches of the same material, the sidewalk and arch being in one piece, and in place of the usual iron supporting beams, these metallic ties are built in near the bottom of the arches and take the

place of the bottom flange of the ordinary beam, the ties resisting the tensile strain, and the upper part of the arch and sidewalk above the neutral axis resisting the compressive force and so far aiding in one-half of its own support.

With the former the combination is a concrete beam combined with iron or steel ties and is required to sustain the entire wood upon it. Portland cement, sand and gravel has a great resistance to crushing but is comparatively very weak in resisting separation or tension. In General Gilmore's Work on Coignet-Beton and Other Artificial Stones, mention is made of his experiments in which he found that of a mixture of 1 volume of Portland Cement to 2 volumes of sand, the ratio of the compressive to the tensile strength varied from 14 to 1 to 19 to 1. With 1 cement and sand 4 it reaches high as 25 to 1 and 29 to 1. With cement 1 and sand 5 as high as 35 to 1. Comparing these resistances with that of cast iron the ratio of the compressive to the tensile strength is but 64 to 1.

When a beam is subjected to a bending stress from the load it becomes more or less curved, by virtue of which the lower part is lengthened and the upper part shortened, in proportion to the depth of the beam and the difference in length between the radii of the curves. Were the beam made up of horizontal layers the effect of the stress would be to cause these to slide one upon the other, but the beam being solid the particles are held together by their own cohesion, the wearing stress being thus opposed by the cohesive force. The primary strains in the beam, or the lines of compression or extension being upon the curved lines, the disturbed particles must of necessity tend to arrange themselves in harmony with the radial lines of circles, all below the neutral axis seeking extension, and all above compression.

As a better illustration of these force reference is had to Figure 1, of the engraving, which represents the side view of a beam or structure to be loaded and to be subjected to transverse strain. When loaded the line xy will represent the neutral axis or dividing line between the compressive force above and the tensile strain below it. The greatest forces and strain will be at the extremes from the neutral axis. The imaginary vertical lines ef are at right angles with the bottom and have reference to the loaded beam or structure, Fig. 2. The distance from any two of these lines in Fig. 1, from e to e at the top is the same as from f to f at the bottom; also the length of the beam along the top and bottom are equal. Fig. 2 represents Fig. 1 loaded by the weight L and subjected to a severe bending stress. The vertical lines ef in Fig. 1 have become radial lines in Fig. 2, caused by the load L , radiating from a center to the curve of the bottom of the beam. The distance from f to f at the bottom of the beam in Fig. 2 is greater than in Fig. 1, the tensile strain or thrust force has disturbed the particles below the neutral axis and elongated the beam in that part, the greatest at the bottom surface of the beam, and gradually diminishing up to the neutral axis where the tensile strain ceases, and from the neutral axis the compressive force begins, and gradually increases until the top is reached where it is the greatest. The distances from e

BEAM OR GIRDER OF COMB

to e is shortened, also the length of the beam at the ton.

Mr. Hyatt, knowing that Portland cement concrete will resist a great compressive force without crushing and was comparatively very feeble in resisting separation of the particles, devised a means to prevent the bottom of these imaginary lines at f/f from spreading by building in the material thin iron or steel ties with a holding surface other than the plain bar to prevent the slipping or the sliding of the surrounding material over the ties along the bottom of the beam. This would furnish all the tensile strength needed below the neutral axis to balance the great resisting property of the Portland cement concrete above the neutral axis if the structure was a beam, or if the brick work of the structure was a brick wall.

Mr. P. H. Jackson, who has the sole right for this coast for Mr. Hyatt's patent, had a beam made in order to test the holding together of these imaginary lines, by seven longitudinal ties of flat iron connected together by $\frac{1}{4}$ inch round iron rods at distances equaling that from $\frac{1}{2}$ to $\frac{3}{4}$ Fig. 1 on the principle of a gridiron. With this beam the trial of last week was made. Fig. 3 shows a side view of this beam. Fig. 4 is a cross section. It was seven inches wide across top and bottom.

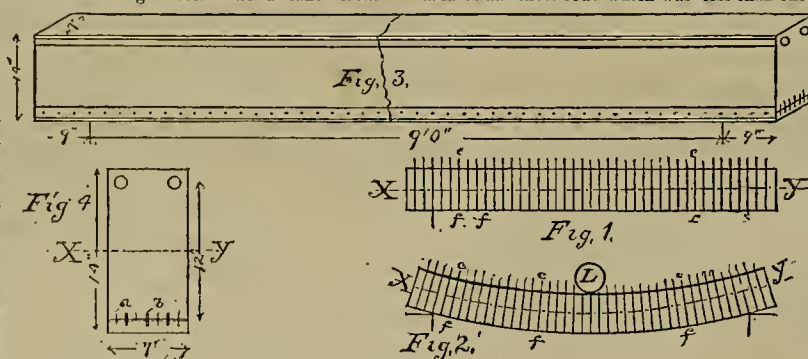
The neutral axes $x y$ in Fig. 2 is the original length of the beam, providing the two opposite forces are balanced in resistance. If

all these imaginary lines, e, f , are held so as to resist the horizontal thrust along the bottom so as not to widen at f, f , as in Fig. 1, and they are also held so as not to draw together at e, e , on the top, then there can be no bending of the beam when loaded, and it will remain as in Fig. 1, and 14 inches deep. Length, 10 feet, 6 inches. Distance between supports, 9 feet. The beam was made of Portland cement and gravel, and was five months old. Near the bottom of the beam was built in three of $\frac{1}{2} \times 1$ inch and four $\frac{1}{2} \times 1$ inch flat iron ties extending the length of the beam, and at every three inches in length, extending the middle of the beam through these seven longitudinal tie bars, were $\frac{1}{2}$ -inch round cross rods, seven inches long, tying the beam in its width; then $\frac{1}{2}$ inch rods were attachments or cross ties to prevent spreading from f to f , as in Fig. 1. This gridiron construction Mr. Hyatt believes to be better than his single bars, roughened in a holding surface other than the regular surface of a metallic bar, as the gridiron principle ties the beam across and unites them in resisting tensile strain. The weight of these ties and cross rods was but 46½ pounds. The $\frac{1}{2}$ -inch hole in the ties reduced the 1-inch width of iron to $\frac{1}{2}$ inch tensile resisting width, therefore the area of these ties is as follows: 3 of $\frac{1}{2} \times 1 = .563$; 4 of $\frac{1}{2} \times 1 = .375$; total, .938 of an inch, or less than one square inch of iron. Two $\frac{3}{4}$ -inch diameter cast-iron rope moldings were built in near the top, as shown in Fig. 4, to resist compression, and was in excess of what the case required, as the concrete above the neutral axis furnished nearly the resistance required. Cast-iron being harder than wrought-iron to resist compression, as its resistance is 93,000 lbs. per inch, wrought-iron being but 36,000 pounds per inch. The resistance by the cast-iron rods would equal the compressive resistance were there a brick wall on top of the concrete body. The beam was loaded over the length between the supports with pig-iron, and was closely piled up 7 feet 6 inches in height before it broke. It was loaded as follows:

Tons.		Inch.
101,	(20,695 lbs.), deflected.	1-16
153,	(30,380 " " "	3-32
153,	(33,590 " " "	1 8
	(35,703 " " "	
18,	(36,045 " " "	1-4
19,	(38,113 " " "	0-32
20,	(40,056 " " "	3-8
21,	(42,062 " " "	1-2
22,	(44,077 " " "	0-16
	(45,078 " " "	21-32
23,	(46,115 " " "	23-32
	(47,018 " " "	3 4
24,	(47,596 " " "	13-16
24½,	(49,081 " " "	5 8
25,	(50,054 " " "	15-16
26,	(52,062 " " "	1 1-8
	(52,632 " " "	1-3-10
20.8,	(53,054 " " "	

Broke, by separation of the tie bearing apart at the holes where the $\frac{1}{4}$ -inch rod passed through and at the center of the length of beam. It is now to be seen in front of No. 231 First street.

The great load required to break this small heam was a matter of surprise to those present in so far of its exceeding that of a wrought iron heam with a bottom flange equaling the area of all these rods which was less than one



BEAM OR GIRDER OF COMBINED CONCRETE AND IRON

square inch. The distance from the center of the ties to the center of the cast-iron bars was 12 inches, as in Fig. 4, therefore, computing it as a wrought-iron beam 12 inches deep we have from the formulae as follows, the breaking distributed height, computing the area of bottom flange at one inch, and depth 12 inches:

$$\frac{1'' \times 12 \times 80 \times 2}{9 \times 12} = 17.8 \text{ gross tons, or } 19.9 \text{ net tons.}$$

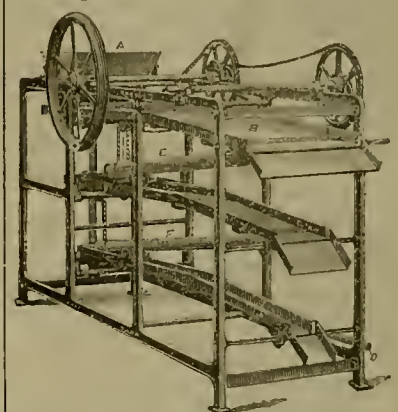
Excess of the Hyatt concrete beam over that of a wrought-iron beam is seven tons, or one-third greater. Cannot be from any other cause than its lateral resistance, being a solid instead of a web, also the bottom flange of an iron made up beam has many punched rivet holes weakening the plate. This construction is certainly new to us, and worthy of adoption when the structure to be supported aids in its own support to the extent of one-half. The result of this trial shows this construction from the deflections may be safely employed at one-fourth its breaking load.

THE GOLDEN GATE CONCENTRATOR has recently been tried in the Chicago-Phoenix Mill, in this State, with, it is said, satisfactory results. Its capacity is large, so we are informed, and it does its work well. We are not at present advised as to any details of construction or operation.

New Dry Washer for Placers.

There is on exhibition at the Mechanics' Fair a new form of dry washer called the Hitchcock & Hershey dry placer gold concentrator. This machine is designed to work gold-bearing gravel in places where water, for washing, cannot be obtained, except in very limited quantity, or at great expense. Such districts exist, in large areas, in the southern counties of California, as well as in Arizona and New Mexico, and in the republic of Mexico, where the want of a portable and effective means by which the gold they contain can be rapidly and cheaply separated, is generally recognized.

The machine is quite simple in form, as the engraving shows. It consists of three inclined



Hitchcock & Hersey Dry Washer.

wooden platforms, B, to each of which is imparted a reciprocating motion. The material is fed from an adjustable hopper, A, onto the upper platform. The upper portion of this platform is flat, and the lower end inclined, as shown. The agitation caused by the vibration causes the gold and heavy fine stuff to settle, while the coarse gravel or tailings passes off over the end of the platform. About 70 to 80 per cent of the tailings passes off at the first tray. The gold and finer material, which settles on the bottom of the platform or tray, B, when it gets to the lower end, passes through a slot under a broad steel knife, S, which is adjustable, and which separates the under and upper strata. This under or richer layer then falls through the slot under this knife into a tube or pipe, E, which leads it back to the upper end of the second tray or platform, where it is submitted to a second similar concentration; and again it passes to a third tray through the pipe, F, in a similar manner. At the lower end of the third tray, where the final separation occurs, the valuable material passes through a discharge spout, D, into a suitable receptacle, the tailings passing off at the end on to the dump. The concentrates may be again passed through the machine if desirable. It can be run by hand or horse power.

A ton of gravel having passed the machine once, is reduced to about 75 pounds, or less (varying with its quality), in which it is claimed will be found about 95 per cent of the gold originally held in the total bulk. Coarse and fine gold are saved with equal facility, but it is manifest that what is known as "float" gold, is more liable to escape.

The capacity of one machine requiring two men to work it, will average 20 tons of gravel per day. They can be built of any size and capacity, but it is believed that when horse or other power is to be used, a number of hand machines, set side by side and provided with pulleys, will prove more satisfactory.

Some preparation of the gravel is often required to break lumps, and separate boulders and stones larger than a walnut, but as placer deposits often lie on hills or hillsides, advantage can be taken of that fact to supply gravel to machines through an inclined trough arranged with a suitable "grizzly," or screen, under which a second trough may convey it to the machines and feed it to them almost automatically.

The machine is built so that all parts are interchangeable, and weighs about 325 pounds. It is readily taken apart for packing. Two mules could carry the machine and a camp outfit for prospectors. The trays are made of good hard wood. Very little power is required to drive the machine, and there are no blowers or fans, as most dry washers have. It is claimed that five of these machines run together will wash 100 tons of dust or gravel per day. We saw a test of this machine when six grains of pure gold were placed in about 100 pounds of clean gravel. After it was passed through the machine, the gold obtained was weighed and showed a scant six grains, proving very little loss, if any. The frame of the apparatus is of malleable iron, and is light and strong.

PRACTICAL HYDRAULICS.

NUMBER 1.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDAL.]
[COPYRIGHTED.]

The term hydraulics was originally applied to water, pipes, or to the conveyance of water through pipes. It is now used in a wider sense to designate that branch of engineering which treats of water in motion, the means of measuring, conveying and raising it, and its application to machinery as a prime motor.

The source of this motion is the force of gravity—a force which acts indiscriminately upon every particle of matter, and impresses upon each particle at every instant the same degree of velocity *in vacuo*. The fundamental principles or laws of hydraulics then, are those of uniformly varied motion.

These, with respect to a body falling from rest through a certain height *in vacuo*, are as follows:

1st—The velocities acquired are proportional to the times elapsed since the beginning of the motion.

2d—The spaces fallen are proportional to the squares of the times elapsed.

3d—These spaces or heights are proportional to the squares of the velocities acquired at the end of each.

4th—The velocity acquired at the end of the first unit of time is equal to twice the distance fallen during this time.

The intensity of the force of gravity varies in different latitudes, but for most purposes in hydraulic calculations, it may be regarded constant.

The velocity which the force of gravity can generate in a second of time at the surface of the earth, is usually designated by g , and is termed *acceleration of gravity*. Its value, as given in Rankin's Applied Mechanics, p. 485, for Lat. 45° at sea-level, is g .

This $g = 32.1695$ feet.

For the most part in practice $g = 32.2$.

In case a high degree of accuracy is required, the oblateness of the earth, the latitude and elevation of the place at which the value of the force of gravity is sought, have to be considered.

The formulas involving these elements (the two former deduced from numerous pendulum experiments made in various parts of the world), are given in Rankin's Applied Mechanics, pp. 485-486, as follows:

$$R = 20,887,540 \text{ feet } (1 + 0.00164 \cos 2l) \quad (2)$$

$$g = g' \left(1 - 0.00284 \cos 2l \right) \left(1 - \frac{2h}{R} \right) \quad (3)$$

In which R denotes the earth's radius at the locality of observation, l the latitude, g' the force of gravity at sea-level, in Lat. 45° , and g the force of gravity at the elevation above sea-level in the given Lat. l . The factor $\left(1 - \frac{2h}{R} \right)$ in the second member of equation (3) is readily obtained from the well-established proposition that the gravity of a body varies inversely as the square of the distance from the center of the earth. If in a given latitude l , g denote the force of gravity at sea-level, and g'' the force of gravity at an elevation, h there will result:

$$g'' = g \left(1 - \frac{2h}{R} \right) \quad (4)$$

When $h = 0$, it is obvious that in equations (3) and (4), the factor $\left(1 - \frac{2h}{R} \right) = 1$.

When $l = 45^\circ$, $\cos 2l = 0$; whence

$$R = 20,887,540 \text{ feet} = 3956 \text{ miles.} \quad (2)$$

Example 1.—What is the value of the force of gravity at Presidio, San Francisco, in latitude 37° , $47'$, $48''$, at sea-level.

Calculation.—Employing formula (3).

Find $\cos 2(37^\circ, 47', 48'') = 0.2488$.

Substitute this value, namely, 0.2488, and the value of $g' = 32.1695$, of equation (1) in equation (3), observing that $h = 0$, $g = 32.1695 (1 - 0.00284 \times 0.2488)$. Whence $g = 32.1468$ ft.—*Answer*.

Ex. 2.—In latitude 37° , $47'$, $48''$, as in Ex. 1, what is the force of gravity at an elevation of 2 miles?

Cal.—We find from (2) and (2),

$$R = 3956 (1 + 0.00164 \times 0.2488).$$

Whence $R = 3957.6$ miles.

Substituting this value of R and the value of g as found from Ex. 1, in equation 4, $g'' = 32.1468 \left(1 - \frac{2 \times 2}{3957.6} \right)$ Reducing $g'' = 32.1144$.—*Ans.*

Ex. 3.—Required the force of gravity at an elevation of two miles above sea-level at the equator.

Cal.—When $l = 0$, find $\cos 2l = 1$. Substituting this value of $2l$ in eqs. (2) and (2), and reducing $R = 3962.5$. Substituting the value of $R = 3962.5$, the

value of $\cos 2l = 1$, the value of $g' = 32.1695$, and the given value of $h = 2$ miles in formula (3).

$$g = 32.1695 \left(1 - 0.00284 \right) \left(1 - \frac{2 \times 2}{3962.5} \right)$$

Whence $g = 32.0457$.—*Ans.*

Remark.—Had we made $R = 4000$ in the preceding examples, it would in no case varied the result to exceed .0003. We may, therefore, without sensible error, regard the radius constant and equal to $R = 4000$.

These refinements, with respect to variations in the force of gravity under different conditions, though highly important in establishing a standard of measurement, and in various scientific investigations, yet for the most part are little applied in practice.

Reverting to the subject of the laws of varied motion, it will be noted that the velocity acquired by a falling body at the end of the first second of time, is double the height which the body has fallen during that time. A body then, *in vacuo*, falls during the first second of time 16.1 feet, or more accurately, 16.085 in lat. 45° .

Denote in seconds, the times of a falling body *in vacuo* by the consecutive numbers—1, 2, 3, 4, 5, 6, 7, 8, 9, etc.

Then, according to the 2d law, the heights of the fall are proportional to the squares of these times; thus—1, 4, 9, 16, 25, 36, 49, 64, 81, etc.; and, according to the 3d law, the heights are proportional to the squares of the velocities acquired during these times.

If the height of fall, as found by law 2d, due any given time, be taken from the height of fall due this time increased by one second, the remainder will be equal to the space fallen during this increment of one second.

Thus the heights, so fallen in the natural order of times, are 1, 3, 5, 7, 9, 11, 13, 15, 17, etc.

Examples and Calculations.

Ex. 4.—How many feet will a body as water fall *in vacuo* during the 5th second of its descent?

Cal.—By the foregoing it will be seen that the fall during the 1st second is 16.1 feet nearly, and during the 5th second is 9 times as much:

$$\text{Hence, } 16.1 \times 9 = 144.9 \text{ feet.} \text{—Ans.}$$

Ex. 5.—What distance will water fall *in vacuo* in 5 seconds?

Cal.—Note in accordance with law 2d, that a body falls 25 times as far in 5 seconds as it does in 1 second; hence, $16.1 \times 25 = 402.5$ feet.—*Ans.*

In further illustration:

Cal.—Note that the heights fallen respectively during each second of the given time of 5 seconds, are 1, 3, 5, 7, 9. The sum of which is 25, as found in the preceding calculation; hence, $16.1 \times 25 = 402.5$ feet.

Ex. 6.—What will be the velocity of water falling, *in vacuo*, at the end of the 5th second?

Cal.—Observe that, according to the 1st law, the velocity is 5 times as great at the end of the 5th second as it was at the end of the first—that is, $2 \times 5 = 10$; hence, $16.1 \times 10 = 161$ feet.

RULES WITH RESPECT TO THE RELATIONS OF SPACE, TIME, VELOCITY, AND THE FORCE OF GRAVITY, INVOLVED IN THE FALL OF A BODY AS WATER IN VACUO.

The velocity given to find the head or distance the water has fallen.

Rule 1.—Divide the square of the given velocity by twice the acceleration of gravity—that is, by 64.4.

Ex. 7.—The velocity is 150 feet per second; what is the head on distance fallen?

$$\text{Cal.}—150 \times 150 \div 64.4 = 349.4 \text{ feet nearly.} \text{—Ans.}$$

To find the head or distance water will fall in a given time

Rule 2.—Multiply the square of the time in seconds by 16.1 feet.

Ex. 8.—What distance will water fall in 4 seconds?

$$\text{Cal.}—4 \times 4 \times 16.1 = 257.6 \text{ feet.} \text{—Ans.}$$

The time given to find the velocity of water falling freely.

Rule 3.—Multiply the time in seconds by the acceleration of gravity—namely, 32.2 feet.

Ex. 9.—What velocity does water acquire in falling 7 seconds?

$$\text{Cal.}—32.2 \times 7 = 225.4 \text{ feet.} \text{—Ans.}$$

The head, or distance of water fallen freely, given to find the acquired velocity.

Rule 4.—Extract the square root of twice the product of the head and the acceleration of gravity; or multiply the square root of the given head by the square root of twice the acceleration of gravity—that is, by 8.025.

Ex. 10.—What velocity will water acquire by falling freely 196 feet? In other words, with what velocity will it flow under a pressure or head of 196 feet?

Cal.—Square root of 196 feet is 14 feet; Then $14 \times 8.025 = 112.35$ feet.—*Ans.*

The velocity being given to find the time which a body, as water, has fallen.

Rule 5.—Divide the given velocity by the acceleration of gravity, viz.: 32.2 feet.

Ex. 11.—The velocity is 322 feet per second; what is the time fallen?

$$\text{Cal.}—322 \div 32.2 = 10. \text{ seconds.} \text{—Ans.}$$

To find the time required for water to fall freely through a given distance.

Rule 6.—Extract the square root of twice the given distance, divided by 32.2; or, in other words, divide the square root of the given distance by the square root of one-half the acceleration of gravity—that is, by 4.012.

Ex. 12.—What time will water require to fall freely a distance of 144 feet?

Cal.—The square root of 144 feet is 12 feet; hence, $12 \div 4.012 = 3$ seconds nearly.—*Ans.*

Determination of these laws of hydraulics by analysis.

To determine these laws let h represent the head or distance in feet, through which the water acts, or has fallen in a given time denoted by t , let v represent the velocity acquired at the bottom of this head or distance fallen, and let g denote the acceleration of gravity—that is, the velocity which the force of gravity can generate in a second of time at the surface of the earth.

Then the expressions for velocity and acceleration of gravity will be:

$$v = \frac{dh}{dt} \quad (5)$$

$$\text{and } g = \frac{dv}{dt} \quad (6)$$

Eliminate dt from (5) and (6):

$$dh = \frac{v dv}{g} \quad (7)$$

$$\text{Integrating (7) } h = \frac{v^2}{2g} \quad (8)$$

$$\text{Integrating (6) } v = gt \quad (9)$$

$$\text{Combining (5) and (9) } dh = g t dt \quad (10)$$

$$\text{Integrating (10) } h = \frac{gt^2}{2} \quad (11)$$

$$\text{Combining (9) and (11) } h = \frac{v^2}{2g} \quad (12)$$

$$\text{Reduced (7) as to } v \quad v = \sqrt{2gh} = \sqrt{2} \times \sqrt{g} \times \sqrt{h} \quad (13)$$

$$\text{Divide (9) by } g \quad t = \frac{v}{g} \quad (14)$$

$$\text{Reduce (11) as to } t \quad t = \sqrt{h \div \frac{g}{2}} \quad (15)$$

By inspection it will be seen that in the text, the given rules and the enunciations termed laws are derived from these formulas, or are but expressions for them; and that the relations of space, time, velocity and force of gravity are more clearly expressed by formula than it was possible to do by words.

To facilitate this inspection, the following references to the different forms of expression, but equivalent in meaning, are given. Thus—

Laws.	Rules.	Formulas.
1st.	3d.	(9) $v = gt$.
2d.	2d.	(11) $h = \frac{gt^2}{2}$.
3d.	1st.	(8) $h = \frac{v^2}{2g}$.
4th.	—	Modification of (12) $v = 2h \div 1$ See.
	4th.	(13) reduced from (8") $v = \sqrt{2gh}$.
	5th.	(14) reduced from (9) $t = \frac{v}{g}$.
	6th.	(15) reduced from (11) $t = \sqrt{\frac{2h}{g}}$.

The value of g being substituted in these formulas, every possible question with respect to the free fall of water or other body can be answered.

The formula of most frequent occurrence in hydraulics corresponds to the 3d law, 1st rule, and is denoted in the column of formulas above by (8)—that is, $h = \frac{v^2}{2g}$. This formula, reduced with respect to v , is denoted by (13); $v = \sqrt{2gh} = \sqrt{2g} \times \sqrt{h} = 8.025 \sqrt{h}$, in which forms, it frequently occurs in works in engineering. In this, or these formulas, v is termed the velocity due to a given height, h , and h the height due to a given velocity, v —that is, v denotes the distance which water flowing freely under a pressure of h feet in height, will pass over in one second of time at the bottom of this height, h , which velocity is the same, as water falling freely through the height, h , would acquire at its bottom.

The Manufacture of Alkalies.

It is gratifying to find that the producers of alkalies have seen it to their advantage to utilize the products that at one time were allowed to escape to the great injury of all kinds of vegetation. From the report of the Chief Inspector under the Alkalies Act for East Lancashire and Yorkshire, it appears that last year there were 155 works under his inspection, including 15 connected with alkali and copper, 40 with nitric acid, and 36 with gas liquor and sulphate of ammonia. We are told by the inspector that with respect to nitric acid there is still a nuisance arising from it, not, however, from its direct manufacture, but from its use in subsequent operations. However, throughout the West Riding of Yorkshire, where considerable quantities of nitric of iron are produced for dyeing, it was found that the recovery of the lower oxides of nitrogen, as a mixture of nitrous and nitric acids was never attempted, but were sent to the chimneys and allowed to escape. It is almost needless to say that these have done a great deal of harm to both animal and vegetable life. However, the inspector states that during the last year or two the efforts made to induce manufacturers to study their own interest as well as the public benefit, by erecting oxidizing condensers, have been so far successful, that whilst at the beginning of 1882 there were only 16 condensers in the district there are now 40, of which 18 have been erected or enlarged in 1884. The saving effected by this means is from 20 to 35 per cent of the nitric acid formerly used to obtain the same result. Consequently, not only have the manufacturers been greatly benefited, but those living near the works as well. Ammonia is now extensively used in the production of various kinds of sodas, bleaching powder, etc., and is obtained in considerable quantities from gas water. It is also used to make alum, the vapors of the boiling liquid being forced through a mixture of aluminous earth, and hydric sulphate gives ammonia alone. From the same water there are also other salts, such as ammoniate carbonate, the sulphide, and the sulphocyanide. Where the sulphate of ammonia is made from the gas liquor the fixed ammonia only is liberated by the lime; the method does not appear to have been successful, owing to the amount of acidity evolved, and of this manufacturers were informed and warned to alter their system if the gases were being burnt. Where liquid ammonia is principally made from the crude liquor, very little sulphuretted hydrogen is evolved, which is allowed to be draughted to the boilers or still fires. In another direction the report of the inspector is also satisfactory, for it states that the quantity of sulphur burnt in the same chamber space in many cases has been diminished, so giving a more regular low exit test, while in other cases there has been a decided increase of the sulphur burnt, but not of such an amount that the chamber space has been insufficient for the work. In the vitriol works proper, as well as at many of the alkali works, we are told that a considerable proportion of the acid made is rectified for sale, while there has been a decrease in the productive power as regards mineral phosphates. The small manufacturers find it to their advantage to purchase superphosphate from the large makers and make their own mixtures from it, instead of dissolving for themselves, so avoiding the cost and trouble of dealing with the gases evolved. The inspector further states that in those works where mineral phosphates are used a fair amount of efficiency has been attained in dealing with the acid vapors evolved from mixer and den, and in no case are mineral phosphates dealt with unless with the latter condensing arrangements attached. However, at only one establishment, it is stated, has it been found possible to reach the limit of 0.2 gr. SO² acidity per cubic foot of gases escaping to the chimney; but the amount of acidity added to the chimney gases would probably not exceed that figure. The business done at the alkali works during 1884 was far below the productive power, for they par ool of the depression so general throughout the country, and so far during the present year they have continued in the same state. Still, as before stated, it is gratifying to find that manufacturers in their own interest, although at first against their will, have introduced appliances for abating nuisances injurious to health and all kinds of vegetation.—*London Mining Journal.*

RESUMPTION OF THE OLD DOMINION COPPER COMPANY.—The announcement that the Old Dominion Mining Company would resume operations on Monday next was received with much satisfaction by all classes of our citizens, as it is an assurance that the perplexing difficulties which caused the suspension of work have been overcome, and there is now every reason to hope that the mine and smelter will be operated continuously through the winter. Good miners can procure work by calling at the office of the company; men will be hired as fast as their services can be made available, until full shifts are employed. Some development work will necessarily have to be done before the usual production of ore can be counted on, and consequently smelting will not be resumed for two or three weeks.—*Silver Belt.*

USEFUL INFORMATION.

PORPOISE SKIN LEATHER.—Since the large attention that has been devoted to the porpoise fishery on the Atlantic Coast efforts have been made to utilize to their greatest extent the refuse product after the extraction of the oil, which constitutes the chief product of these fish. Among other efforts, the skin is now utilized for the manufacture of leather, and Mr. Baker has recently established a porpoise skin tannery in Philadelphia to meet the demand in this direction. Porpoise leather is a novelty as yet, especially when used in the manufacture of shoes. It has been largely used, however, in making shoe strings, owing to its great strength and pliability. It has a long, tenacious fiber, and as it will not crack nor tear, it makes an excellent leather. When made up into a shoe it greatly resembles French kid. It wears like iron, and would be suitable for boys' shoes. It is said to be entirely waterproof and very cooling to the feet, making it excellent for summer wear. The skins cut from five to six pairs of men's vamps. The leather is hemlock tanned.

A WONDERFUL GUN—IF ALL IS TRUE.—The gun which Mr. Hiram S. Maxim has now on view at the Exhibition of Inventions is probably as near an approach to perpetual motion as has ever been reached. Here is a daily paper's description of this terrible machine: "The ingenuity of the contrivance consists mainly in using the recoil or reacting force that follows a discharge. By that means the empty cartridge is cast out, a fresh one put forth in its place, and the instrument fired. And so the deadly round goes on at the rate of ten shots a second, or 600 per minute. Such is the rapidity that the ear cannot discriminate the individual explosions, the sensation being that of one prolonged sound. And such is the ease of manipulation that the gunner can write his name with bullets on a target at the limit of his vision as quickly as one could make an impression by an Albion printing press."

A SUCCESSFUL ATTEMPT was made last year in Leipzig to remove by chemical means the incrustation that coated the interior of the force main from the pumping station to the reservoir. The main is about 15½ inches wide and 4.55 km. long, and the incrustation was from 13 to 24 mm. thick, and in places thicker still. The operation lasted from the 7th of March to the 11th of May, and during that period at intervals the pipe was filled with dilute hydrochloric acid eight times, with soda solution three times, and with a solution of chloride of lime once, being washed out thoroughly with water between the successive applications. It was stated that the incrustation was entirely removed, and the practical effect of the cleaning was indicated by the pressure gauge, there being a decrease of from 1.8 to 2 atmospheres pressures at the pump.

SETTLEMENT OF MASON WORK.—It is reported that the outside of the tower of the new public building at Philadelphia has become cracked, and that the cause has been ascribed to the contraction of the brick masonry at the back of the marble facing. The base of the tower of the capitol at Hartford, Conn., shivered a few years ago, because the builders, in their desire to make good joints in stone masonry, laid them with contact at the edges. The difficulty was repaired by pouring a number of tons of melted type metal at the back of this masonry, the alloy expanding as it cooled transferred the pressure from the front edges toward the middle of the tower foundation; the surface blocks were dressed over again, and in some instances new stones were laid in.

CLEANING CLOCK AND WATCH MOVEMENTS.—The movements of a clock can be readily cleaned by placing it for a few minutes in a boiling hot bath compound as follows: One quart of water, one teaspoonful of liquid ammonia, into which should be placed about a great spoonful of scrapings of common soap. The articles should remain in the bath about 30 minutes, then be removed and wiped dry. The entire movements of a clock may be so treated to advantage without taking them apart. It is better, however, to take them all apart and polish each separate piece with a brush dipped in some delicate polishing powder, when they will look like new.

THIN VS. THICK GAUGE BAND-SAW BLADES.—One who has had considerable experience in the use of the hand-saw says: It is generally held that thick gauge saws are the most durable, from the fact of their strength. Against their use there is the drawback of their waste of wood in the attrition of the saw and the necessity of the use of carrying wheels of large diameter. One great point in the durability of band-saws is to sharpen with a round-edged file, the breaking points of the saws always being in the sharp angles of the teeth.

A NEW TANNING AGENT.—According to the *Arizona Gazette*, a new tanning agent has been discovered in that Territory which bids fair to become of considerable importance. The statement is made that a tanner at Temple, Arizona, two or three years ago discovered a plant which carried a large proportion of tannin, and which, when used in the manufacture of leather, gave extra weight to the product.

The plant is of annual growth, indigenous to the deserts and dry uplands, and is known to the Mexicans and Indians as "gonagra." It has a root somewhat longer and more scraggy than the cultivated beet, though resembling it in appearance. It is said to contain a very large per cent of tannin, and to make a good substitute for oak bark.

THE REDWOODS.—Theories and explanations in regard to the question why redwood should only be indigenous to a limited portion of the Pacific Coast have often been given and answered. There is little doubt, however, that in former times the whole of the Coast Range of mountains was completely covered by that growth. How they were destroyed none but Omniscience knows. If they died a natural death, beaten and huffed by the elements or finally succumbed only to old age, there must have been a great climatic change on this coast. The change is probably that of severe summer droughts, from a former more rainy era, thus drying up the tender shoots of the young trees. Gradually, too, the ground has become too arid for the support of even those of more mature growth. The inquiry is a very interesting one.

SUBSTITUTE FOR BRISTLES.—The fibrous bark of the sugar palm (*Arenya saccharina*) proves to be a good substitute for bristles and animal and human hair. The treatment is simple. The bark is first immersed in water, and boiled for some time in an alkaline solution; the fibers are then soaked in an emulsion of fat, alkali and water, for about 24 hours, after which time they are sufficiently hard and elastic for the above-named use.

FOR POLISHING OLD FURNITURE.—The subjoined simple preparation is said to be desirable for cleaning and polishing old furniture. Over a moderate fire put a perfectly clean vessel. Into this drop two ounces of white or yellow wax. When melted add four ounces of pure turpentine, then stir until cool, when it is ready for use. The mixture brings out the original color of the wood, adding a lustre equal to that of varnish.

THE FIRST CAST-STEEL SAW.—The elder Hoe, founder of the firm of R. Hoe & Co., printing press makers, is said to have been the first man in this country who made saws of cast-steel, and the first in New York to drive his machinery by steam.

ORIGIN OF THE SAW.—Grecian mythology tells us that the inventor of the saw once found the jaw-bone of a snake and used it to cut through a piece of wood, then imitated it by jaggung an iron plate, and thus made a saw.

THE REDWOOD POSTS of a fence erected in Napa thirty-two years ago were recently removed, and found in as good condition as when first put into the ground.

IF THE MANDREL is a tight fit when cold, it will be apt to spring the saw when it is heated.

GOOD HEALTH.

Rubbing Swellings and Bruises.

When a thorn pierces the flesh, or an insect bites or stings us, we instinctively rub the part. Why? Whenever

"The boy who rides upon the pig,
Is made to feel the beechen twig."

he claps his hands on the parts that smart and rubs them vigorously. Why? For the reason that the normal condition of the circulation of the vital fluid has been interfered with, and Dame Nature prompts the use of the hand, by way of rubbing, to maintain the natural circulation. When the flesh is bruised, the blood is obstructed in its passage through the tissues of the fleshy parts of the body. By rubbing immediately, before the blood has time to coagulate, the natural passages are kept open and the normal circulation will be maintained. By forcing the blood all out of the bruised part, fresh blood will immediately flow in, and the injury to the flesh will be repaired much sooner than if the affected part was not rubbed. Several years ago I bruised one knee, which seemed but little more than a flea-bite. After a lapse of a week the little bruise began to swell and I was scarcely able to walk. I consulted two excellent surgeons in New York, who shook their heads at the swelling and said they "feared I would have a bad knee." Their remedies utterly failed to reduce the swelling or mitigate the pain. I then tried rubbing and a stream of water. For about half an hour at a time, several times a day, a small stream of water was directed on the knee while I rubbed it. In a week the knee was completely cured. At first the part was so tender that I could not endure the weight of the hand; but by rubbing gently, and then a little harder, the pain ceased and the normal circulation began to be established and the swelling gradually disappeared. Bruises and swelling may often be driven away and cured by rubbing, when medicine would have but little influence.—*E. E. Tee, in Herald of Health.*

HEALING PROPERTIES OF WATER.—There is no remedy of such general application and none

so easily attainable as water, and yet nine persons in ten will pass it by in an emergency to seek for something of less efficacy. There are but few cases of illness where water should not occupy the highest place as a remedial agent. A strip of flannel or a napkin folded lengthwise and wrung out of hot water and applied around the neck of a child that has the croup will usually bring relief in ten minutes. A towel folded several times and quickly wrung out of hot water and applied over the seat of the pain in toothache or neuralgia will generally afford prompt relief. This treatment in colic works like magic. We have known cases that have resisted other treatment for hours yield to this in ten minutes. There is nothing that will so promptly cut short a congestion of the lungs, sore throat or rheumatism, as hot water when applied promptly and thoroughly. Pieces of cotton batting dipped in hot water, and kept applied to all sores and new cuts, bruises and sprains, is the treatment now generally adopted in hospitals. Sprained ankle has been cured in an hour, by showering it with hot water poured from a height of ten feet. Tepid water acts promptly as an emetic, and hot water taken freely half an hour before bedtime is the best of cathartics in the case of constipation, while it has a most soothing effect upon the stomach and bowels. This treatment continued for a few months, with proper attention to diet, will alleviate any case of dyspepsia.

NAPHTHOL.—The extraordinary power of naphthol as an antiseptic and disinfecting agent has been known for a long time, but its disagreeable smell and the difficulty of preparing it in a purified state, with the occasional toxic action of the crude naphthol, have been a bar to its use as a remedial and antiseptic agent. Justus Wolff, a chemist interested in coal tar products, has recently succeeded in producing it in a pure and odorless state in well defined crystals, and claims its antiseptic action is much greater than that of carbolic acid. Recent research has demonstrated that the toxic effects of crude naphthol were due to the impurities it contained. Dr. Shoemaker, of Philadelphia, in a paper read before the Philadelphia County Medical Association, on the "Medical Use and Value of Naphthol," conclusively proved the non-poisonous character of the purified or odorless naphthol by taking large doses internally. It has no corrosive action on the skin, and will not injure textile fabrics. As a remedial agent it acts with greater efficiency, and has many advantages over carbolic acid; the fact of its being absolutely odorless will make it a desirable substitute. It is expected that it will shortly be produced on a manufacturing scale as a substitute for carbolic acid.

CONSUMPTION IN CHICKENS.—A discovery has been made in France which gives us a useful lesson. At Charenton, a man sick with consumption was put in charge of a poultry yard, which in that country are very abundant. Shortly afterward the chickens began to be sick and to die off in a strange way, and one of them was sent to the Veterinary School for examination. Its lungs and liver were filled with tubercles and bacilli, or germs. The fowls had evidently eaten the expectorated matter from their diseased attendant; at least this is the theory, and it seems reasonable, and adds to the evidence of the infectious nature of the disease, and also shows us that men and animals may each communicate their diseases to others.

LEECHES.—The best leeches come from the pine districts of New Jersey, but the most of them come from Sweden and Norway. They are imported into this country by a firm whose office is in Maiden Lane, New York, who collect orders from their customers and make but one general importation, receiving fully 2,000,000 leeches per year. The average price is about \$8 per thousand, and the cost price and freight are about \$2. The profit is simply enormous.

REFRESHING DRINKS FOR INVALIDS.—Lemon water: Cut a lemon into slices, put them in a jar or pitcher and add a heaped teaspoonful of sugar and a pint of hot water; let it stand until cool; strain into a bottle; place on ice until wanted. Apple water: Is an agreeable beverage for feverish patients, peel and slice a sour apple, add a small piece of lemon peel and three lumps of sugar; pour hot water over them and strain.

A CURIOUS FACT in connection with cremation is the amount of ashes received from a body and the disposition made of them. The two largest bodies cremated in Philadelphia weighed 200 pounds each, the ashes weighing 4 pounds 8 ounces and 5 pounds 4½ ounces respectively. The largest percentage of ashes thus far received was from a body weighing 180 pounds, and whose ashes weighed 5 pounds 11 ounces.

SINIGLES.—The cause of this complaint is as yet unknown. It is a painful skin eruption, affecting one-half of the body, from the spine to the breast bone. The cure is affected by means of wet bandages to the part, and a simple diet of fruit and farinaceous foods, in about a fortnight's time.

EIGHTY AND OVER.—A committee of the British Medical Association is collecting information concerning the experience and habits of persons who have attained the age of eighty or over. Interesting results are expected.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

DISCOVERY OF A SILVER LEDGE.—Amador Dispatch, Sept. 5: There seems to be no end to new discoveries in this vicinity of late. Messrs. Mello & Costa have, within the past few days, struck a lot of fine looking rock in their claim at the little town of Jackson Gate, about a mile from the town of Jackson. The peculiar appearance of the rock induced them to have some of it assayed to see what it contained, and the result of the assay shows that it contains \$52 in silver and \$4 in gold per ton. The rock was taken out of the shaft at a depth of about 60 feet, at which depth the ledge has been penetrated to the distance of about four feet. It is not yet known how deep or how wide the ledge will prove to be, as work is progressing very slowly on account of so much water in the shaft. But the discovery of the fact that the ore contains such a large amount of silver is creating quite a stir among the miners, as it has not heretofore been supposed that there was any great amount of silver in the rock in this vicinity. A specimen of this rock was left at our office last Wednesday which can be seen and examined by any one who may be acquainted with silver ore. The owners of the mine felt highly elated over their new discovery, and are opening up the ledge as fast as possible.

BUNKER HILL.—Ledger, Sept. 5: We understand that the sinking of a new shaft, north of the present shafts, has been decided upon by the managers of this prosperous mine. A contract to furnish 75,000 feet of lumber for this purpose has been made with H. C. Farnham. The shaft, we presume, will be commenced at once, as some of the lumber has to be delivered this month.

MAHONEY.—An agreement has been filed for record in the Clerk's office which will be hailed with satisfaction by the people of Sutter Creek. The parties to the agreement are the Valentines and Fitch, owners of the Mahoney mine, on the one side, and Julius Leszynsky, of San Francisco, on the other. The document is dated August 28th, and its terms are that within three months from signing the agreement the said Leszynsky will commence operations in developing the Mahoney mine, and within four months from the commencement of work thereon he will spend \$10,000 in said development. He further agrees, within 15 months therefrom, to expend an additional sum of \$25,000. When this expenditure of \$35,000 is completed, the owners agree to deed to said Leszynsky one-half interest in said mining property.

MISCELLANEOUS.—Antone Mello and A. Questra have made what may turn out to be an important mineral discovery at Jackson Gate, a short distance in the rear of Chichizola's store. In prospecting at the depth of 50 feet, following small veins of quartz, they came across a body of ore several feet thick, which is pronounced by good judges to be of excellent general character. An assay of the ore gave \$4 per ton in gold and \$52 in silver. It is one of the rare instances in this county of silver being met with in paying quantities. The value of the discovery depends upon the ledge extending to a much greater depth, and to determine this question the erection of hoisting machinery will be necessary.

Operations so far have been carried on by hand windlass. F. A. Huntington, of San Francisco, proprietor of the roller quartz mill bearing his name, paid a visit to the Doyle quartz claim in Hunt's gulch the past week, with the idea of securing an interest therein, should the prospect be deemed sufficiently encouraging. He took to San Francisco with him a box of the ore for testing purposes. The Doyle is considered a promising property, and should the pending negotiations be perfected a mill and other improvements will be erected at an early date. W. A. Nevills has gone to San Francisco to make arrangements for the addition of 30 more stamps to the Bechtel mill at Angels, Calaveras county. It is reported that W. H. Rose will shortly take charge of the property. The reconstruction of the old Martell ditch, to convey water from Jackson creek to Carille & Co.'s claim, $\frac{1}{2}$ miles west of Jackson, was completed last week. It took 10 men 18 days to complete the job, and involved the construction of 2700 feet of flume. The ditch will carry about 100 inches of water.

Calaveras.

VALLECITO DISTRICT.—Cor. Mt. Echo, Sept. 4: Having arrived from the Alps of Calaveras to the great vale of San Joaquin, I seat myself and according to promise proceed to give you and your readers a partial account of the mines and mining enterprises of Vallecito district. We find the mining industry of that section at a very low ebb. The surface or placer diggings are partially suspended owing to scarcity of water. The gravel or deep mines are numerous and probably are destined to be the richest in the county. Considerable prospecting in the latter mines is going on at present. I will mention a number of claims that are reputed to be rich in gold. The Don Pancho Gravel Chispa claim, situated on the south of Balaklava hill, was discovered a few months ago. Your correspondent had the pleasure of seeing some large nuggets that had been taken out—one of them a three oz. and the others from two down. The lucky owners say that they have taken out something less than 100 in ten days' run. The Moffit & Barnes Gravel mine, situated on Balaklava hill, is probably the richest mine of the kind that has been struck in that district for a number of years. This mine was struck about a year and a half ago, though they have owned the ground for 18 years. This mine pays too well for a man to attempt to give the exact amount of gold extracted from its bed of gravel since its discovery, suffice it to say that it prospects from one to ten dollars per pan. Moyle & Co. are prospecting in the Padgett hill and anticipate striking a rich deposit of gravel. Another very rich strike was made in Vallecito recently. A nugget was found valued at \$45. Modesty forbids mention of names: As for deep gravel diggings and an opening for capitalists there is no better place in the county than Vallecito. There is some very fine quartz situated about the place, though there is but one mine being worked at present. The Mollie Sloan is a new quartz mine

that has recently been discovered and is destined to be one of the richest mines outside of Angels. The rock prospects from \$20 to \$50 per ton. Mr. Sloan is making arrangements to have a new arastra put up to work it. Old Vallecito has a bright future before her in the way of mining.

Inyo.

DEFIANCE MINE.—Independent, Sept. 5: At the Defiance mine seven or eight men are at work, the prospect is good and business begins to liven up a little.

LOOKOUT.—Over at Lookout Frank Fitzgerald has eight or nine men at work, and report says he is doing well.

ORE RETURNS.—Inyo Reporter, Sept. 3: S. P. Roberts has just received the returns from ten tons of Pine Mountain silver-lead ore he recently shipped to the Selby Works, and is well satisfied with results. The lot averaged 68 per cent lead, and 63 ounces silver per ton. The high percentage in lead makes this a valuable shipping ore, as were other lots from the same mine shipped by Mr. R. heretofore. We have never seen the mines on Pine mountain where Mr. Roberts has been digging away for years, but we are well assured that right there are some splendid mines, well worth the attention of men of means, particularly those desirous of finding a concentrating proposition. Ores, water and wood are there in abundance; of course, the carbonates, or second grade ores only are involved in this proposition, since the galena ores are not susceptible of further concentration, that is, as a class. Pine mountain is about 13 miles east of the railroad, going via Black canyon; one half the distance is over a fair wagon road, the remainder a pack trail only, but over which a good wagon road can be built for about \$2000. Mr. Roberts is now packing out 30 tons more of ore, already on the dump.

PANAMINT.—A large amount of freight, comprising provisions, tools, etc., for Panamint passed down the road last Saturday. The work of repairing the road up the canyon to the town of Panamint will keep a number of men employed two or three weeks. A ten-stamp mill is to be built and set to work as soon as possible. The engines and other portions of the machinery of the splendid mill that was burned are to be used in the new one.

Mono.

BENTON.—Cor. Inyo Reporter, Sept. 3: Mining on the hill goes along steadily; more men are at work at present, than have been for a long time; and outside of those working for wages in the Borasca, every one is on his own hook, prospecting and developing the various ledges. Several are taking out nice lots of ore. The fatal accident to James T. Fregembo, last week, has stopped the work at the Kearsage for a while. The shaft as far as it has been sunk is the best timbered and most complete of any on the hill, and the opening of the drifts started were secured in the best possible manner. Most of the dead work had been done, and deceased was in expectation of soon being able to send for his family. Hugh Jones was down the other day from White mountains, and says they have cut the ledge again with the lower tunnel and have started to drift on the vein. Prospects are looking good and the ore a fair average, while some of it is even better than was found on top.

STANDARD CON.—Bodie Free Press, Sept. 7: The west drift 300-level advanced 11 feet. North drift 325-level advanced 12 feet. South drift advanced 15 feet. East drift advanced 8 feet. Second south drift, same level, advanced 13 feet. The work of retimbering the shaft and 400-station is progressing favorably; this work has prevented the raising of ore, and consequently no men have been employed in drifts below the 325-level. Expect to so far complete the repairs as to resume raising of ore on or before the 15th.

BODIE CON.—During the past week the east drift 700-level was extended 9 feet. No. 1 south drift, same level, was extended 14 feet. No. 2 south drift is in 20 feet. East drift 550-level is in 24 feet. South drift second incline level is in 33 feet.

MONO.—The joint south drift 400-level is in 75 feet. The south drift 650-level is in 18 feet. Winze No. 1 550 (Lent shaft) level is down 102 feet, with good ore in it. We commenced to-day to haul Mono ore to the mill. Eleven men employed.

CON. PACIFIC.—During the past week Winze No. 1 has been sunk 6 feet. Total depth 43 feet.

Mariposa.

COULTERVILLE.—Mariposa Herald, Sept. 5: The quartz interests are looking up. Jonathan Mentzer and Andrew Goss are prospecting a vein on Blue Gulch, a tributary of Maxwell's creek. They are running a wide open cut on the vein, which is very laborious and expensive, but the prospects are very flattering. The Reed brothers are pushing work on their recent find and the outlook is still encouraging. The Wide West mine just across the line in Tuolumne county is being worked. A four-stamp mill is being put in position for crushing ore. Parties in San Francisco are negotiating for the purchase of the Cook brothers property, situated near Coulterville. Quartz Johnson is acting as the agent of the Cook brothers. Considerable work has been done in the old shafts and tunnels, putting them in condition for inspection. The people are anxiously hoping a sale will be effected, as it will be everything for the town. The Red Cloud people have let a contract to a party of miners to sink their shaft 100 feet deeper. They have passed through a strata in the shaft that will mill from \$10 to \$12 per ton. Good rock is being taken out of the Hasloe mine. The Compromise mine will start up right away. The water is being pumped out of the mine and Anthony Stolder has a contract to furnish 200 cords of wood for the mill. A party from San Francisco wants to buy the mine, and the owner, Mr. Gage, says he will sell it if they pay him his price; but it makes no difference whether they take it or not, as he intends to work it anyway.

Nevada.

YOSEMITE MINE.—Grass Valley Union, Sept. 5: The Yosemite Mining Company, whose claim is situated on Banner mountain, has resigned the latest assessment of two cents per share upon the capital stock of company, for the reason that the quartz taken from the mine during the past month more than pays all expenses, and from present appearances will continue to do so. The last crushing gave a yield of \$25.75 per ton.

Placer.

STARTED UP.—Placer Herald, Sept. 5: We learn from W. R. Monahan, of Ophir, who was in town Thursday, that the owners of the Boulder mine, which is located near the town of Ophir, are putting up the necessary works and getting things in order generally for working the lead thoroughly and systematically. If the Boulder and the Greene, both of which have yielded rich ore, are put in full operation again, they will make things around Ophir pretty lively and from the stimulus Auburn will receive no little benefit.

DIVIDE DOTS.—The paying mines hereabouts are letting down bountifully, the Mayflower having, it is said, produced \$10,000 one day last week, and prospects abundant for the continuance of large returns for an indefinite period. Charley Marley, of San Francisco, has been for some time pumping out the Excelsior mine for the purpose of recommencing work on the high rock. The water is now on and workmen have been put on. The Washington is still running drifts in the rock. The neighboring mine of Breece & Wheeler, at Bath, is also taking out pay dirt, but will have to lay off some of their men until they have raised their new chute and judging from the prospects of the grave in sight, will again be taking out richer pay than for a couple of years back.

MICHIGAN BLUFF ITEMS.—Placer Argus, Sept. 5: A. C. Bowen, J. L. Gould and O'Donnell have begun work on a drift mine called the Hermit, located on the main channel, between the Hidden Treasure and the Orion about six miles above Michigan Bluff. They have eight or ten at work at present in running a bedrock tunnel, and they intend to prosecute the work vigorously until they strike the channel. Ed. Polifka, W. F. Croft, Ed. Kavenagh and other parties have located the ground known as Robinson's Flat, above Canada Hill. The company will begin work probably this week, getting out timbers, starting a tunnel, etc. Just below this claim is a mine operated by Spaniards—they call it the Screw Anger—in which considerable coarse gold has lately been found. Michigan Bluff is livening up again and we are hoping for still better times by and by. A good deal of prospecting is going on all over the divide, from Forest hill up. Work was resumed on the Hazard mine last week under the experienced supervision of Col. J. H. Keown, the former superintendent. The mine will be run by an English company having a large capital, and this, we firmly believe, to be all that is needed to develop one of the richest mines in the State of California.

Plumas.

GIBSONVILLE.—Mt. Messenger, Sept. 5: The Union Company are raising an air shaft, working three shifts. About 150 feet has been completed, with 250 feet more to run, when drifting will be resumed. Water is very scarce, and there is just sufficient for prospecting. The gold yield this year has been quite large and profitable for its lucky owners. A \$1500 timber contract is now being filled by T. Delahanty. The Go-Ahead Company are running a tunnel down near Wallis creek. The rock is very hard, costing \$20 per foot for blasting. Elias Squier and his father are running a bedrock tunnel to tap the ground that pitched off from them on the high rock last year.

PLUMAS EUREKA.—Oroville Mercury, Sept. 5: A six-stamp mill is constantly operating, crushing on an average 120 tons of rock per day, and gives employment to 40 men, mostly Cornish men. The running expenses average not less than \$25,000 per month, and two communities, Johnsonville and Eureka Mills, containing at least one thousand inhabitants are supported entirely by the mine. The mill is situated on the side of a hill, about 3000 feet below the mouth of the upper tunnel, from which the quartz is taken. This quartz is placed in a car and run down the mountain on a track at an angle of about thirty-five degrees, and on this car one can enjoy one of the most picturesque and exciting rides imaginable.

Siskiyou.

METHODIST CREEK.—Yreka Union, Sept. 5: Methodist creek is a permanent stream that empties into the south fork of the Salmon at Yocumville. Yocumville is about 40 miles from Etna and 70 miles from Yreka. From Etna it is reached by good mountain trails, over which the mail passes. The head of the creek is blocked up with snow during the winter, but, except in very severe winters, the parts that would be probable to have ledges and in which quartz has already been discovered, would be accessible at any time. Upon the stream several ledges have been found at various times, but prospecting has only lately been carried on to any extent. The ledges found prospect well but have not as yet been fully developed. The country is well timbered and watered, and from its extent has only been glanced at in places. There are about 20 or 30 men now on the creek. There is a store at Yocumville, and the camp of New River is on the south side of the divide separating New River from Methodist creek and south fork of Salmon.

Tuolumne.

WATER.—Union Democrat: There was a large influx of water into the Lamphier mine last week. So great was the flow the pumps could not handle it. In consequence operations have been suspended below the 217-foot level. It is, however, the opinion of the superintendent that the heavy flow of water will only be temporary. This excess of water does not interfere with the operation of the mill, as all the ore being crushed is stopped from the South shaft where the water is not troublesome. The mill was cleaned up last Sunday, but we could not learn the amount of the shipment.

LOOKING WELL.—Tuolumne Independent, Sept. 5: Nervi's mine is looking very well. The mill hammers away and the plates indicate a good cleanup. Mr. Keefe, of Summit Pass, is preparing to open up his mine which is located in his field. This promises good reports. Placer mining is suspended for the time being, the supply of water having been exhausted.

SOULSBYVILLE.—The celebrated Bone-Crusher has started up. The superintendent is kept well supplied with bones. The present price paid for them is 50 cents per hundred pounds. If the bone-crusher runs many days longer there will not be any left, as the boys are busily engaged gathering and hauling them for the crusher. If anyone in Sonora has any to sell, call around this way and inquire for the superintendent of the bone-crusher. The Black Oak hoisting works were completed on Monday and

run very well. News has been received that water in the Soulsbyville branch ditch will be cut off this week, and in consequence thereof, they will be obliged to stop until water comes again. It is bad for the company, and the gardeners also. They will be obliged to start up at the Soulsby mine by steam, which is considerably more expensive, as water power is cheaper than steam. They will also stop the mill till water comes again. Jas. Burns is hauling the lumber along the river hill to where the flumes are to be built to bring water for the mill at the Buchanan mine. It is said it will take him a month longer to get through with his contract. They have out several tons of ore at the Morning Star mine, near Cherokee, and have been repairing the Louisiana mill to crush it. The water to run this mill comes from the Soulsbyville branch ditch, and are, therefore, unable to start up the mill on account of the water being turned off. This ditch also supplies some of the gardeners near Cherokee, so they will be without water, as well as Soulsbyville gardeners. It is reported here that the water will not be turned into the Soulsby branch ditch until rain. If this be the case all the gardens here will suffer for want of water. They have a good vein on the Pennsylvania mine. Some of the rock shows gold very well. Contracts were let at the Soulsby mine Tuesday. There will not be as many men working this month, on account of the water being turned off. Mr. Kiley Gilkey is expected back from the city the first of next week, when he will start up his mine at Jamestown if he makes satisfactory arrangements below.

Trinity.

MINING INVESTMENT.—Trinity Journal, Sept. 3: Mr. A. P. Minear, of San Francisco, has purchased from Mrs. H. E. Willey the Vermont mine in Deadwood district, and is now arranging for working said mine. He has on the way a Huntington mill and two Frue Concentrators and will commence work with about fifteen men. It is not his intention to crowd matters on the start, but rather to cautiously feel his way, although he has the most implicit faith in the outcome of the mine he has purchased, as well as to the future of Deadwood district in general. There have been no failures there so far and we feel that Mr. Minear has made an excellent investment. Parties in town have discovered what may ultimately prove a bonanza in the shape of a $\frac{1}{2}$ foot ledge on Broken Nose gulch, a tributary of Sidney gulch, in Weaver Basin. Work is now being done on it and encouraging prospects found. The interested ones are confident that they have "found it." However, it will take time and labor to substantiate the fact. We hope that it will "pan out" to their fullest expectations.

NEW RIVER.—Cor. Humboldt Standard, Sept. 5: One of the finest mines visited is the Hard Tack, situated on the divide between Larcenville and New River city. This ledge is, on an average, eighteen inches and reached at a depth of 170 feet by an incline shaft. The rock already tested yields on an average \$50 per ton. The company have a great amount of this grade of ore on hand. The only excavations made so far are by shaft and tunnel. The next place visited there was the Kidgeway mine. It is owned by George Dean and others, of Eureka, and is supposed to be an extension of the Hard Tack. This is opened in a workmanlike manner by two tunnels and an incline shaft. The ledge in the upper tunnel and shaft makes a good showing. The lower tunnel, or crosscut, is for the purpose of a draining and working tunnel. This arrangement shows that good judgment was used in opening the mine and sound sense as to the advantages to be obtained in future working. Part of the rock taken from this mine was milled and yielded about \$40 per ton. The ledge varies from three to twenty-five inches in thickness as one goes down. Still down the ridge in a westerly direction are three other claims—the Armstrong, Sullivan, Miller & Co.'s and the Salina, the Sullivan ledge being the most extensively developed of the three. An incline shaft is down close to one hundred feet in it, with a continuous ledge of quartz the whole distance, varying in thickness from six inches to two feet. From the amount crushed in a hand mortar, which is a bad test, the rock would yield \$25 or \$30 per ton. This ridge seems, in my opinion, the principal ground of operation. As far as developed it has the best showing in the country. The rock is soft and there is every reason to believe that the body of quartz should continue down. We can safely say the five claims would produce 6000 tons of quartz. At this stage of development the Hard Tack has an arastra for reducing some of the ore. This is situated just below New River city and about one and a half miles from the mine. In company with Mr. Dean we visited the Mountain Boomer mine, located on the south side of Slide creek. They have some very rich croppings and also an arastra for working the same. The mine is not developed to that extent to judge of its future, although they have a large amount of decomposed quartz, which is worked on a very cheap scale. The general drawback to the district is the lack of a mill to crush the rock. A custom mill of four or five stamps could be placed in the vicinity and command the entire country, as there is sufficient paying rock to justify this procedure. A mill of this sort would enable miners to crush their quartz and supply themselves with means to make more extensive developments. In their present condition, time and money have been expended toward opening these claims and nothing is left for the erection of machinery. The water privilege is good for six or eight months of the year and for a small steam engine the year round. Timber to construct mills exists in abundance. At Butcher creek and vicinity several parties are engaged in making openings in small stringers, but nothing extensive enough to justify one in forming an opinion of the mines has been made. The Uncle Sam mine looks favorable for a continuous claim. The vein stands nearly perpendicular, with good walls, and is opened in a fair way for working a small mill and donkey engine on it, but not one of much force for crushing rock. It is not for me to say definitely what the district will be in three years, but in my opinion, from past experience and close observation during four days in the camp, it is the foundation for a better camp than any other locality in northern California, providing men of experience and energy are secured to execute the work.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Sept. 5:

The station on the 3100 level is full opened, and the drift practically started in a southeast direction to connect with the drift coming northwest from the combination shaft on the same level. Some very good streaks of ore have been met with in opening the station, and owing to the diagonal direction assumed by the drift, it does not cut across the ore vein as rapidly as it would were its course directly east, therefore ore development need not be too suddenly looked for. The management at the office yesterday seemed a little reticent, as though they had good things in view not necessary to tell about, all of which, however, will come out in due time. Archie Morland is here yet, and expresses himself as very sanguine in the matter of developing the long promised bonanza.

CROWN POINT.—The repairs and overhauling of the machinery continues, and work in this part the Belcher mines has not been resumed as yet, notwithstanding the popular idea that it would be the first of this month. The flume of the Mexican mill is being put in first class repair, being, in fact, renewed from beginning to end, and the Santiago mill is also being put in most thorough order for a new reduction campaign when the state of the water in Carson river will allow of renewed milling work. Nothing will be done in Belcher until work is resumed in Crown Point.

CON. CALIFORNIA AND VIRGINIA.—The usual amount of about 125 tons per day continues to be yielded from the 1750 level on company account, the average assays being \$18 per ton. About 60 tons per day are extracted from the Jones lease section above the 1550 level, assaying about \$14 per ton. The ventilation of the mine is now very much better and more advantageous work being done.

CHOLLAR.—Work progressing in the croppings preparatory to the extraction of low grade ore. The station on the 3100 level of the Combination shaft is fully opened, and the main drift west from it going ahead finely. The face of it is already advanced 112 feet west from the shaft.

UNION CONSOLIDATED.—The main lateral drift north is making good progress, being now within 50 feet of the Sierra Nevada south line. The formation continues to be vein porphyry and quartz, and the chances are favorable for a good ore development in that direction.

GOULD AND CURRY.—Crosscut No. 1 west on the 1000 level has been advanced 42 feet during the past week, making a total length of 328 feet. The face continues in vein porphyry, clay and quartz, with no new feature of a favorable character.

YELLOW JACKET.—Something over 200 tons per day continues to be the yield from the old upper workings above the 1300 level. The ventilation of the mine is of a very superior order throughout, allowing of effective work being done.

ANDES.—Drifting west on the 175 and 375 levels continues under the most favorable auspices, the principal feature in the way of new developments being the assessment of twenty-five cents per share levied yesterday.

SIEKKA NEVADA.—On the 520 level the west crosscut has been extended during the past week 45 feet, making a total length of 200 feet. The face continues in dry, hard porphyry, with streaks of clay and quartz.

JUSTICE.—About twenty tons per day continue to be extracted from the southern portion of the mine, on the 450 level, through the Woodville shaft, and reduced at the old Thompson mill.

ALTA.—The main drift west on the 700 level has been advanced to the extent of 118 feet, and making very good progress considering the very hard nature of the rock encountered.

MEXICAN.—Running the middle crosscut east is the principal business of this mine. It is now in about 100 feet, running in a wet, heavy formation of clay, porphyry and quartz.

KENTUCK.—The usual amount of ore continues to be yielded from the old upper workings, which is hauled to the Rocky Point mill on Carson river by teams for reduction.

OPHIR.—The repairs to the old Mexican shaft for ventilation and prospecting purposes still continue.

ARIZONA.

HUMBURG.—Prescott Courier, Sept. 4: T. W. Cochrane, the superintendent of the West Humburg quartz mill belonging to the St. Louis-Yavapai Mining Co., is now in Phoenix, his mill being shut down at present for want of water. We learn from the *Herald* that the company has let a contract for sinking 100 feet on the Gold hill. Mr. Cochrane has recently devised a plan by which these ore may be profitably handled for \$15 per ton, and on the strength of this the company is now purchasing such ores at 80 percent of the total value per ton.

PINAL.—Two miles of ledge from 80 to 100 feet wide and carrying ore of exceptionally high average is being developed by Judge Reymert. The Tucson *Star* devotes two columns to the description of this property, describing it as a second Comstock. The ledge is a contact vein between slate and syenite and pays from \$8 to \$400 per ton, two of the claims very much exceeding this. The owner has expended over \$50,000 in developments and has refused an offer of \$150,000 from the bonanza company. The Specie Paying company's mill is now running on the ores from these mines and works it up to 90 percent of assay. The *Star* pays a high compliment to Judge Reymert for his energy in paying all the heavy expense of developing this handsome property out of his professional earnings as a lawyer. The Tomestone M. & M. Co. paid \$23,500 for the Way Up and Gilded Age mines, says the *Record-Epiphany*. Another smelter will be put up on the San Pedro by Judge Robinson.

SALERO.—The Salero camp near Tucson has only recently come into importance as a hulsion producer. The *Citizen* states that the Waddell mill and mine are employing 37 men, and 50 chlorides get their ore worked there. Large quantities of horn silver are found.

COLORADO.

OPHIR NOTES.—San Miguel Journal, Sept. 5: Sam Twigg came down from Bridal Veil basin Sunday morning and reported that he had struck it big in the Benedictine. Mr. Twigg brought down some very fine gold specimens which he says are a fair

average of a pay streak a foot wide. The work on the mine consists of a 20 foot open cut and 40 feet of drift. George W. Pickett, formerly landlord of the Silver Mountain house, was in Ophir last Sunday. Mr. Pickett is owner of the Torpedo mine situated on Silver mountain on the Turkey creek side. A shipment of ore was made last week which ran 114 ozs in silver. As the pay streak is a foot wide 114 ozs will do very well. Al Woodruff has been up to look at the mine and is talking of taking a lease on it. Orrin Parsons says that he has struck a big body chlorides and brittle silver ore in the Two Sisters, a mine situated on Yellow mountain near the mother lode. El Silshy has had a lot of ore from the gold streak of the Dixie tested at the Gold King mill. The returns are not yet in but the showing warrants the belief that it will pay well. Mr. Silshy also had some ore from Ruby Gulch, San Juan county, tested at the same mill. This lot averaged \$16 to the ton. Gold lodes are all the rage at Ophir. J. J. Lashaw had a lot of ore from the Hidden Treasure tested at Goehle & Lane's mill. It ran \$30 to the ton. Mr. Crim has put on a force of men to connect the drift in on the Grand View lode with the drift on the Sulphurets. He is taking out some very fine ore.

IDaho.

ANOTHER STRIKE.—Wood River Times, Sept. 5: George Riddle, who came down to-day from Narrow Gauge gulch, reports a new discovery on Red Cloud ground, made this morning. While prospecting on the surface, at a point about 300 feet above and 100 feet north of the mouth of the tunnel, he struck a vein of galena which he and Mr. Macon uncovered at once. In less than two hours they had extracted over one ton of clean, solid galena ore, in chunks so large that they are too heavy for one man alone to lift. The news soon spread in Narrow Gauge gulch, and all the miners and prospectors in the vicinity flocked to the spot. The ore body appears to be fully three feet in width, and the ore to be clean galena and high grade.

THE GOLD BELT.—Mr. Robertson, an old prospector and miner, who came here at the instance of Mr. Brockway, of the Wiswell machinery, is visiting the Gold Belt. He is very favorably impressed with this region, and thinks we have as fine a country as lies outdoors.

MOKE SMOKY ORE COMING IN.—Pierce Dorgan came in from Smoky last evening to look after the sampling and sale of another load of ore from the Smoky claim, which he owns in partnership with Messrs. Rafter and Menas. The ore was brought in by J. O. Swift's teams. These teams make a round trip every six or seven days, and move about 20 tons per trip. They are retained for most if not all the season already, the ore being piled on the mine dumps, awaiting its turn for transportation. Next trip the teams will bring ore from Mr. Dorgan's Galore claim.

FROM NARROW GAUGE GULCH.—J. F. Kunkle came down from Deer creek to-day. He reports the Narrow Gauges as running the jigs day and night, and shipping 3 1/2 tons of first class ore per day. They employ about 15 men. The Cyclops and Red Cloud are looking finely, the French group is improved day by day, and the new hand-jig kept busy.

TWO RECENT STRIKES.—M. T. Richardson, of the Red Elephant group, was in town yesterday, looking pleasanter than ever. Last Monday the lessees struck a vein of solid galena in entirely new ground, on the Queen Fraction, which although not over three inches wide, is quite rich, and will pay good wages. In addition to the galena there is about six inches of jiggling ore that will also pay to extract. The galena, so far, has been of uniform width, but it is expected to widen in depth. This strike was entirely unexpected, as the miners were running for something else. It was therefore just like "finding it." Yesterday a galena vein between six and eight inches wide was cut into in the heading of the big tunnel on the Red Elephant, at a depth of about 250 feet from the surface and a distance from the mouth of about 500 feet. This discovery is also in entirely new ground, and therefore very encouraging. In a day or two drifts will be started both ways on the vein, to determine its extent.

MONTANA.

RESUMPTION OF WORK ON THE OPHIR.—Inter-Mountain, Sept. 5: The Ophir is a prospect located about midway between Butte and the railroad depot, directly east of the Shonhar, and on a line with that property and the Star West. It has been worked at intervals for some years under lease, but owing to the volume of water encountered in sinking and the poverty of the lessees, it has never had the benefit of systematic development. The Ophir, like other offshoots of the famous Black Chief lode, has produced some very rich sulphurets ore. For more than a year this property has been idle. Mr. Newkirk and the other owners having failed to agree as to its exploration. During the past few weeks, however, it has been under lease to J. M. Venable, Milo French et al. A new shaft has been started about sixty feet south of the croppings and a depth of 40 feet already attained. It is the intention to sink without delay to the 100-foot station, tapping and penetrating the ledge at an estimated depth of 70 feet according to the present dip. Within the past few days a pump has been put in capable of handling all the water that is likely to come into the shaft. Mr. Venable does not propose to stop work until he reaches the 100-foot station, and from that point will crosscut to the hanging wall and drift on the vein. The new shaft sunk on the north side of the ledge is now all in ore in the bottom. The main ledge dips south but the doctor thinks that he has struck a rich offshoot dipping north, as otherwise of course his shaft would have missed it. Dr. Whitford says he made the strike several days ago and that he has four feet of ore in sight which will sample \$100 per ton. He will continue sinking through the new strike which is leaving the shaft and will at a greater depth crosscut and work the ore chute which he firmly believes is of a permanent character as to quality and extent.

THE SALE OF THE NEIHART MINES.—Townsend Transcript, Sept. 5: Col. Broadwater and Mr. Ryan arrived here yesterday afternoon from Neihart, and the same day's coach brought in Messrs. McIntosh and Wells, part owners of the leads at Neihart which had been bonded last spring. The parties were uncommunicative, but we have since learned

from most reliable sources that Broadwater et al have purchased the interest of McIntosh and Wells, and that the deeds of the same are now on record at the county clerk's office at the Springs. We did not learn the exact figures of the consideration, but understand that they are in the neighborhood of \$50,000. As Col. Broadwater has letters of administration on the estate of Wallace Bell, deceased partner in these mines, the present purchase leaves only the interest of James Chamberlain outside of his, and gives Broadwater and his associates a large controlling interest in the property. The purchase money was paid in Helena on Monday, and we expect to see operations on this group of mines resumed immediately.

NEIHART NOTES.—Husbandman, Sept. 5: We are reliably informed that the Mountain Chief mine at Neihart shows a fourteen foot vein of ore at the depth of two hundred feet. James Chamberlain, of Neihart, who owns a one-third interest in the Montana Belle, a one-half interest in the Minnehaha and an interest in the Dickens and Maud S. mines, bonded by Col. Broadwater, refuses to sell for less than the bonded price, regards the mine worth a million dollars, and is confident that if released from the present bond he will be able to sell his interest at the rate of a half instead of a fourth of a million, as it is bonded for.

THE SWEET GRASS MINES.—Inter-Mountain, Sept. 5: The mines are about 120 miles northwest of Fort Benton and about 300 miles from Butte. In going there the party went to Helena and took the Benton road to a point about four miles the other side of the crossing of the Dearborn river. There they left the road, turning to the left. They crossed Sun river about 40 miles above the town, crossed the Teton at the old Blackfoot agency and then made a bee line for the mines. He found the mines in a rolling prairie, there being no mountains in their immediate vicinity. Three buttes, each somewhat larger than the butte west of this city, alone broke the monotony of the view over the level plains. The mines, as far as known at present, are confined to a small gulch about eight miles from Milk river, and 45 miles from the Marias. They are covered by 35 claims, each 300 feet in length. Prospecting above and below this area has thus far failed to show gold, beyond a few very small colors. Bedrock is found from 12 to 15 feet below the surface and is composed of decomposed slate. The pay dirt is taken out by drifting and washed in pans. No rockers or sluices are used, as water is too scarce for the latter, although the former might be employed if they were upon the ground. There are only four or five inches of water running in the gulch. Water might be obtained by taking a ditch out of Milk river, several miles above, but the known area of the mining grounds is so small that no one will hazard the undertaking. Some parties claim to have made as high as \$10 and \$12 a day with pans, but in this estimate no account is taken of the time employed in getting out the dirt. This is packed on mules or hauled in wagons, in some places, from a half to three-quarters of a mile. The nearest timber for either firewood or lumber is 12 to 15 miles distant. No saw-mill is yet built in the vicinity. Everyone lives in tents or roughs it in wagons or such other shelter as may be obtained. Our informant has but a poor opinion of the mines. There is gold there, and if plenty of water was upon the ground good wages may be made for some time to come. But there is no immediate prospect of getting more water. The gold taken out is fair looking and some of it is what may be called coarse. The gravel shows extensive wash, but in some places is covered with a deep layer of clay. When our informant left, bedrock in the main gulch had been reached by only three companies. On side gulches it was shallower and had been struck in several places. The mines are upon the Piegan reservation but the Indians seldom frequent that portion of it. There is no game there or anything else above the ground that an Indian can make use of. The Indians have raised no objection to parties going there, although the agent of the reservation has protested against the invasion. It is not thought, however, that he cares much about it. After carefully looking over the mines our informant came to the conclusion that it was a good place to stay away from by those who have anything to do elsewhere. But for those who are itching for adventure and who are always looking for a fortune under a rock it is a good place to prospect in. If it doesn't cure them there is no place that will. The Butte party that went there last July will remain in Butte. It had enough of the Sweet Grass mines.

NEW MINERAL DISCOVERIES.—Inter-Mountain, Sept. 7: When the thriving town of Anaconda was first laid out, it was supposed that the place would never derive any support aside from what the operations of the Anaconda smelter and the contiguous valley trade would give it. It is a fact, now sufficiently authenticated to warrant publication, that Anaconda promises to loom up as the business center of a very important mining district. A number of Butte men are interested in the late discoveries, and have already expended considerable money in prosecuting development, in some cases with very profitable results. Among these may be mentioned J. D. Thomas and J. Ross Clark, from whose mines some rich ore has already been shipped to Butte for treatment. With the Anaconda works and good mines also, the future of the town takes on an aspect of increased brightness.

NEW MEXICO.

THE SMELTER TO START SOON.—Rio Grande Republican, Sept. 3: The Las Cruces smelter is completed in every part, with nothing left but to light the fires and smelt the ores. We are told by men experienced in the smelting business that the plant is unexcelled for convenience and perfection considering its capacity. It consists of two stacks, a 40-ton galena-silver stack and another of the same capacity for copper ore. Dust chambers for collecting the fine ore and waste gases are in connection with the galena stack. A 50-horse power engine runs the machinery. A Gates crusher reduces the ore to a proper fineness, and a Baker blower, of the largest size, connects with the stacks. The machinery is all modern, of the latest improved pattern. The buildings are substantial; well-arranged laboratory and offices are separate from the main building, as is also a boarding house for the accommodation of the employees. The Santa Fe railroad company have built a side track out to the works. In building the smelter the means of the company were exhausted, but this will not long retard the working of the en-

terprise. Very sensibly they did not attempt to run it without a sufficient amount of money to keep the ore bins always full and so have about completed a lease to Wm. Dussauer, Skidmore and Dougher, owners of the Bennett mine. So soon as enough ore has accumulated to keep the smelter running without delay, the works will be started with a force of skilled employees, sufficient to run it to its full capacity.

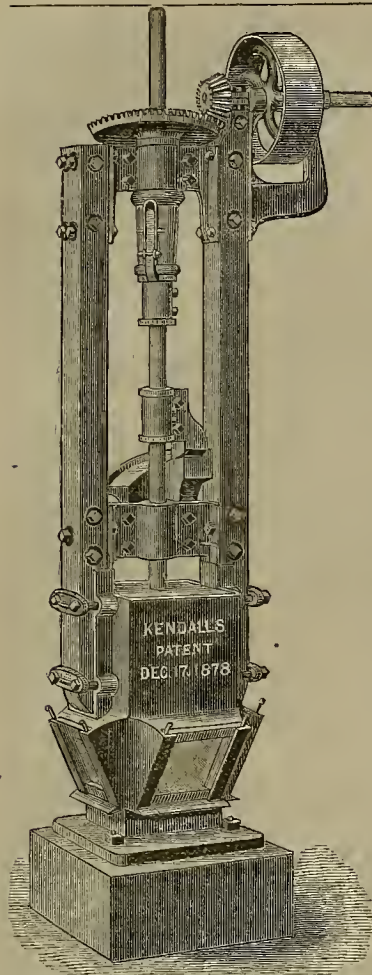
PINE CREEK NOTES.—Bedrock Democrat, Sept. 5: The Pine creek mines seem to be attracting more attention abroad than ever, and mining men and capitalists are arriving in this city daily en route to the new El Dorado. Of all those who have paid the mines a visit, not one has returned and spoke disparagingly of the prospects, but on the contrary they have all been most favorably impressed with the outlook and are eager to secure locations or purchase interests. We doubt if there ever was a camp discovered that has met with the unqualified approval of mining men as has the Pine creek district. As the work of development progresses upon the discoveries the richer they become, so rich, in fact, that the report seems incredible. Nevertheless, all one has to do to satisfy himself as to their richness, is to pay a visit to the bonanzas—the evidences are there, and no mistake. While we do not think the camp will become a working camp this fall, considerable work will be done, giving employment to a few men. But the coming spring we look to see the camp flourish, the like of which has not been known for years on this coast. The principal locations will have passed into the hands of capitalists by this time, mills will be erected, and hundreds of men will find employment. All the contract work on bonded mines will be finished Tuesday, and the coming week will tell whether or no actual sale to capitalists has been made. Every shaft sunk or tunnel run has developed the ledges both wider and richer, and there is no doubt felt here but what the mines will be accepted and at least one mill be in operation within the 90 days. J. W. Norton, who has been prospecting on East Eagle, eight miles west of here, and on Little Eagle, five miles distant, has some very promising looking specimens, and informs me that the ledges are well defined and easily worked. Specimens of the East Eagle rock have been sent to Portland for assay. Thomas Hoffman, Clarence White, Jack Eastabrook and Pierce Rogers, returned last Saturday from a prospecting tour in the Pine creek district and report having made numerous valuable locations. The bonded mines, the "Whitman," "Companion" and "Tiger," are showing up exceedingly rich and development progresses. They are now down to a depth of 25 feet on the "Whitman" and are now tunneling 25 feet. It is said that there is now enough ore on the dump of this mine to pay the bonded price and erect a mill. Building is progressing rapidly in Cornucopia and Allen town. Everything booming. Several California capitalists are in the mines and are endeavoring to secure interests. Pine creek, like every other new mining camp, is infested with a set of individuals who will not prospect themselves but are inclined to "jump" locations made by energetic prospectors, but as yet they have failed to commence operations from the fact that the better class in the camp have signified their intention of dealing out swift retribution to all who shall attempt such proceedings. The road from Sparta to the mines is a sure thing.

THE DISTRICTS.—Silver City Enterprise, Sept. 5: S. A. Wellington has commenced a survey of a group of three mines in Bullard's Peak district for the purpose of procuring patents. Joseph McQuerry, a Georgetown miner, made a shipment of ore to Deming last week. The first-class averaged 619 ounces, and the second 75 ounces. W. H. Newcomb has struck a two-foot vein of gold quartz in the Cow Springs district, that promises to be an important thing. Nick Rascom, with whom Mr. Newcomb is interested, is working it, and recent assays are very satisfactory. The following returns have been received from a mine near this city which is abundance of ore in sight, the name of which is withheld for the present. First class 8266 oz. silver, \$1942.98 gold; second class 91 oz. silver and \$30 gold. A body of water was encountered in the adjoining claim to the Old Man on Wednesday that drove the miners out, preventing them from sinking deeper. The superintendent, W. C. Hadley, states that he had figured on striking water and mineral at the same depth. Instead of sinking deeper Mr. Hadley will drift for the vein. Barney Tiernan will return to Europa and take a lease upon the Horner mine, owned by the Massachusetts New Mexico Mining company, and represented by B. Y. McKays. Mr. Tiernan will put a force of men to work upon the property immediately. The main shaft on the lower lead of the Rose mine, shows up a fine body of ore through which native silver can be seen. Owing to the flow of water sinking has been discontinued at the point where the fine showing is. As soon as some means are devised to drain the water work will be resumed upon this ore body. On the upper ledge the main shaft is down 110 feet from the surface, or fifty feet as a winze from the tunnel, where water has also been encountered, obliging the superintendent to discontinue sinking. A drift has been started 35 feet from the tunnel, and native silver and chloride ore shows up well in the face. Sinking has begun from the 550 foot level in the Black Hawk mine again with a good showing of ore to begin with. The mine is looking as well if not better than at any time since its discovery. The ore bodies are not of as high grade but they have every appearance of being permanent. In six different places on the mine ore is exposed and being extracted. The pump recently put in works to a charm. Twenty-eight men are employed upon the property.

UTAH.

MILFORD.—Cor. Salt Lake Tribune: Large shipments of ores are coming in from all points, to be sent north, and if the Salt Lake buyers do the fair thing, they will be worked there; otherwise they will go farther east.

THE CHRISTY COMPANY.—Southern Utah Times, Sept. 7: The late heavy rains washed out the water ditch, necessitating a closing down of the mill for a day and a half. Everything is running smoothly again, and between 40 and 45 tons of ore is crushed every day. A full force of men are at work in the mines, the stopes are furnishing their regular supply and the slight stoppage of the mill caused the dumps of the California and New Shaft to become crowded with ore.



NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco.

...MANUFACTURERS OF...

**Stationary and Compound
Engines,**

**FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.**

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

**KENDALL'S PATENT
QUARTZ MILLS.**

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL.

Send for Circulars and Price List.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize its poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

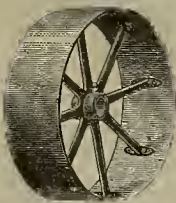
No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - - San Francisco, Cal.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

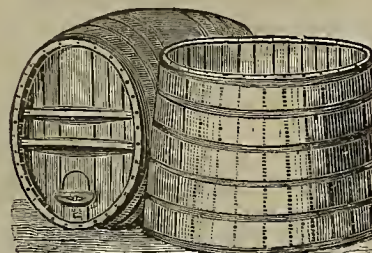
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street - - - SAN FRANCISCO, CAL.

WATER TANKS! WINE TANKS!
CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.
Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office - 47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast - Joseph H. Dorey, 529 Commercial St., S. F.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'g Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chases, Cement and Slant Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrow, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:
No. 243 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

... MANUFACTURERS OF ...
BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals. Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.
Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.
113 Leldesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process,
Ores Sampled,
Assaying in all its Branches,
Analyses of Ores, Minerals, Waters, etc.,
Working Tests (practical) Made,
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations
Mines; Plans and Reports furnished.
C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. H. KUSTEL.
★ METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leldesdorff Street, - SAN FRANCISCO
Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by improved processes.
G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

San Francisco Cordage Factory.

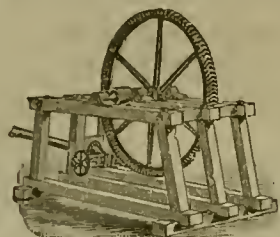
Established 1866

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tanned Manila Rope, Hay Rope, Whale Line, etc., etc.
Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.
SEND FOR CIRCULAR.
EDWARD A RIX & CO.,
Sole Agent,
18 and 20 Fremont Street, San Francisco.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S
Inserted Tooth

AND
CHISEL BIT
CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of
all kinds of
Chemical Stoneware
—FOR—
Manufacturing
Chemists.
Also Chemical Brick
for Glover Tower.

“CLAYTON”
IMPROVED
MINING PUMPS
AIR COMPRESSORS
For CATALOGUES, ESTIMATES, Etc., Address,
Clayton Compressor Works,
Near Brooklyn Bridge, BROOKLYN, N. Y.



SOLE AGENTS

“HOYT'S” Pure Oak, Short Lap Leather Belt.
WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.
The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,
653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL, The “Old Reliable,”

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE.

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel: Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet “Jenkins Standard Packing,” and is for sale by the Trade generally.

Manufactured only by

For Sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal. JENKINS BROS., 71 John St., New York.

Market Reports

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for, let him not fail to write us direct to stop it. A postal order (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER,

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 1, 1885.

- 325,387.—AMALGAMATING PAN—M. P. Boss, Oakland, Cal.
325,388.—FRICTION CLUTCH—M. P. Boss, Oakland, Cal.
325,394.—REEL FOR HOLDING WIRE IN THE COIL—A. Cavali, S. F.
325,395.—AIR COMPRESSING PUMP—J. B. Clot, S. F.
325,327.—MILL STOCK FEEDER—Downie & Eisan, Marysville.
325,339.—FEED ROLL—P. Hanavan, Oakland, Cal.
325,418.—LIQUID COOLER—A. Kurtz, S. F.
325,614.—HOUSTING APPARATUS—L. I. Lancaster, Tacoma, W. T.
325,348.—FAKE BOX—Landgrane & Willis, S. F.
325,353.—SHIRT—L. Lemos, S. F.
325,257.—MANUFACTURE OF INCANDESCENTS—P. N. Mackay, S. F.
325,354.—ROAD LEVELER—S. A. Moulton, San Jose, Cal.
325,432.—CULTIVATOR—S. A. Moulton, San Jose, Cal.
325,437.—ALARM AND WAKING BED—A. J. Nordmann, S. F.
325,442.—TIRE TIGHTENER—E. R. Powers, Paradise, Cal.
325,277.—TAILOR'S PRESS PAD—S. C. Rugland, S. F.
325,368.—SPINNING MACHINE—A. L. Tubbs, S. F.
325,295.—SAW-MILL INDICATOR—A. J. West, Aberdeen, W. T.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROCK CRUSHER OR BREAKER.—Frank A. Huntington, S. F. No. 324,937. Dated Aug. 25, 1885. This improved apparatus for breaking or crushing rock consists in a combination of devices rather difficult to describe clearly without the aid of an engraving.

FAKE BOX.—F. O. Landgrane and M. E. Willis, S. F. No. 325,348. Dated Sept. 1, 1885. This is an improvement on fare-boxes, such as are used in street cars to receive the fares of passengers. It consists in certain details of construction which improve the box ordinarily in use.

BILLIARD TABLE LEG.—Michael Cashu, S. F. No. 324,917. Dated August 25, 1885. The invention relates to that class of billiard table and to certain new and useful improvements in the legs thereof. The object is to provide a simple and effective means for leveling the table and adapting it to be moved.

FEED ROLL.—Philip Hanavan, Oakland. No. 325,339. Dated Sept. 1, 1885. This is an improvement on the feed rolls for wood-working machinery. It consists of removable, adjustable teeth and a means for securing them in the roll. When the teeth become worn they may be removed and others substituted. These teeth can be made of steel.

MACHINE FOR SPINNING HEMP.—A. L. Tubbs, S. F. No. 325,368. Dated Sept. 1, 1885. This invention relates to spinning machines for fibrous material of different kinds, but specially adapted for spinning hemp, whether Manila, Sisal, Kentucky, Russia or other forms of hemp. The object of the invention is to effect economy in power and space, and to secure a machine capable of doing increased work.

BORING MACHINE.—John B. Cobb, College City, Cal. No. 324,920. Dated August 25, 1885. This drilling apparatus consists of a rotating frame, around the periphery of which a number of shanks for drills of different sizes are journaled, a gearing or mechanism by which these drills are operated, and a means for bringing any drill into action and throwing others out, together with a feed mechanism.

MILL-STOCK FEEDER.—George Downie and Albert F. Eisan, Marysville. No. 325,327. Dated Sept. 1, 1885. This invention relates to that class of feeders which are adapted to properly direct or feed what is known as "mill-stock" to any suitable machine underneath—such as rolls or a purifier; and the machine consists of a combination of devices. The object is to provide a simple and effective feeder of this class adapted to automatically feed the stuff in a uniform and steady stream.

ROAD LEVELER.—Stillman A. Moulton, San Jose, No. 325,354. Dated Sept. 1, 1885. This road-leveling device is adapted to be attached to any wagon, cart or other wheeled frame, but especially to watering or sprinkling carts. It consists in a scraper head carrying a series of spring teeth or scrapers adjustably suspended from the wheeled frame either before or behind the wheels, said scraper head being so constructed as to be enabled to bend at its middle to an angle in a horizontal or in a vertical plane. There are peculiar runners connected with the wheeled frame and with the scraper head, which may or may not be used as desired.

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscription up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz.:

1. World's Encyclopedia, 794 pages, with 1,200 illustrations, worth \$1.75. Postpaid for 50 cts.
2. Patent Binder (cloth cover) with name of this paper in gilt. Postpaid for 50 cts. \$1.00
3. To NEW SUBSCRIBERS, 12 select back Nos. of the MINING AND SCIENTIFIC PRESS.—Free .75
4. Any of Harper's first-class periodicals, 15 per cent less than regular rates.
5. Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates.
6. Pacific Coast and Eastern Bibles, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates.
7. Picturesque Arizona, 380 pages, in cloth and gilt. Postpaid for 25 cts. 1.25
8. Californian, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos. Postpaid for 3 cts. .35
Per volume, unbound, 5 Vols. Postpaid for 20 cts. 2.00
Per volume, bound, cloth back and stiff paper sides. Postpaid for 40 cts. 2.50
9. Picturesque California Homes (40 building plans and estimates). Postpaid for \$1 3.50
10. Dewey's Patent Newspaper File Holder (18 to 36 inch). 25 cts. .50

NOTE.—The cash must accompany all orders. If too much is sent for any article or publication, the balance will be returned immediately. Address this office, No. 252 Market St., S. F.

1885.—No. 11 is really a valuable premium to new-comers and others who appreciate the better class of stories and a good standard of California literature.

- Webster's Dictionary, 634 pages, with 1,500 illustrations. 50 cts. 1.50
Grant Lithograph, size 24x19. 50 cts. .50
Cleveland Fine Steel Plate, size 12x16. 10 cts. .50
Grant Steel Plate, cabinet size. 5 cts.
De Groot's History of Mining in California. 5 cts. .25
Beautiful Poetic Review, a handsome, entertaining and instructive souvenir of real merit. 25 cts. .50

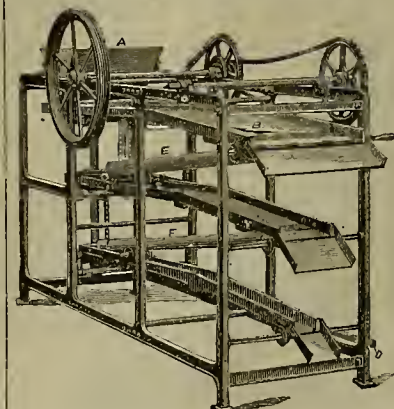
Send for any further information desired. Readers will please inform their new neighbors and others concerning our paper and these offerings. On application, sample copies of this paper will be mailed free to the address of any persons thought likely to subscribe.

To Young Men and Young Women.

All intelligent boys and girls should prepare themselves for usefulness in business if they wish to "step up higher." We have for sale to such, on easy and favorable terms, a scholarship in one of the best business colleges in the U. S. Address this office.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
Dry-Placer Gold Concentrator.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or fans. No quicksilver used. Frame of malleable iron. Will save a higher percentage of gold than other machines.

Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

W. E. CHAMBERLAIN, JR. T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

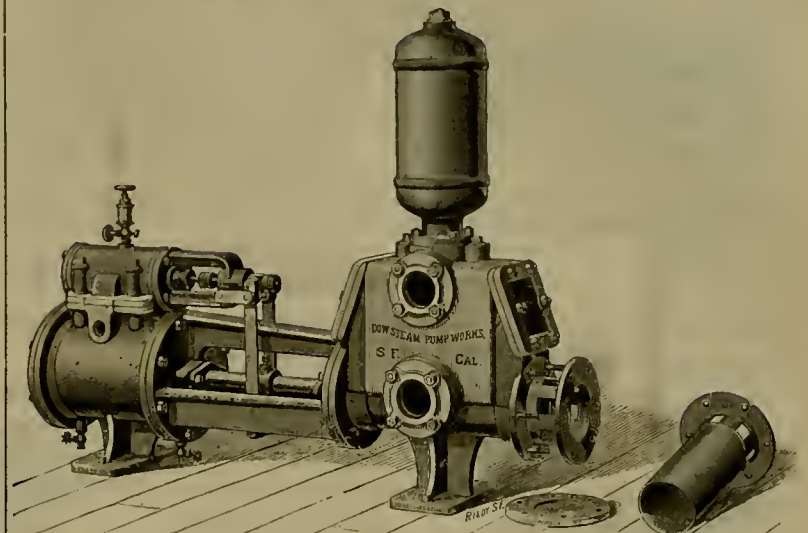
Call, or send for Circular to CHAMBERLAIN & ROBINSON, Prop's.



HEALD'S BUSINESS COLLEGE, 24 Post St. S. F. Send for Circular.

DOW STEAM PUMP WORKS,

San Francisco, Cal.



DOW'S IMPROVED STEAM PUMPS
And Pumping Machinery

FOR EVERY POSSIBLE DUTY.

COMPOUND PUMPING ENGINES,

Condensing and Non-Condensing,

.....FOR.....

Water-works,
Mining Purposes,
Irrigation, Etc.

WORKS: 114 and 116 BEALE STREET.

Correspondence Solicited.

Call or Send for Catalogue.

EUCALYPTUS
Boiler Scale Preventive and Remover.

This Preparation is now in use in many thousands of Steamship and Stationary Boilers all over the World, and has always driven other Scale Removers out of the Market when they have come into Competition.

WHAT IS SAID OF IT.

U. S. NAVY.

"In the surveying cruise of this vessel previous to this, similar in all respects, I found it necessary at times to scale the boilers. The use of Eucalyptus has obviated this necessity." "The use of Eucalyptus has been proved to protect the iron of the boilers from corrosion."—Report of Chief Engineer U. S. S. Ranger.

P. C. S. S. Co.

"I have used many kinds of scale removers, and never found anything that could do as thorough work as yours does. What we have used has paid for itself many times over in the saving in boiler repairs alone." JOHN COSGROVE, Supt. Eng'r P. C. S. S. Co.

O. & O. S. S. Co.

"I hope never to be without it."—T. Tomlinson, Chief Eng'r S. S. Arabia.

JOHN ROACH & SONS, N. Y.

"Your preparation is perfect in its working and a complete success in all things for which it is intended." P. DORRIS, Supt. Forging Dept. Morgan Iron Works.

FULTON FOUNDRY.

"We find it to be the best in use for removing scale."—H. P. Christie, Supt.

STARR'S MILLS.

"It is a success, and we advise and endorse its use strongly."—Starr & Co., per A. D. Starr.

BUCKEYE MILL, MARYSVILLE.

"We have never in our experience of 15 years found anything to equal it."—Buckeye Mill Co., per Justus Greeley.

GIANT POWDER WORKS.

"I cheerfully add my testimonial to the many given already in regard to the efficacy of your scale remover." FRANK ROLLER, Supt.

U. S. MINT.

"I take pleasure in recommending it as the best and cheapest thing I have used." GEO. L. HARRIS, Chief Eng'r U. S. Mint.

We refer also to the following, some of our regular Pacific Coast Customers: SAN FRANCISCO—Ridson Iron and Locomotive Works; Union Iron Works; Market St. Cable Railway Co.; San Francisco Gaslight Co.; State Board of Harbor Commissioners; California Wire Works; A. M. Simpson & Bro.; Anna Iron Works; American Sugar Refinery; Baker & Hamilton; Spreckels & Bros.; Pacific Whaling Co.; U. S. Appraisers' Building; Davidson & Reed; Golden Age Mill Co.; Hobbs, W. & Co.; R. D. Hume & Co.; A. Lusk & Co.; Louis Sloss & Co.; Ship Owners' and Merchants' Towboat Co.; Selby Smelting and Lead Co.; San Francisco Laundry; Sol. Wangerheim & Co.; West Coast Furniture. CHICO, CAL.—Sierra Lumber Co.; Chico Water Co. OAKLAND, CAL.—Judson Manufacturing Co.; Samu's Mills; Pacific Press; Mitchell, Fisher & Ketcher. SAN JOSE, CAL.—John Christian; Farmers' Union. LOS ANGELES, CAL.—Los Angeles Electric Light Co.; Mills & Carr; V. Beaudry; Kerchoff-Guzner Mill and Lumber Co. STOCKTON, CAL.—Insane Asylum; N. T. Whiting; White & Thomas; Duncans Mills L. and L. Co.; Vanderhurst, Sanborn & Co., Salinas. UTAH—Ontario S. Mfg. Co.; Park City; Santa Clara Valley Mill and Lumber Co.

The Preparation is put up in 10-gallon casks and 50-gallon barrels.

DOWNIE B. I. P. CO., Manufacturers,

No. 204 Market Street,

SAN FRANCISCO, CAL.

Iron and Machine Works.

THOMAS THOMPSON THORNTON THOMPSON
THOMPSON BROTHERS,
EUREKA FOUNDRY,
 129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,
WM. H. BIRCH,
 Engineer and Machinist,
 119 Beale Street, San Francisco.

— BUILDER OF —
 Steam Engine, Flour Mill,
 Mining, Saw Mill and
 Dredging Machines
 Brodie Rock Crushers,
 Steam Power, Hydraulic,
 Side Walk and Hand-Power
 ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic
 Safety Catches for Elevators. All kinds of machinery
 made and repaired. **ESTIMATES SOLICITED.**

UNION IRON WORKS,
 SACRAMENTO, CAL.

ROOT, NEILSON & CO.,
 MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
 constructed, fitted up and repaired.

Front Street, Between N and O Streets,
 SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
 of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

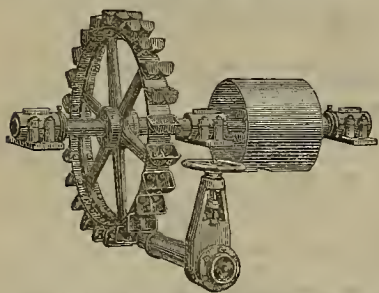
California Brass Foundry,

No. 125 First Street, Opposite Minna,
 SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
 Metal Castings, Brass Ship Work of all kinds, Spikes,
 Sheathing Nails, Rubber Braces, Hinges, Ship and Steam-
 boat Bells and Gongs of superior tone. All kinds of Cocks
 and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-
 pings and Connections of all sizes and patterns, furnished
 with dispatch. **PRICES MODERATE.**

J. H. WEED. V. KINGWELL.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
 by the Idaho Company at Grass Valley, Cal., and
 gave 90 2 per cent., distancing all competitors. Send for
 Circulars and guaranteed estimates.

L. A. PELTON,
 Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
 San Francisco, Cal.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

— FOR —

Automatic Cut-Off Engine.
 SILVER MEDAL AWARDED
 1883
 For Best Hoisting Engine and
 Boiler Combined.

W. H. OHMEN,
 Machine and
 Engine Works
 22 Fremont Street,
 SAN FRANCISCO.



INVENTORS. MODEL MAKER,

258 Market St., N. E. cor. Front, up stairs, S. F. Experiment-
 al machinery and all kinds of models, tin, copper and brass.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold
 in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.
 (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting
 that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
 Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded
 to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-
 ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,
 316 California St., San Francisco.

HEINE PATENT SAFETY BOILER.

RISDON IRON AND LOCOMOTIVE WORKS.

Sole Agents for the Pacific Coast, Corner Beale and Howard Sts., San Francisco.

FIRST PREMIUM AWARDED at MECHANICS' FAIR, 1884.

Economy in space and fuel. Safety at high
 pressures. Freedom from scaling. Equally
 adapted for power and heating purposes.
 Especially adapted for mills, factories, hotels,
 stores or any place where safety is a necessity.
 Will work well with muddy water and any kind
 of fuel.

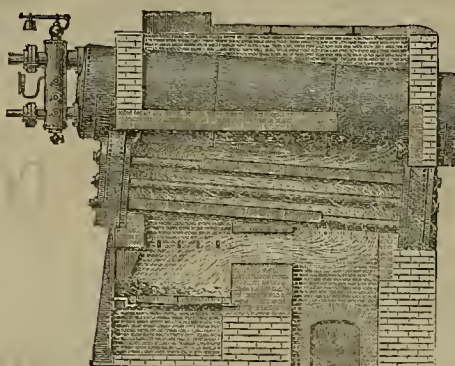
TESTIMONIALS.

SAN FRANCISCO, Sept. 19, 1884.

Risdon Iron and Locomotive Works—Gentle-
 men: We have had one of your Heine Patent
 Safety Boilers in use for four months at our
 Borax Works, in Alameda. It does good work
 and gives perfect satisfaction. Yours truly,
 (Signed) WM. T. COLEMAN & CO.

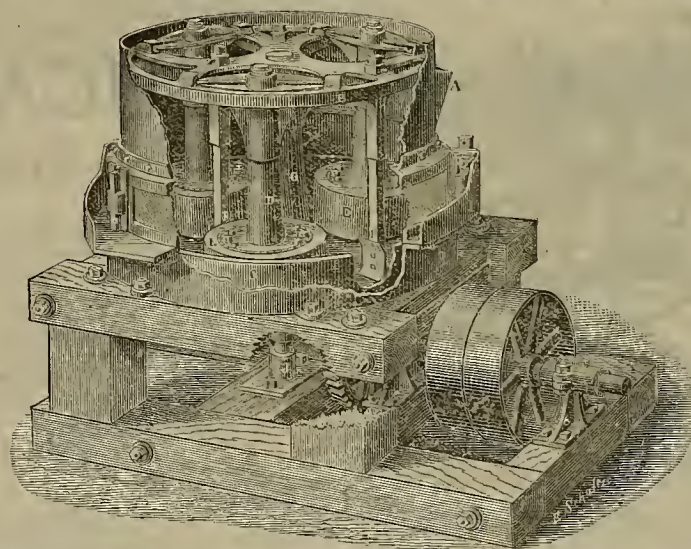
SAN FRANCISCO, Oct. 4, 1884.

Risdon Iron and Locomotive Works—Dear
 Sirs: I am using one of your Heine Patent
 Safety Boilers in my Candy Factory on Twenty-
 Third street, near Valencia. For economy of
 fuel, safety and efficiency I have never seen its
 equal. Very truly yours,
 (Signed) W. S. TOWNSEND.



Send for Circular and Prices.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy
 in Saving Gold. Economy in Transportation of Machinery.

Economy in Cost of Erection of Mill at Mine. Econo-
 my in Time Required to Establish Plant
 (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of
 continuous use at a number of mines in California has enabled the inventor to perfect and im-
 prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
 LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

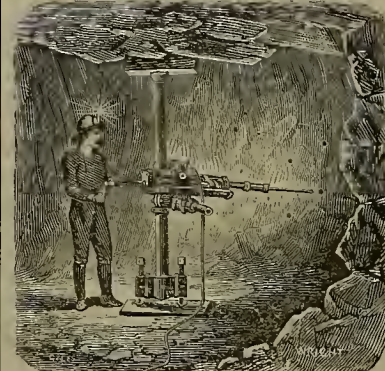
Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,
 45 Fremont Street, San Francisco, Cal.
FRASER & CHALMERS,
 Cor. Fulton and Union Sts., Chicago, Ills.

A. T. DEWEY, } Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED
 W. B. EWER, } 1860.
 GEO. H. STROG }
 INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class
 Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal
 nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original
 cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies.
 The information accumulated through long and careful practice before the Office, and the frequent examination of
 Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled
 us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not
 few. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 262 Market St., S. F.



INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
 Ports, will do 20 per cent more work than
 the Old Ingersoll.

MINING MACHINERY.

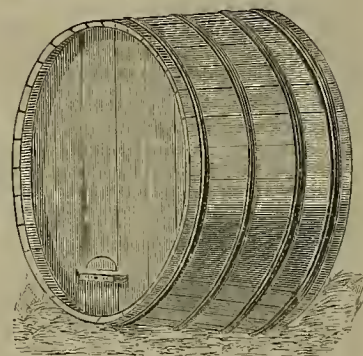
For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MECHANICS' MILLS.



Water Tanks. Wine Tanks.

Our well-known TANKS are made by machinery,
 from the best of materials, and shipped to all parts of
 the country. Each piece numbered. No skill required
 in setting up.

WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

.....MANUFACTURER OF.....

Canners' and Soap-Makers' Presses and
 Dies, 20-inch Engine Lathes,
 12-inch Shapers.

Punching and Shearing Machinery for
 Hydraulic Pipes

SHAFTING, HANGERS, AND PULLEYS.
 Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

"ACME" DRAWING PAPERS

QUEEN & CO'S

CELEBRATED

PROFILE AND CROSS SECTION PAPERS



Extra Fine
 Swiss
 Instruments

QUEEN & CO'S Improved TRANSITS and
 LEVELS, TAPES, CHAINS, RODS, RULES,
 and Drawing Materials of every description. List and
 description of our Ten Catalogues sent on application.
JAMES W. QUEEN & CO.,
 924 Chestnut St., Philadelphia.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



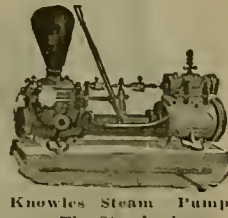
Putnam Placer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.



Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.



SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.

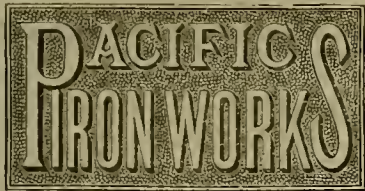


SEND FOR CIRCULARS.

PELTON
HURDY-GURDY WATER WHEEL.

SOLE AGENTS FOR

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850. 1885.
RANKIN, BRAYTON & CO.,
MINING MACHINERY.

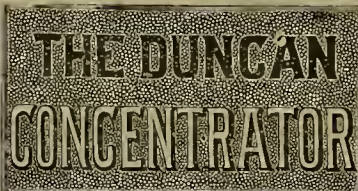
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

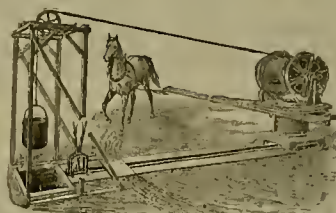
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting, was DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished in order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



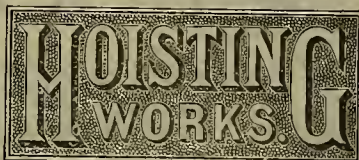
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires. Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

CHICAGO PLATING COMPANY, 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St., San Francisco, Cal.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE



Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Cravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

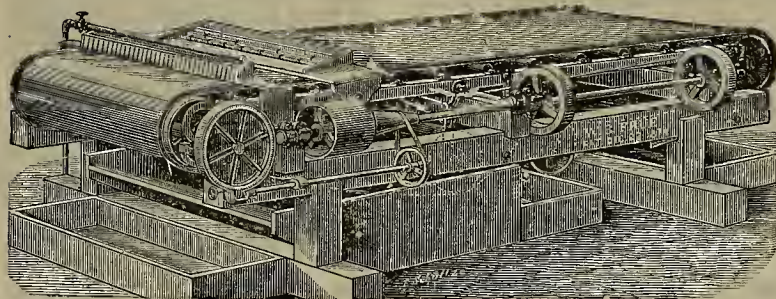
WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

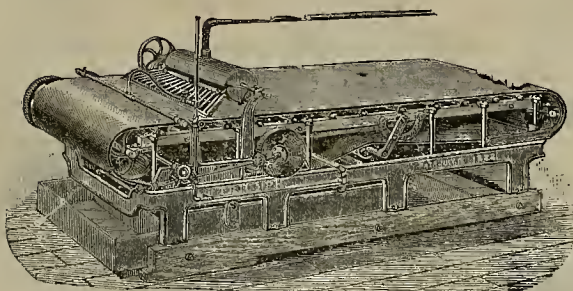
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.

THE "TRIUMPH" TRIUMPHANT!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$193.15, or \$9.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flaunted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 19, 1885.

VOLUME LI
Number 12

Bed-Rock.

In California bed-rock is commonly slate, shale or schist, but sometimes it is granite or sandstone, and more rarely limestones. The slates, etc., are of various colors (brown, blue, green or black), and are usually soft (talcoose or chloritic), but in fine grained silicious blue or black slate also occurs, which is rather hard. The granite is soft and decomposed, and slacks rapidly on exposure. In Oregon, Colorado and Montana similar rocks occur, according to Williams in his "Placer Mines and Mining Ditches."

In Idaho the common bed-rock is a highly decomposed granite, which is firm when first uncovered, but soon disintegrates on exposure to the air. In Dakota slate prevails, as also granite and sandstone. In the southern gold belt of Georgia, North Carolina and South Carolina the bed-rock is usually a soft, decomposed mica schist, which is highly silicious, and often contains stringers of quartz, though a hard slate is also met with. In this portion of the country the "bed-rock" itself is mined. The disintegration of the surface by decomposition and weathering gives rise to a loose material which may be "hydraulicked," but which is not usually of the same character as the western gravel deposits, the latter often occurring at considerable distance from their origin.

The form of the surface of the bed-rock is a matter of considerable importance in working. A rough, uneven bed increases the labor of cleaning up, and if very irregular may suddenly leave the sluices "out of grade" at points where the pay is richest. In drift mines operations are facilitated by a regularity in the formation, while the drainage and extraction of ore are obstructed by a reverse condition.

Strata of indurated clay, or of dead gravel cement, occur frequently in gravel deposits, forming what are known as false bed-rocks. Sometimes it happens that below such a stratum the deposit, consisting of "dead wash," is too poor to pay for washing, or that the grade will not admit of deeper working; in such cases the seam is treated as a working bed-rock, and the tougher and more uniform it is the better. A number of profitable mines are operated on this plan, working off only the top pay streak down to a false bed-rock; but in more numerous cases, where it is desirable to "bottom" the entire deposit for the sake of winning the richer gravel on the true bed-rock and the gold lying in the crevices of the latter, the occurrence of the false bed-rocks is a great hindrance. Some clays are so tenacious as to yield but slowly to the pipe, and often blasting has to be resorted to, thus increasing the expense.

On the whole the lead situation still remains very strong, and its apparent offish flurry must soon be checked by the demand, for the Horn Silver Company is producing nothing, and that is a loss of at least 1000 tons per month, which, so far as we can learn, is not being made up in any other locality, and during no year since 1870 has our annual consumption been 12,000 tons less than our production.

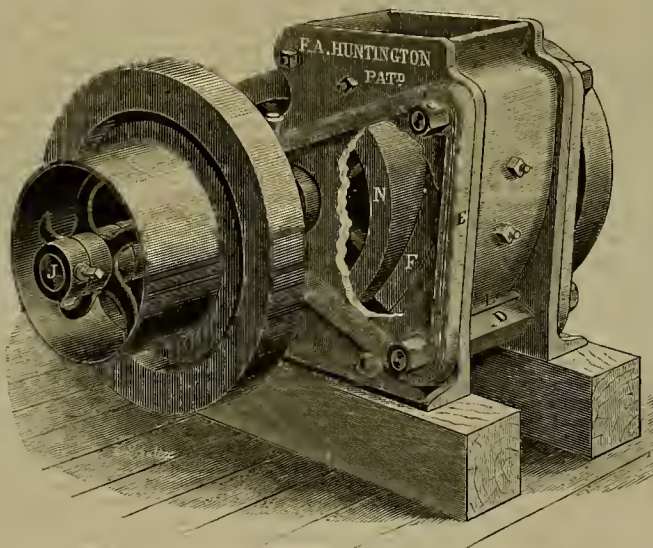
The mines down at Hiko are reported to be improving greatly. That 150-foot (in width) ledge, of which the public heard so much, has entirely evaporated, and in its stead there is a seven-foot ledge of good grade ore. The company's indebtedness is light and everything now promises well at the mines in Pahrangat.

Silver in Oregon.

Oregon has never been noted as a silver region, and in fact, compared with other Pacific Coast States her gold mining industry even has been unimportant. Still there are many good gold mining places within her borders. Now, however, the State is coming into the ranks of silver producers. From Granite Creek, the other day, 500 ounces of silver were shipped from the mine of J. B. Cavel. It has been known for some time that the mountains of Granite Creek abounded in rich mineral, but for some reason or other no great stir has been created regarding them, the owners seemingly contented to "pursue the even tenor of their way" without molestation. The different owners of the ledges discovered have from time to time erected small mills and arrastras for the

Proper Land District for Mines.

A decision has been rendered by the Commissioner of the General Land Office, on a California mining case, to the effect that where a party commences proceedings for mining patent on unsurveyed land in a certain land office, under the erroneous belief that such claim is within that land district, he must, on discovering his mistake, commence *de novo* before the proper local office. It seems that a man filed an application in the Shasta land district for a placer claim which was $1\frac{1}{2}$ miles from the district line, and carried on all his legal proceedings in that district, as, the land being unsurveyed he thought his claim was within the Shasta district, and did not learn it was in the Humboldt land district, until after the township survey had been made. He then requested



F. A. HUNTINGTON'S IMPROVED ORE CRUSHER.

working of their ore, and other than that they were making fair wages, the full extent of the richness of the mines was never given to the public. These mines are in a spur of the Blue mountains.

Last week the returns from assays of ore from the Wallowa mountain were received, the croppings of the leads showing from \$20 to \$75 per ton in silver. The Wallowa *Chieftain*, published at Joseph, Oregon, says that a private assay of ore taken a few feet from the surface of one of the galena ledges by an experienced miner gave \$400 silver to the ton. There are two kinds of ore found here, one bearing lead and silver and the other copper and silver; some of them carrying 50 per cent lead and others 75 per cent copper. There are 19 claims already recorded and at least 150 more located. The prospecting in general has been done by inexperienced miners and they have located everything that looked like a ledge, and a great many veins of quartzite. The ledges are from two feet to fifty feet in thickness and are found on several distinct mountains. All that is needed now is capital to develop these mines.

CHLORIDES in El Dorado canyon recently shipped ore clear to Pueblo, Col., for reduction. The ore is boated down the Colorado river to the Needles, thence shipped by rail to the reduction works.

that he be allowed, under the circumstances, to make the entry at the Shasta district office.

The Commissioner of the Land Office calls attention to the fact that Section 2325, Revised Statutes, clearly sets forth the manner of proceeding to obtain patent to a mining claim; one of the statutory requirements is that the application for patent shall be filed in the "proper land office" that notices of the application shall be posted in such land office, and that the Register of such office shall publish a notice that such application has been made, etc.

The Commissioner decides as follows: "In the case under consideration it is manifest that the statute has not been complied with; therefore, in view of this fact, Mr. Jacobs could not be allowed to make an entry or receive patent upon his present application, which, as stated, has not been filed in the proper land office, as required. Applicant's proper course to obtain patent will be to file his application for patent in the proper land office, and commence proceedings *de novo*, subject, of course, to any prior valid appropriation of the land."

OWING to the depression in the silver mining industry the newspaper business is evidently on the wane in Nevada. Of the fifteen counties in the State, only thirteen are represented by newspapers, and six by only one each. The counties unrepresented are Churchill and Roop.

A New Ore Crusher.

Mr. Frank A. Huntington, of this city, has just received through the MINING AND SCIENTIFIC PRESS Patent Agency a patent on his improved rock-breaker, an engraving of which is shown on this page. Although the patent has just been issued, Mr. Huntington has been manufacturing these machines and selling them with his centrifugal roller mills, for breaking the ore before feeding it to said mills.

There are but two working parts to this crusher, viz., the eccentric shaft J and the cylindrical jaw N, through which the shaft J passes loosely. And by rotating the shaft J, the jaw N is moved to and from the stationary jaw F, crushing the ore between these two points, the same as in the ordinary jaw crusher. When crushing, the jaw N moves slowly around in the opposite direction to the eccentric shaft J, thereby causing an even wear around the whole surface of the jaw N, which has ten times the wearing surface of those used in the ordinary crusher. This slow rotating movement also materially assists the discharge of wet ores. By dropping plates L between the bar D and jaw F, the ore can be crushed to any desired fineness. The wrought-iron bands E pass around the bearing of the eccentric shaft J, and the bolts C and D take all the strain from the cast-iron sides, thus enabling it to be made light and strong.

The special claims of excellence for this machine made by the inventor are: the few working parts; the large wearing surface of the jaw N; the easy adjustment of the machine to crush coarse or fine; the free discharge of wet ore; the entire absence in the working parts of bolts, toggles, eccentric straps, rods, rubber springs, and numerous other complicated devices, which are a source of annoyances and expense in the ordinary jaw crusher.

There is a lug or projection at the upper side of the shoe, which prevents rock from being forced outward, when the cylinder approaches the shoe, the rock being held beneath this projection until it can be acted on and crushed by the movement of the cylinder. As the cylinder or its interior bushing turns loosely upon the shaft, it will be seen that the action of the cylinder will simply be to approach and recede from the fixed jaw without partaking of the revolving movement of the shaft.

There will be, however, a slight forward movement of the cylinder in the direction of the rotation of the shaft at each forward and backward movement with rotation to the die, so that the cylinder always presents a new force to act against the rock between the two, and will gradually complete the revolution.

Three sizes of these crushers are made weighing respectively 850, 1900 and 2700 pounds.

SALT AND BORAX IN NEVADA.—There are now being shipped to various points monthly, over the Carson & Colorado Railroad, some 400 tons of rock and table salt, and about 250 tons of borax. The salt is equal to the very best Liverpool salt. These minerals are found in nearly a pure state in many places. In some borax marshes the native borax (called tinkle) and borate of lime has to be mixed with carbonate of soda brought from soda flats to make the merchantable borax. In other places nature has made the necessary mixture herself. Boiling and evaporating pans and tanks are used. Sagebrush is the fuel, and Indian labor is employed.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

A Little Mining Philosophy.

[Written for the Press.]

Never build a mill before you have a mine; that has been the Eastern fashion and has not been a success.

Never buy complicated machinery when you can get simple machinery to do the same amount of work.

Never base your calculations on the assay of a specimen.

In taking down ore take it down clean as possible. If impossible to take down clean have it assorted on top. It costs as much to mill a ton of waste as it does a ton of ore. The same rule holds good in regard to smelting ore.

In taking down ore for shipment assort down as fine as possible. It will reduce the quantity and will improve the quality, giving the shipper a greater profit.

Keep cars, track and chutes in good repair. It saves time, money, waste of ore and bad language.

Keep plenty of drifting tools and picks on hand. See they are kept in good repair. There is nothing so exasperates the miner and is less profitable to the mine owner than a miner working dull steel.

Always buy the best quality of powder, fuse, caps, etc. It pays the best, does more work, and lessens the amount of danger in use.

Keep hanging ground secured in proper shape. Miners working where they think there is any danger will be in their places as little as possible.

See that shaft timbers are put in in proper shape and correctly in line so that in working the levels there will be less danger of an accident.

Work as many miners as can profitably be worked below and as few others as can be got along with on top. T. R. MORGAN.

Park City, Utah.

Formation of Mineral Veins.

EDITORS PRESS:—I mail to you herewith a ferrotype plate beautifully veined with metallic silver, which may bear some relation to the mineral veins and deposits in the earth's crust.

This accidental discovery in photography was made some years ago when overhauling a lot of old dirty "tin-type" plates, and is the most beautiful specimen of the kind I have ever seen.

It is unnecessary to refer to photography any further than to say that before "taking" the picture the plate is coated with a silver salt solution, and too long delay before an exposure is made results in injury to the sensitized surface, hence the plate is cast aside unused. It is quite common to find such old plates with mottled silver veins along the edges where the iron has rusted and the asphalt has separated from the iron. And the only way that I can account for this plate being completely veined is that one with a rusty back may have lain on top of it, and the iron rust may have had the effect of transforming the silver salt to metallic silver and drawn it into veins. Now that the foundation has been laid, the building up of veins is very simple. A process commonly used in photography for intensifying weak negatives is to flow over the negative a silver salt solution, to which a reducing agent (proto sulphate of iron) in solution has been added immediately previous to the operation. This solution is kept in motion over the surface of the plate, and where the heaviest deposits already exist there is the most attraction, hence there the proportion of deposit will be greatest.

Seeing that the affinity of metals is sufficiently strong to produce the results described above, we do not consider it unreasonable to suppose that at any time during the earth's formation, after it had commenced to crust over, the metals were drawn into veins by their own affinity, and as other volumes of matter were subsequently precipitated on the surface and flowed to and fro either in an igneous or aqueous solution, the mineral continued to build up the veins so long as mineral existed in the clouds of chaotic matter that fell on mother earth. And even as the clouds of vapor hover around the mountain crests to-day, so may we suppose the clouds of chaotic matter most rich in mineral were drawn by affinity to shower down their metallic burdens in the region of former deposits.

Mineral veins formed in this way could, of course, be larger where the proportion of mineral was greatest in the matter precipitated, and as the proportion decreased the vein would "pinch up," unless some other matter for which the metal had an affinity should fill the place with gangue.

We may also suppose that a stream or wave of matter (bearing mineral) flowing continually southward over a north and south vein, would have a tendency to draw the "chimneys" toward the north, etc.; or flowing from east to west over a north and south vein, the vein must "dip" to the west as the trend of the chimney in its downward course would be to the south. Of course upheavals by earthquakes must be taken into consideration here.

In examining the plate which we lend you

we may learn something of the relation that one vein bears to another. The heaviest ones we see tend to lie across the "belt," and where main veins lie close together and nearly parallel no spurs exist between them, while spurs do exist in the direction of vacant fields, also largest veins are more isolated from other deposits.

Probably there is no field on which science has thrown so little light as that of mining, and though, as Von Cotta says, "no one theory will apply to all mineral deposits," yet we trust that some day science may so guide us in extracting the precious metals from the bowels of the earth that we will not "put more money in the ground than we take out."

In sending you this plate it is with the hope that it may engage the attention of men of science as well as prospectors, for although the latter occupation has engaged the writer for the past ten years, yet he acknowledges his ignorance of geology and mineralogy and can only give hints on the supposed value of this accidental discovery, which may disprove the popular theory that "where a pocket exists there's more below."

HENRY W. BROWN.

Glendale, Montana, Sept. 5th.

Nevada Coal.

Some years ago Professor W. Frank Stewart, the deceased scientist, published in one of the journals of this city an article headed "No Coal in the Sagebrush." It was intended to demonstrate by scientific facts and observation that this was no coal country, and its geological composition was such that no coal existed in it and need not be looked for. He was right to a certain extent, yet he was not until afterward conversant with the fact that coal had actually been found at a few points, yet not in paying quantity or quality. Some of the earliest prospectors after silver and gold ledges found quite a large deposit of an inferior quality of coal in El Dorado canyon, a few miles east of Dayton, and a large amount of money was expended in the attempt to develop it, but in its deepest explorations no real coal suitable for mechanical or domestic use was found. Several tons were hauled to this city and put to practical use, but either in cooking ranges or under steam boilers it was found deficient in its natural heating properties; in fact, it cost too much for wood to make it burn good; therefore, it never came into general use. Other coal mines of a similar nature were opened in that vicinity with like result, and over beyond Como, in Whitman District, small veins of a better quality were found and explored, and the "Whitman coal mines" are to be found laid down on some of the earliest maps. But both quantity and quality were lacking.

In 1864-5 extensive deposits of coal or ignite were opened and explored near Crystal Peak, some miles above Reno, where the Truckee passes out of the mountains. Some beds were several feet thick, but led to nothing better than bituminous shale. It would burn, but gave too little heat. The best vein was found in Dog Valley creek. It was 2 or 3 inches wide where it first appeared on the bank of the creek, and laid almost flat. About 50 feet further south a shaft was sunk 28 feet, intersecting the vein. Here the writer of this, with a pick, cut out a slab of the coal two feet long by a foot wide, and about eight inches thick, which was the full thickness of the vein. It was subsequently brought to this city and put on exhibition at the office of the Crystal Peak Coal Company. More coal was taken from the bottom of this shaft, and J. W. Hemenway, a well-known blacksmith of this city, took some of it to a forge in the town of Crystal Peak and tested it by welding a couple of bars of iron together, making a good and successful weld. It was of excellent quality—better than that now in common use which comes from Wyoming, but all the explorations of the company failed to develop a paying deposit of it, or any greater thickness of vein than we have described, and the coal boom gradually subsided into nothingness.

It is now stated that a good-sized vein of excellent coal is being opened in Pittsburg district, near Lewis, in the Reese River section, by Hon. L. W. Gitchell and others. It is said to be an old location re-opened, and more practically explored than at first. It most certainly is to be hoped that they may meet with full and complete success, and develop what would be more valuable than an ordinary silver mine at this point—a genuine coal mine in the sagebrush.—*Virginia Enterprise.*

THE statement of the Canadian Pacific Railroad shows the gross earnings for July to be \$908,000; net earnings, \$446,000; increase in net earnings, \$291,000 over the corresponding month of last year.

THERE is a natural bridge near the boundary line between Arizona and New Mexico, 20 miles north of the Atlantic and Pacific Railroad, which surpasses in every way the famous one in Virginia.

PEOPLE from Elko, Nev., say that time is improving at that place, and that business of all kinds is better than it has been for several seasons.

STRONG protests are being made in Mexico against the practice of selling vast tracts of land to foreigners.

The Overland Monthly.

Abandoned Mining Towns.

This favorite California magazine for September came out promptly on time, and a capital number it is, being brimful of choice reading, the most of it relating to California themes and adapted to California tastes and modes of thought. As being best suited to the columns of this journal we reproduce portions of an article from the pen of Dr. Henry Degroot, entitled "You Bet," being a description of one of the many mining towns of California now in a state of decadence, not a few of them having disappeared altogether.

You Bet.

How still it is; how little stir; how devoid of life these crater-like basins, with their rocky bottoms and their steep walls of red earth, where once stood the busy town of You Bet. We know it was You Bet because the name still adheres to the few buildings left on the bluff that divides these basins, and because there are traditions of its once having stood here. It is, or rather was, one of a series of hamlets standing over the "dead rivers" that traverse the several divides between the North Fork, Bear river, Steep Hollow, and Greenhorn Canyon, being the central one of the group. Looking south, it has Little York and Gold Run on that side, with Red Dog and Gouge Eye, now Hunt's Hill, on the other; the most widely separated of these places, measuring in a straight line, being not over six miles apart. Following the wagon road, however, in its windings along the sides of the intervening canyons, the distance is more than twice that much. As has You Bet, so have its neighbors nearly all disappeared, some of them having suffered total extinction, and this at the hands of the very men who built and named, and who once occupied and owned them. As the miners founded, so did the miners destroy, these ancient towns—the drinking saloon, in obedience to the doctrine of the "survival of the fittest," having almost always been the last to succumb.

From the Central Pacific Railroad, a little below Dutch Flat, looking east, three or four buildings can be seen two miles off that way, strongly outlined, being perched on the crest of a high ridge, with a precipitous face on the west. This is all that remains of You Bet. The buildings here left consist of a store, a lodging house, a butcher's shop and a drinking saloon, all modern structures, the old town having stood where now yawns a great hydraulic pit more than 200 feet deep. The house that hangs half way over the abyss, liable to tumble into it at any moment, is not occupied at present, because the last habitation so situated, when it went over the brink, was badly damaged by the descent; moreover, one of the occupants was killed.

Not at all pleasant is it to sit as I do, in this grove of young pines, and look out over the field of desolation so spread out around me; the less so that it was my lot to have been one of the great army of diggers, who, many years ago, toiled and suffered in the placere here, than which few richer were ever found in the State. Then and now! How hardly can one realize that such changes could have taken place in the comparative short period of 30 years! From a solitude to a hive of roaring industry, and back again to a solitude, with only the far-off blue mountains, the beautiful wilderness around, and the rivers rolling as they did of yore. And that active, energetic army of toilers—where are they? For, of a certainty, very few of them are to be seen here or whereabouts any more. I declare to you, Mr. Editor, that, looking out from this eminence, out over these basins, with their billowy heaps of boulders glistening in the sun, and the whole vast panorama in view, I cannot now discern a single human being. It is a strange disappearance! But I know where some of them are, and will tell you a little further on; for, anticipating what thought is uppermost in the mind of the reader, I may as well stop here, and make for these uncouth names such apology as best I can, since it must be admitted that some of them are decidedly odd, and, in a few instances, even carry about them an odor of vulgarity.

In the first place, then, it may be observed that the naming of towns and other localities was in these early days generally the result of some unimportant incident or mere chance, and, being often the work of an individual or company, did not represent the views or wishes of the community at large, who were not at all likely to be consulted in the premises. Some miner, perhaps a rough fellow, would, by reason of some trivial event, or freak of fancy, give a name to a place; and, no one taking any interest in the matter, it would be suffered to stand, even though without significance, propriety or even decency; for it may be observed that the names of the towns above mentioned are respectable and even classical compared with some that could once be found on the map of California—if, to be sure, that would help our case any. As will be seen, too, some amendment in this particular is going on, Hunt's Hill having supplanted Gouge Eye, as some better name might also come to supplant Red Dog and You Bet, were not these towns already so near death's door.

Though of unpolished exterior, and sometimes a little boisterous in their convivialities, these pioneer miners were not, as a class, men

of depraved tastes or vicious habits. This would, in fact, be inferred from what Bret Harte has told us about them in his story of "The Outcasts of Poker Flat." We have it to the authority of the great humorist, that the inhabitants of that camp arose as one man and drove the gamblers and other ungodly characters out of the place, threatening them with dire punishment should they dare to return. What more could the most puritanic church-goer, or even the witch-burners, in their day, have done than this? And is it to be supposed that the denizens of Red Dog, You Bet, and Gouge Eye were less zealous in the cause of evangelical religion and good morals than these Poker-Flaters? We should say not. And although the writer cannot vouch for the fact, it is to be presumed that these good people, in the absence of theaters, prize fights, and horse races, and having no facilities for picnics and balls, did every Sabbath attend regular preaching, and encourage by their presence the edifying Sunday-school and the unctuous prayer-meeting. If the writer cannot recall these precious occasions, it does not follow that they did occur; and if the days of such unregenerate person have been extended beyond those vouchsafed these devout people, such preservation is not to be attributed to his superior piety, but rather, perhaps, to the antiseptic properties of sin.

But dismissing this subject of religion and morals, let me redeem now my promise to tell you where some of the men who took part in the stirring scenes here once enacted are now to be found. Over against the knoll where I sit is another, of gentle acclivity, and like this covered with a growth of thrifty young pines. There on that knoll is the ancient necropolis of You Bet, and the camps around, and there within its precincts have been gathered many of the inhabitants of these pioneer towns. Though the hues of ruin have crept over the place, the ground itself, as is almost everywhere the case with these old graveyards, remains intact. You will say it is to the credit of the miners that these homes of the dead have been so generally respected. Not especially so. In looking for a spot for sepulture, the early miner was apt to select some rocky ridge or knoll which stood apart from the diggings and which, being supposed to contain little or no gold, he had reason to think would never be disturbed. Had it ever been found that they contained pay dirt, these consecrated grounds would have been attacked and run off to bedrock long ago.

But, while the land has been spared by the remorseless gold-seeker, time has not been equally lenient with the tombs themselves, which, with no one to care for them, have, during these long years, been slowly yielding to decay. The place presents, in fact, a sadly neglected appearance. The most of the low mounds have been leveled with the earth; the palings about them have fallen off, and the exterior inclosure is nearly all gone. The head boards, where any are left, lean at all angles, or have tumbled to the ground, so bleached and weathered that the inscriptions upon them can no longer be deciphered; but it matters not, for few will ever come seeking to read or replace them. Nor does it matter that the wild vines and the brambles grow thick over these graves. They who tenant them are mostly forgotten now. There were those who, years ago, thought of them perpetually, and longed for their presence in their old homes. But they wished and waited in vain, for neither the lost ones nor note nor tidings of them came, or ever will come, any more. The names of more than a few who sleep in this field of graves we do not know, nor whence they came, nor how they died. There are representatives here of every country on the face of the earth; the households that have been desolated by their absence are in all lands. As they were mostly young men, none of them very old, their loss was the more keenly felt. They were husbands and fathers, leaving wives and children behind; they were sons, who could not well be spared from home; they were tenderly reared youth, who should never have been snatched to go out on this rough and perilous life; and some there were who had other ties than those of kindred—the betrothed left behind suffering often most of all.

As I stood once, years ago, on the vacant site of Sutter's Mill, filled with the thoughts and emotions that such locality was calculated to inspire, there came along a man of venerable appearance, who, accosting, entered into conversation with me. After talking a little, and alluding to the great gold discovery at that place, I went on to say something about the propriety of having erected on the spot a monument to perpetuate that memorable event. "Yes," said the old man, after listening for a time to my talk, "by all means let a monument be erected here; let its foundations be laid broad and deep, that it may last for all time, and let the superstructure be built of death-heads and cross-bones gathered from the nameless graves of the innumerable victims who have perished far from their homes, miserable and alone, in these accursed gold-fields of California;" and the old man's speech took much of the frothy sentiment out of me.

Very aptly, O California, has the artist pictured thee as a comely maiden, presenting rich gifts with one hand, and grasping a scourge of thorns with the other.

SEVERAL Arizona cattlemen are trying to make arrangements for the establishment of a refrigerator line for the shipment of dressed beef to California and Eastern points.

MECHANICAL PROGRESS.

Heating Feed Water by Exhaust Steam.

It has been a commonly accepted doctrine, without any really distinct reason being given for it, other than usage or practice, that feed water for the steam boiler could only be heated to from 170° to 208° or 210° F. We have seen a great deal of energy expended upon the debating of this question, and always with the same general result, viz., that the feed-water heater, although an essential part of the apparatus for steam-power, was at the same time incapable of accomplishing anything more than our grandfathers accomplished in 1784, and that for the same reason the stove was carried in one end of the bag and the corn in the other, the man who attempted to show feed water higher than 208° or 210° must either be stretching the truth or yielding to the delusions of his imagination.

We have recently had some experience in this matter which has been valuable to us, and at the risk of stating a thing which is not so, or being mistaken, we propose to give some facts. We have often spoken and written upon the general delusion of throttling steam, carrying it around a variety of corners, angles, bends, and of the necessity, in working steam, always to work it as free as possible from the boiler to the end of the exhaust pipe. The same thing refers to some of the feed water heaters which are now in use. Their inventors or constructors, from a lack of knowledge, seem to suppose that steam can be carried up and down, around and around, or can go through sundry gyrations in its course, with a presumptuousness on our part that the designer supposed that, with little obstructions in the passage of the steam, he was going to give out more heat to the water. But this is all wrong. The old idea holds good, and practice demonstrates its correctness; if the steam is to make a turn in its exhaust, give it ample room in which to do it, but the nearer a direct line the steam can flow the better, not only for the freedom of exhaust, followed by no back pressure, but as well for its giving out the heat it contains to the feed water, with which it comes indirectly in contact. It is no uncommon thing now to find positively no back pressure, free exhaust of the steam, and yet to find feed water going into the boiler at 214° F., and not using a doctored thermometer to accomplish it either. In other cases as high as 220°; we do not know but even higher than this, has been secured.

The reader may naturally ask why and how. That is not for us to discuss; we are dealing now with facts, not with vagaries. Our own basis is, however, that with a rightly constructed heater, the steam shall not be driven through tortuous passages, shall not be deflected from a straight line or free egress, unless, if it has to turn, the area is largely increased over that of the first passage, which must be in excess of the total square inches of area of the exhaust pipe. When an engine exhausts under two, three, five or ten pounds above the atmosphere, there is a temperature accompanying the exhaust, especially where this is being moved rapidly, that gives a very considerable heat out to the water, in case the possibilities exist for the steam doing its work correctly. It is also likely that wherever the construction of a feed-water heater is such that the steam is tortured in its leaving the engine for the atmosphere, the steam is still further reduced even by a trifling back pressure (very much as direct steam is passed through pipes, valves, bends, etc., until it turns more and more to water) returning more and more to water, and reducing its sensible heat and its capacity for imparting heat to the feed water, with which it comes indirectly in contact.

If we take steam at the atmospheric pressure of fifteen pounds, we have 213° sensible heat. If, now, we add ten pounds release, it certainly requires a little time for that pressure to equalize itself, or come down to the pressure of the atmosphere. In that case we have 240° of heat for a time. Now, let us suppose the heater to be properly arranged so as to aid in partially condensing the steam, or at least by making a change of 30° or 40°, will it not aid to bring the steam to the heater quicker, something after the manner of an air pump, than it would if we allowed free flow, depending upon the pressure and the pulsation of the engine? Why not, then, utilize some of the difference between 212° and 240°? We often hear men speak, when looking at the exhaust pipe, of the impossibility of heating feed water with exhaust steam at the atmospheric pressure. A quarter or half-pound increase over atmospheric pressure carries with it a slight increase of temperature, and it is no uncommon thing for us to see exhaust steam shoot into the air from the top of a building four, five, or in some cases twenty feet high. Is there not a difference between atmospheric pressure and the pressure of the steam whenever this occurs? If the actual pressure of the atmosphere is 14.7, it strikes us that 15 or 15½ pounds only are necessary to make quite a shoot of exhaust steam into the open air, and this makes a corresponding increase in temperature. Now, if the heater be rightly constructed, there is no difficulty, it seems to us, in accomplishing more than 208° or 210°, or 212° in the feed water for the boilers. We have seen the thing done, and know that it is being done every day, consequently it is past theoretical confirmation. It

is not a matter of old usage or ancient practice, but a fact that to-day water, when confined, can be heated to exceed 212 degrees F., but in too many cases it is from 30 to 50 degrees below that amount, as we have over and over again proved in our last twenty years' experience in this line, and we believe there is a chance still for progress in the heating of feed water or of increasing the temperature wherever the engine exhausts under pressure of several pounds above the atmosphere. On the authority of the *Western Manufacturer*, in which journal the above article appears, it advances the opinions of one of the ablest scientists in the country.

THE "WEDGE METHOD" OF FIRING.—A correspondent of the *British Journal of Commerce* communicates to that paper the following hints on "firing." While looking over my books I came to a method of firing called the wedge method. It is the favorite way of the ignorant, careless and lazy fireman. It consists in banking up the coal near the furnace door and sloping it off to almost a point at the back end, in a wedge shape. The careless and lazy fireman fires in this way because it does not require much labor to shovel coal just inside the furnace door, and the ignorant one does so because appearances deceive him. He peeps through the holes in the door and sees the whole furnace apparently full of fierce, roaring flames, not knowing that it is only the cold air rushing through the bars so thinly covered, and he wonders why such a fire does not make plenty of steam. Boys, let us have a little talk over the ways of the fireman and his methods. I have seen a man who called himself crack put in fifteen shovelfuls of coal and screenings mixed, and when I asked him if he was banking he said "guessed not, he was coal-ing up;" but he must have been killing out what fire he had. The grate was six feet square. There is another question which I should like to ask the engineer. There is a water tank placed in the upper story of a mill, seven stories high; the water is pumped from the lower story through a pipe four inches in diameter; the tank holds a thousand gallons and is six feet high; on this water be forced through the bottom of the tank easier than in over the top, provided it has no syphon?

MECHANICAL INDUSTRY is the characteristic feature of our time, and its development has been so rapid that, by and with the instruments furnished, the laborers of to-day can accomplish four times as much work as did those who preceded us 50 years ago. Mr. Gladstone once remarked that Great Britain was enabled, by labor-saving machinery to perform the work of 600,000,000 hand laborers, or as much as twice the hand labor of the adult laboring population of the globe, unaided by machinery. With the rapid strides making in improved mechanical appliances we may look forward to the not very remote future when hand toil alone, so crushing and so wasteful, will be among the things of the past, and to the time when by devoting only a portion of the day to manual labor we shall live in more comfort, and secure the leisure so necessary for study, culture and recreation. But as nothing can be accomplished without work, the inventors and manufacturers who lighten its duties and shorten its hours are true benefactors, for they are always contributing something to the common benefit. The modern appliances which are continually being brought forward in this country as labor-saving machines perform their work well. If they did not do this the manufacturers would soon find out that second and third rate work would amount to nothing more nor less than neglect of duty and waste of opportunity.

TEMPERING STEEL WITH LOW HEATS.—Some curious statements on tempering steel are made in a paper published in *Dingler's Polytechnic Journal*, Vol. 225, by Herr Jarolimek, "On the Influence of Annealing Temperature upon the Strength and the Constitution of Steel." Hitherto it has been generally considered that to obtain a specified degree of softness it is necessary to heat the hard steel to a particular annealing color—that is to say, to a definite temperature—and then allow it to rapidly cool. Thus for example, that steel might anneal—be tempered—yellow, it had to be heated to 540 degrees, and the supposition was formed and acted upon that it must be allowed only a momentary subjection to this temperature. Herr Jarolimek says the requisite temper which is obtained by momentarily raising the temperature to a particular degree, can also be acquired by subjecting the steel for a longer time to a much lower temperature. For example, the temper which the annealing color—yellow—indicates can be obtained by exposing the hard steel for ten hours to 260 degrees of heat; in other words, by placing it in water rather above the boiling point.

CHISELS should be made short for hard, rough work. They transmit the power or force of a blow much better. Long chisels are apt to "broom up" on the hammer end, as the long steel through which the blow passes has more chance to absorb the force of the blow. The harder the metal to be worked the quicker the blow should be transmitted. Cast-iron works much better with a short steel chisel and light hammer than if the blow was struck upon a very long chisel with a heavy wooden mallet. In one case the blow is delivered all at once, in the other it takes time, and much of the force is absorbed.

SCIENTIFIC PROGRESS.

Distinction Between Animals and Plants.

The lower organisms exhibit such simplicity of structure that naturalists find it extremely difficult to determine, in many cases, whether a certain group of organisms should be classed among animals or plants; and the question is so difficult to decide that there is much difference of opinion among the best informed specialists as to the proper position of a large number of such lowly organized beings. Prof. E. Frankland a distinguished chemist, has lately submitted a generalization which appears to be a good one to decide this vexed question. He defines plants as "organisms possessing synthetic functions, or such in which these functions greatly predominate." By this generalization, animals would be defined as "organisms performing analytical functions, or such in which these functions greatly predominate." On the strength of this generalization he refers the "microbia," such as bacteria and bacilli, to the animal kingdom, inasmuch as their life "essentially depends upon the tearing asunder of more or less complex compounds, resolving them into simple compounds, at the expense of potential energy."

The editor of the *Journal of Science*, in a recent criticism of this definition, holds it to be untenable, and that when we come to the lower forms of life, no distinction between animals and plants can be made. The vast majority of plants, he points out, take into their system the carbonic acid of the atmosphere—a compound—and decompose it, exhaling the free oxygen and retaining the carbon. This, he adds, is surely an analytical process. The vast majority of animals, on the other hand, take into their lungs, tracheæ or gills, free oxygen and convert it in their bodies into the compound, carbonic acid. This appears to be a synthetic process.

Again, he makes the point that, while generally plants feed on inorganic material, or upon organisms that have been decomposed into such simple substances as ammonia, nitrogen acids, etc., building up complex molecules out of them, there is a numerous group of carnivorous plants which feed, like animals, on ready-made albuminoid matter, and seem to require it if they are to flourish. Here the reference would appear to be justified that such plants have not the power to form such matters synthetically in a sufficient degree to meet their needs. In this case, therefore, the definition of Frankland is inadequate, and the distinction between animals and plants, based upon it, is valueless.

Again, he points out that Englemann has found animals—vorticellæ—which decompose carbonic acid and assimilate its carbon by means of a chlorophyll, forming part and parcel of their own living structure. He concludes, from these and other interesting discrepancies and anomalies, that Prof. Frankland's paper, though in other respects of great value, must be regarded as an attempt to revive an arbitrary and fast-fading distinction.

The Sun as Photographed.

The photography of the sun has been carried further in France than in any other country. A very interesting lecture on this subject was recently given before a New York audience, from which we extract as follows:

The sun's surface looks rough, like drawing paper; it is not a smooth surface, such as water would present, but it is in all probability a surface of clouds. Here is one of Janssen's pictures (not illustrated here). On that scale the sun would be about 200 feet in diameter. You can see here the form and character of the granules on the solar surface. You will notice that in one place the granules are nearly round; they look like finger tips turned towards you. In this corner, on the other hand, they are lying sideways toward you, and appear much elongated. There is another place where the filaments are disturbed. Janssen found that if you take a pair of these pictures, at an interval of one minute, they would very nearly agree in all particulars, but if an hour or more should elapse between the pictures they would differ enormously; and remember that every one, even of these smallest granules, is 200 or 300 miles in diameter. The surface of the sun seems to be made up of cloud-like masses floating in a gaseous atmosphere. Prof. Langley compares the appearance of the surface of the sun to snow-flakes on a gray overcoat, and an English physicist has said that it looks like pea soup.

Sometimes we wish to study the sun with the eye instead of by photograph. The photograph, of course, tells no lies, but it gives merely a brutal copy of what can be seen at any particular moment. With the eye you can look leisurely and study what you see. The sunlight is so bright, however, that you must find some means of diminishing it. The apparatus now shown on the screen (not here illustrated) is the best for that purpose. It is known as a helioscope. The little thing is about five inches in diameter and five or six inches long. Here the sunlight enters; it is reflected at the first surface of glass, most of the light goes through the glass, but a little is reflected and strikes on this second surface; most of that light goes through again and the remainder is reflected. We first throw away nine-tenths of the light, and then throw away

nine-tenths of what is left. The remainder is reflected to another mirror of black glass; it is again reflected, and thus suffers four reflections before reaching the eye, each reflection at the angle of polarization. The upper box turns round upon the lower one; when I turn one at right angles to the other I can cut the light entirely off, but when they are turned so that the mirrors are all parallel to each other the light is quite bright, so that by turning the upper box I have all the degrees of brightness. You thus see the solar surface with the greatest ease and comfort. We do not cut down the size of the lens, but let the whole light come through and then throw away what we do not want, leaving enough for vision. I ought to say here that it is a mistake to cap the object glass of the telescope in order to diminish the light; sometimes you have to do it if you have not a proper eye piece, but the definition is never so good on account of diffraction effects, and with such a helioscope as I have described there is no difficulty in observing the sun with the whole 23 inches of aperture of our Princeton telescope.

THE SCIENCE OF SOIL.—An observant correspondent of the *German Town Telegraph* notes on this topic: "Soil, in contradistinction to mere earth, is always composed of silica, alumina, lime, magnesia, oxide of iron, salts, and decayed animal and vegetable matter. The difference then between earth and soil, technically, is that earth has its fertilizing properties either so nearly absent or so unevenly balanced as to be incapable of supporting vigorous plant-life. Soils are fertile in proportion to their combination of such elements as are required by the particular plants to be grown, and their ability to obtain and retain moisture sufficient to maintain during the growing season the activity of decay in their fertilizing components so necessary. The ideal perfection of soil and moisture is when the action of the constituents is gently vigorous while the seed is sprouting, increasing as the heat of the sun increases during summer, and slackening toward fall to ripen the plant for winter. A good soil resting on a subsoil of sand or gravel is best, because it contains heat and moisture, without too much heat or too much wet, as a superabundance of either checks decay of the elements of the soil and stops growth. The best soil is worse than none if it does not possess a due proportion of heat, of light, and of moisture, which must also vary as the season advances.

THERMOMETER MAKING.—The thermometer that will rise the highest in summer and fall the lowest in winter is a "joy forever." An absolutely accurate instrument depends entirely on the care given in its manufacture. The first step in the making of a thermometer is to draw the tube out of a mass of soft glass into which a bubble of air has been introduced; then the bulb is blown by a skillful workman, who from long practice is able to blow it almost the exact size. The next step is the filling of the bulb, which is done by gently beating the tube and causing the air to expand; the end is then dipped in mercury, a small portion of which is drawn into the bulb. The mercury is then carefully hoiled, and as soon as it expands, filling the tube and bulb with vapor, the end of the tube is again introduced into the mercury, which again fills both bulbs and tube. The instrument is then heated to the highest point intended for it to register, and the excess of mercury flows out, after which the end of the tube is closed. After this the freezing and boiling points of water (32 degrees and 212 degrees) are marked and the intermediate gradations put in, when the thermometer is ready for use. The evenness of the bore and the size of the bulb determine the accuracy of the instrument.

HOW FAR CAN ONE SEE?—A discussion is going on in Europe concerning the distance at which large objects on the earth's surface may be visible. Emil Metzger mentions that he once saw, with some difficulty, Keizerspicket, in Sumatra, when distant 110 English miles, and he also made out Gug Merapi, in Java, when 180 miles away. From the Piz Muraun, near Disentis, E. Hill has seen Mont Blanc, the intervening space measuring about 110 miles. J. Starkie Gardner states that Mont Blanc is visible from the Piz Langer, though distant about three degrees. In Greenland, Mr. Whymper beheld a mountain from which he was separated by 150 miles, and from Marcellus Zuch saw Mount Canigon at a distance of 158 miles. The whole range of the Swiss Alps has been looked upon by J. Hippley while 200 miles away, while Sir W. Jones has affirmed that the Himalayæ have appeared to view from the great distance of 224 miles.

THINKING AND WORKING.—In our present system of education now, happily, rapidly passing away for a better one, we want one man to be always thinking and another to be always working, and we call one a gentleman and the other an operative, whereas the workman ought often to be thinking and the thinker often to be working, and both should be gentlemen in the best sense. As it is, we make both ungentle, the one envying, the other despising the other, and the mass of society is made up of morbid unhealthy thinkers and miserable workers. It is only by labor that thought can be made happy, and the professions should be liberal, and there should be less pride felt in peculiarity of employment and more in the excellence of achievement.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate).....25 .80 \$2.20 \$5.00
Half inch (1 square).....\$1.50 \$4.00 10.00 24.00
One inch.....2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Sept. 19, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Bed-Rock; Silver in Oregon; Proper Land Districts for Mines; A New Ore Crusher, 193. Passing Events; Dredging the Gold Coast Rivers; Sierra County Mines; English and American Yacht Models; Ores and Minerals in California, 196. An Important Strike at Colfax; Caves in Connection with Ore Bodies, 197.

ILLUSTRATIONS.—F. A. Huntington's Improved Ore Crusher, 193. Sketch of the Big Oak Tree Mine, Placer County, Cal., 197.

CORRESPONDENCE.—A Little Mining Philosophy; Formation of Mineral Veins, 194.

MECHANICAL PROGRESS.—Heating Feed Water by Exhaust Steam; The "Wedge Method" of Firing; Tempering Steel with Low Heats, 195.

SCIENTIFIC PROGRESS.—Distinction Between Animals and Plants; The Sun as Photographed; The Science of Soil; Thermometer Making; How Far Can One See; Thinking and Working, 195.

ENGINEERING NOTES.—Running Engines with Water Wheels; Traction and Strain on the Brooklyn Bridge; An Important Irrigation Enterprise; Gun Cotton for Steam; An Underground System of Railway for Paris, 199.

USEFUL INFORMATION.—Homoeopathic Remedies; A Pea Shelling Machine; To Remove Dry Rot; Soluble Glass as a Preservative; Improving Gypsum; Toughened Glass; A Good Idea; Butternut Wood for Shoes; Improving Commercial Copper; Steam Pipe Jacking; Etching of Iron and Steel; Lubricant for Heavy Bearings; A Good Coating for Iron; Cement for Petroleum Cisterns; Cost of an Ocean Steamship, 199.

GOOD HEALTH.—Hay Fever and Its Cure; What Pneumonia Is; Induced Nervous Conditions; Safe from Disease; What are the Causes of Nervousness, 199.

MISCELLANEOUS.—Nevada Coal; The Overland Monthly, 194. Practical Hydraulics, 198.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 200-01.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 204.

Passing Events.

It is stated that a meeting of miners was held at Candelaria, and when the wages was brought up 77 voted to accept the proposition of the mine managers, and agreed that all who wished to go to work for \$3 per day should have the privilege of doing so. In accordance with this decision work was resumed in the mines, all hands starting in with a will at \$3 per day. A large additional force is to be put to work as speedily as practicable.

A new mining district called the Telephone has been organized near Hicke district, Nevada.

There is a revival in American district, 20 miles from Unionville, Nev., on the east side of the Lower Humboldt range.

The exciting feature of this week has been the international yacht race for the America's cup. The English and American types of vessel contested, and for the sixth consecutive time the American type has been the victor.

A GLASS FACTORY FOR CHINA.—Two Chinese gentlemen of wealth and intelligence made a tour of the Pittsburgh glass houses last week, with the view of establishing the glass manufacturing industry in China under Government protection.

THE BICYCLE is to be officially introduced into the Bavarian army. A number of the soldiers of the garrison of Munich are at present doing orderly service for the purpose of trying the practicability of the "wheel."

LESS than twenty miles remain to complete the gap between the California Southern and Atlantic and Pacific Railroads.

Dredging the Gold Coast Rivers.

A company has been incorporated in England for dredging the Ankobra river for gold. Letters are being written to the London papers by ex-residents of West Africa encouraging the plan and vouching for the richness of the river beds. It is probable, therefore, that stock in this new company will be easily sold, for there is a charming idea to people who do not know anything about it in being able to scoop up the gold by buckets.

But those who care to investigate a subject before investing, will go slow before they take up any project of this kind. We have very rich river beds in California, and it was a day dream with many a miner, to dredge for the gold by steam and scoop up the gold.

The fact is to be regretted, however, that wherever this plan has been tried it has failed. We have had all kinds of dredges built for this purpose and every one of them has failed. They never get any gold. We have tried them on the rivers and on the edges of the ocean. We have had scoop dredges, suction dredges, vacuum dredges and hydraulic apparatus. All have failed. The problem is not an easy one, as our English friends will doubtless find to their dissatisfaction after they have spent a few hundred thousand dollars in their venture. If they do not care to take our experience for nothing they can, of course, pay for their own.

Formation of Mineral Veins.

On page 194 of this number of the PRESS is an interesting letter on this subject from a correspondent in Glendale, Montana. He sends with his letter a little "tin type" plate, covered with fine veins of metallic silver, formed in the manner he describes. We should like to have those interested in the subject examine the plate, which we have at our office for that purpose.

The little veins of silver are most abundant at the edge of the plate, but they branch off towards the center. The largest veins are isolated and run across the plate its narrowest way. Where they are close together they are finer. They are all very plainly marked and the connections can be readily traced. The whole plate is a very beautiful one, being clear black with the white veining of the silver in clear distinctness.

To those interested in geological subjects the plate will be of interest. We should be glad to have it carefully examined with reference to the theory advanced by our correspondent, by some one who has made a close study of the subject. It is seldom such plates are found with the silver veins showing more than a quarter of an inch from the edges.

Sierra County Mines.

Many of the mines in Sierra county are doing very well. The drift mines there are some of them very profitable. The work accomplished by the Bald Mountain Drift mine is well known, and now another one near it, on the Bald Mountain extension, is in a position to be profitable. For a long time they have been at work on it opening the claim. This mine, which is at Forest City, finished working out its rich gravel lead on the South Fork ground some three weeks ago, since which time they have been developing the channel on their own ground, with 70 men employed. Their first clean-up for five days' work was 166 ounces of gold. The second, last week, was 204 ounces. The company is out of debt, and expects soon to have regular monthly dividends.

There is a general revival in drift mining and quartz work this year in Sierra county, and they expect a genuine mining boom there next year, or sooner. Most all the mines prospect beyond expectation, and are very remunerative investments. The mineral resources of the county are being rapidly developed with very encouraging results.

WORKING SMALL LEDGES.—Along the road from Dayton to Gold Hill can be seen small squads of men working into the hillsides wherever the sight of a pay streak of ore presents itself. An old Comstock miner tells the *Enterprise* that the amount of ore taken out by those engaged in such labor is very much more than generally supposed.

It is said that the tin mines in the Black Hills, D. T., will soon be in a condition to produce 3000 tons per year.

English and American Yacht Models.

The international yacht races this week, between the American sloop *Puritan* and the English cutter *Genesta*, have awakened interest on the question of yacht models, and the relative merits of the types of vessels of both nations. The American model has proved its superiority again, winning two races out of three, one in a light wind and one in half a gale, proving itself to be the best "all round" boat.

This old yacht *America*, built by the famous George Steers, first showed to the English nation that we could build fast vessels. She won the great international race, in English waters, in 1851, and carried off the cup which we have held ever since. Since then the English have sent as representatives the *Cambria*, *Livonia*, *Atlanta*, *Countess of Dufferin* and *Genesta*, and we have beaten them all, in set races.

There is a very great difference in the types of racing vessels of the two nations. The English representative boat is a cutter, or one-masted boat, with very narrow beam and great depth, carrying an immense weight of lead on its keel. Their bowsprits are made to slide in so that as sail is reduced the bowsprit is shortened. Their mainsail is not laced all along the boom, but is secured to the boom at its ends only.

The American sloop is wide and comparatively shallow. Some of the ballast is carried inside, and less in proportion on the outside of the keel. Our mainsails are laced along the boom to make them set flat. Our bowsprits are "standing," that is, they are immovably fixed, and our jibs slide on fixed stays and are not set flying as the English are. The main feature with us is the centerboard instead of the keel, to prevent eliding to leeward.

Perhaps comparative figures of the two racers in the recent contest will best convey the idea of difference in sizes. The dimensions and elements of the two yachts are as follows:

	<i>Puritan</i> .	<i>Genesta</i> .
Length over all.....	93ft.	96ft. 5in.
Length on waterline.....	81ft. 11in.	81ft. 7 1/2 in.
Extreme beam.....	22ft. 7in.	15ft.
Extreme draft.....	8ft. 5in.	13ft. 6in.
Depth of hold.....	11ft. 9in.	11ft. 9in.
Displacement, tons.....	105	150
Ballast on keel, tons.....	27	70
Ballast inside, tons.....	20	2
Ballast, total tons.....	47	72
Ratio of ballast to displacement.....	.45	.48
Tonnage, U. S. A. rules.....	140	80
Racing length, N. Y. Y. C. rule.....	88.85ft.	83.05ft.
Mast, deck to hounds.....	60ft.	52ft.
Mast, heel to cap.....	73ft.	77ft. 10in.
Mast, diameter in partners.....	18in.	17in.
Topmast, fid to sheave.....	44ft.	44ft. 6in.
Bowsprit, outboard.....	24ft.	36ft. 6in.
Boom, length.....	76ft.	70ft.
Boom, diameter.....	14in.	14in.
Gaff.....	47ft.	46ft.
Spiroaker boom.....	62ft.	64ft.
Sail area, by rule.....	7,982ft.	7,387ft.
Topmast, block to deck.....	102ft. 11in.	97ft. 2 1/2 in.
Bowsprit to boom end.....	144ft. 7in.	140ft. 6in.

The English claim that with their deep keels and outside ballast the boats will carry more sail than ours, and beat to windward better. The Americans claim that with our wide beam we can carry sail as well as they, and that our centerboards will let us go closer to the wind than their keels. And the contests have proven that our theory is correct. The *Puritan* has outweathered and outsailed the *Genesta* in both light and heavy weather. The advocates of the English system said if they could have plenty of wind they would "drown out" our boat and easily beat her. The wind in the last race blew from 29 to 37 miles on time, and yet, in going to windward our centerboard craft beat them over three minutes. And this in the Englishman's own chosen weather. It is a triumph for the American idea, and one of which we may well be proud, for the *Genesta* is conceded to be the best all round yacht in England.

This was really a battle of the two types. A perfect English racing cutter met a perfect American sloop. The practical results of the trials, will, of course, overthrow all the previous theories. The centerboard boat has proven her superior weatherly qualities, in both light and heavy weather. It is more particularly a great victory for us, for we built our representative specially to meet the *Genesta*. We had no sloop large enough in our waters to fairly compete with her. The New Yorkers built one boat, and the Bostonians another. Both these new boats beat all the old ones badly, and the better one was chosen to meet the English representative.

It proves, moreover, an advance in American ship building, because we have built two boats for a special occasion which outsailed all the old models. So that really we have outdone

ourselves, and made these improvements in our own types which we before believed impossible. The new boats are better than the old ones in that they are more able. They have more depth and are in every way superior to the old style of shallow craft they used to build for smooth water sailing.

Having won the cup for the sixth time, it will probably be a year or more before our English cousins send over another yacht to compete for it. As it is, we have proven the superiority of our designs—a great and signal triumph for American naval architecture.

Ores and Minerals in California.

In addition to gold and silver there are several other mining products of this State, which exist in various counties, some of which are mined for and others not. There is plenty of opportunity for people to go to work on the various deposits, which are known to exist. But, strange to say, many products which abroad are looked after are here neglected. From the records of the State Mining Bureau the following list of minerals was compiled to show the ores, minerals and other mineral substances of industrial importance which are at present mined:

Aragonite (Suisun marble), Solano county; used for mantels, pedestals and smaller ornaments. Asphaltum, Los Angeles, San Luis Obispo and Santa Barbara counties; used extensively in paving, roofing, etc., and employs considerable capital and labor throughout the State. Calcite (limestone), burnt for lime in Santa Cruz, Placer, San Luis Obispo and Napa counties. Calcite (marbels), quarried for coping and building, in Calaveras and Tuolumne counties; for making lime in Santa Cruz and Amador counties; as flux for iron works in Placer county. Cement, Solano county. Chromic iron ore, San Luis Obispo, Tuolumne and El Dorado counties; shipped to the Eastern States in large quantities. Clay, Contra Costa, Placer and El Dorado counties; used for pottery, but no fine ware yet made. Cinnabar, Lake, Sonoma, Napa, Fresno and Santa Clara counties. Copper ore, Calaveras, Nevada and Fresno counties. Galeua (lead ore), Inyo county. Granite, Sacramento and Placer counties. Salt, Alameda county; large investment for manufacturing salt from the water of the bay of San Francisco. Iron ore, Placer and Shasta counties. Lignite, Contra Costa and Placer counties. Mercury (native), in some of the cinnabar mines. Petroleum (coal oil), Santa Clara, Santa Cruz, Los Angeles, Ventura and Santa Barbara counties. Pumice stone, San Francisco county. Sandstone, Solano county. Saponite (rock soap), Ventura county. Steatite (soapstone), Placer county; used as furnace lining; sawed into bricks for the market. Thiolite (gallussite), Mono county; used for making lime. Tincal (borax), San Bernardino county. Tufa, Santa Cruz county; used for making cement. Ulexite (borax, borate of lime), San Bernardino and Inyo counties.

The list of ores, minerals and mineral substances of industrial importance and known occurrence in this State, but which are not at present mined, is larger, and is as follows:

Alabaster, Alabaster cave, El Dorado county; also in Solano, Tuolumne and Los Angeles counties. Aragonite (onyx marble), San Luis Obispo, Siskiyou, Placer and Kern counties; found in small fragments not large enough to work. Arsenic ores. Asbestos, Tulare, Yolo and Mariposa counties; in small quantity, limited market. Asphaltum, Mendocino and Sonoma counties; in small quantity. Azurite (blue carbonate of copper), Inyo, San Bernardino and Shasta counties. Barite (barytes, sulphate of baryta). Bismuth ores. Bitumen, Santa Clara county. Buhstone, Inyo county. Calcite (marble), Monterey, Nevada and Kern counties. Calcite (limestone) San Bernardino, Mono, San Benito, Inyo and Calaveras counties. Cassiterite (tin ore) San Bernardino county. Temescal district. Cement, Alameda, Amador, Santa Cruz and Contra Costa counties. Chalk, Silver Mountain district, Alpine county. Chromic iron ore, Sonoma, Santa Clara, San Mateo, Napa, Fresno, Amador, Sacramento, Tulare and Solano counties. Cinnabar, many deposits in El Dorado, Fresno, Kern, Napa, Solano, San Luis Obispo, Yolo, Santa Barbara and Tuolumne counties, which cannot be worked at a profit at the present price of quicksilver. Clay, Kern, Tuolumne, Amador, Mono, Marin, Lake,

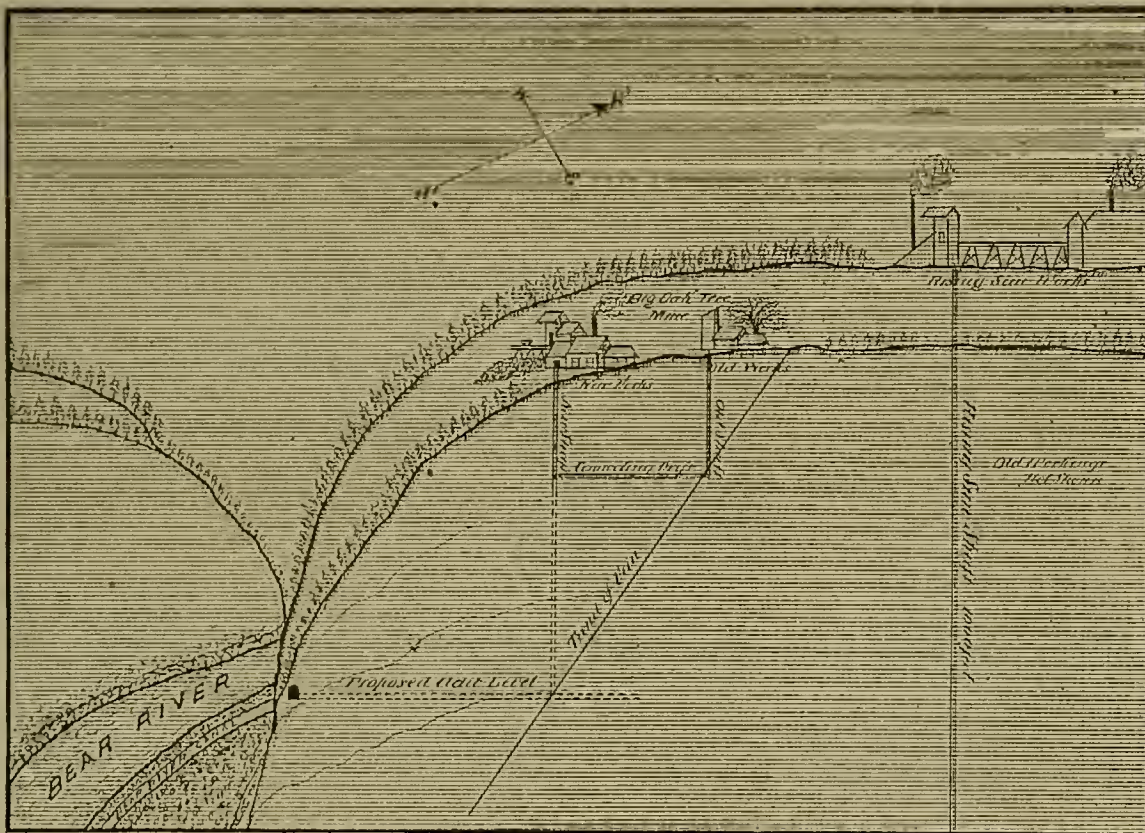
Inyo, Sonoma and Mendocino counties. Chrysocolla (silicate of copper), Inyo and San Diego counties. Diamond, in gold placers, Shasta, Butte and other counties. Erythrite (red cobalt ore), Los Angeles county. Feldspar, Mariposa county. Galenite (galena), San Bernardino, Mono and Amador counties. Granite, Mariposa and Nevada counties. Graphite (plumbago), Calaveras county. Halite (salt), Inyo and San Bernardino counties. Hematite (iron ore), Amador, Inyo, Alameda, Del Norte, Alpine, Butte and Nevada counties. Iridosmins, in gold placers. Lignite (coal), is found in inferior quality or small quantity in the following counties, but in some cases further development will probably show better results: Amador, Monterey, Lake, San Benito, Los Angeles, Kern, San Bernardino, Fresno, Calaveras, San Francisco and Lassen counties. Limonite (iron ore), Calaveras, Tulare, San Luis Obispo, Placer, and Santa Clara counties. Litharge, San Bernardino county. Lithographic stone, Kern county; quality fair; quantity not known. Malachite (green carbonate of copper), San Diego, Colusa, Shasta, Tuolumne, Los Angeles, Amador, Tulare, Del Norte, Placer, Contra Costa, Mono, San Luis Obispo, Sonoma,

An Important Gold Strike at Colfax.

The Big Oak Tree mine is situated about one mile in a westerly direction from the town of Colfax on the Central Pacific Railroad, and directly on the old Grass Valley stage road. The discovery of this mine marks a new and important era in the mining property of this section, and at once makes an assured success of a region lately looked upon as comparatively exhausted. The discovery of this auriferous lead was made by Mr. William Werry, of Colfax, who followed closely scientific mining theories that he had conned over in his mind for a number of years. The lead was completely "blind," covered over by a thick deposit of soil and gravelly formation, hidden from all eyes but those of the practical miner, who had become, as it were, *en rapport* with nature in these rolling hills, so thickly covered with timber and tangled underbrush.

Mr. William Werry was for many years superintendent of the old "Rising Sun" mine, which produced something over \$3,000,000, paying almost a steady stream of dividends for over 20 years. Mr. Werry carefully observed several underground phenomena in the Rising

shaft 8x4 sunk on the vein under the umbrageous branches of the "big oak" tree at first. To this friendly shade was afterwards added appropriate buildings, a powerful whinn supplanting the bucket, and the shaft sunk to a depth of 100 feet, the ore taken out in this sinking being milled at the Rising Sun mill, paying expenses as quickly as they were incurred. It was then decided to sink a second shaft again upon the vein, and some 300 feet westwardly; this shaft is 10x4, double compartment, timbered throughout with man-way, and all perfect modern appliances for hoisting, pumping, ventilating, etc. Over this second shaft is now erected the new steam hoisting works with engine and boiler of 30-horse power, built at the Grass Valley foundry where mining machinery is not built as mere matter of show, but as a practical exposition of means to an end. From the 100-foot station of this second shaft (as shown upon diagram) a connecting drift has been run to the old shaft which will always serve as a ventilating apparatus during all future workings in depth. All of this superstructure has been well and substantially built under the personal superintendence of Mr. Werry, who is one of the oldest practical miners in this section of country.



SKETCH OF THE BIG OAK TREE MINE, PLACER COUNTY, CAL.

Mariposa, and San Bernardino counties. Magnetite (magnetic iron ore), Shasta, Amador, Plumas, Butte, Yuba, El Dorado, San Benito, Mariposa and San Diego counties. Marl, various localities. Muscovite (mica), El Dorado and Mariposa counties. Nickel ore, San Benito and Kern counties. Ochre, red and yellow, Calaveras and Sonoma counties. Platinum, Mendocino and Trinity counties. Pumice stone, Mono and San Diego counties. Iron sulphurets, Alpine, Amador, Placer, Lake, Inyo, Nevada, Shasta, Tuolumne, Mono, El Dorado, and San Luis Obispo counties. Pyrolusite, (manganese ore), Sonoma, Tuolumne, Marin, Calaveras, Mariposa and Alameda counties. Sandstone, Santa Clara, Shasta, Tuolumne, San Mateo and Napa counties. Saponite (rock soap), Santa Barbara county. Selenite (gypsum), Ventura, Los Angeles, Monterey, Kern, Lake, Santa Barbara, Tulare and Lassen counties. Sphalerite (zincblende "black jack"), Tulare and San Mateo counties; small deposits of no present value. Steatite (soapstone), Yuba, Tuolumne, Kern, Los Angeles, Nevada, Fresno, Amador, Marin and Tulare counties. Stibnite (sulphide of antimony), San Benito, Los Angeles, Tulare, Santa Clara and Kern counties. Strontianite (carbonate of strontia), Sulphur, Lake and Napa counties. "Syenite," San Mateo county. Thenardite (sulphate of soda), Inyo county. Thionite, gaylussite, Lassen county. Trona (carbonate of soda), Inyo county. Tufa, Kern, Shasta, Mono and San Luis Obispo counties. Ulexite (borate of lime), Kern county.

Sun mines from grass roots to the 1000-foot level, and coupling these with overground indications, such as rich float in places, contour of surrounding country, and the rich placer products of the bed of Bear River, led him to prospect by running deep cuts, commonly called "Irish tunnels" scarring the hills in every direction. Finally at the roots of a big oak tree from which the mine takes its name, he struck a stratum of quartz in places no thicker than a knife blade; this he commenced to follow downward convinced that it was the apex of the missing lead, until it widened to three, four and finally at 100 feet to 20 inches in thickness, showing rich in sulphurets and free gold in almost every piece.

He had now discovered a mine identical in every respect with the Rising Sun, as regards character of ore, country formation, and every other characteristic of that famous gold producer, and the lead on further exploration proved to be a parallel vein to the Rising Sun, running in the same course not more than 300 feet apart in a southerly direction. The rock, as before stated, shows free gold throughout, and the whole product of the vein has averaged from \$80 to \$100 per ton. Since its discovery the mine has been self-supporting and has already paid the cost of erection of elegantly equipped hoisting works and pump, driven by an engine of 30-horse-power, and capable of sinking on the vein to a depth of 600 feet or more. The explorations consist of a

Referring to the diagram it will be seen that the position of this mine is favored by nature to an extraordinary degree. Bear river runs below, and from about its level an adit can be run tapping the vein at about 600 feet in depth. This tunnel will not be over 1000 feet in length, and its numerous advantages need hardly be mentioned. In addition to draining the mine, it will bring out the ore on Bear river canal, where it can be milled by water power, and thus reduce the cost of mining and milling to not over \$3 per ton; while this great adit level could be easily completed in six months at a cost not to exceed \$10,000.

In conclusion I would again call attention to the great importance of this discovery. It gives us the Rising Sun mine "redivivus." Another \$3,000,000 can be calculated upon almost demonstrated. If one rich blende lead runs parallel to the Rising Sun not 300 feet apart, why not another, even two or three, to be intersected by the great adit above proposed? It is a discovery of one of the "rich" ore leads that made the Grass Valley region so deservedly famous in early times. It is a discovery in a proved region. The Rising Sun mine paid all the way down to the 1000-foot level, and would be paying yet but for litigation involving the company in other and more uncertain mining localities. Mr. Werry and his fellow-townsmen are to be congratulated on thus obtaining a new lease of prosperity, and as far as your correspondent could observe they bear their blushing honors with becoming modesty.

H. E.

Caves in Connection With Ore Bodies.

In limestone districts, caves are often found and are of frequent occurrences in connection with ore bodies; in fact, it is stated that in some districts no large ore bodies have been found which had no caves over them; but caves are by no means always accompanied by ore bodies. These caves have been produced in part, at any rate, by the solvent action of water carrying carbonic acid. These waters passed through fissures and cracks, enlarging them, and dissolved the limestone especially where it was crushed and broken. This action was naturally most considerable where the best opportunity was afforded for the free circulation of the water, and as the limestone was not uniformly shattered, and as the different varieties of rock did not offer equal resistance, the openings are of very irregular character.

The theory of the formation of these caves, as advanced by Mr. J. S. Curtis, in his Geological Survey Report on the Silver-Lead Deposits of Eureka, Nevada, is as follows:

The formation of caves in limestone is usually attributable to the action of waters percolating from the surface and carrying carbonic acid in solution. As is well known, even rain-water contains carbonic acid in solution, though in small quantities corresponding to the traces of carbonic anhydride always present in the atmosphere. The air occupying the pores of the soil for a considerable distance from the surface is much more highly charged with carbonic anhydride than the free atmosphere, a fact no doubt due to the oxidation of organic matter, and the percolating waters are correspondingly charged with carbonic acid. Below the permanent water-level of a limestone country the water is nearly saturated with calcium carbonate, and though there is a slow circulation of subterranean currents beneath this level, no strong local action can be expected. To form a cave at a given spot, water containing free carbonic acid must be supplied in sufficient quantities, and an escape must be provided for the more or less saturated solution of calcium carbonate which results from the corrosion of the rock. Caves cannot, therefore, form at an indefinite depth from the surfaces of the limestones under any circumstances, for, after passing a certain distance through limestone, this percolating waters would be nearly or quite saturated. Caves, too, can only be found in a country with deep drainage, since otherwise the saturated solvent could not be removed.

The rate of cave formation is dependent upon the quantity of water, the amount of carbonic acid that it contains, and the velocity with which it flows. Climatic changes and changes in the formation from dynamic causes accelerate or retard the action of these waters, as the case may be, but a tendency to the formation of caves exists wherever water percolates through limestone. The solution of limestone ordinarily appears to be accompanied by the deposition of more or less calcium carbonate in the same neighborhood. When the process of solution and deposition go on simultaneously their coexistence is no doubt due to local differences of temperature and pressure. Changes in the amount of percolating water and other circumstances may also bring about deposition where solvent action once prevailed, or *vice versa*. As before stated, the dissolving of the limestone in particular directions has been owing, in a great measure, to the antecedent crushing of the limestone.

The caves in Eureka district are of more frequent occurrence near the surface than they are in depth, no caves of any importance having been found below 1000 feet. They are almost invariably connected with some fissure, and are also often connected with one another by fissures and open pipes. No oxidized ore body of any great magnitude is found without a cave above it, which is usually proportionate in size to the ore body, but all caves are by no means accompanied by masses of ore. Though the caves are very irregular, having ramifications in all directions, they form a system of systems which have a downward trend approaching the foot wall of the formation in which they are found. As the ore bodies are associated with caves, their deposition is, of course, similar.

THE prospectors rooting around in old abandoned prospect holes that were deserted in early days as worthless are now uncovering some excellent silver-lead ore.

PRACTICAL HYDRAULICS.

NUMBER 2.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDAL.]

[COPYRIGHTED.]

Flow of Water Through Openings.

Openings are of two classes—the *submerged* and the *weir*.

An opening having its top, as shown at *B*, Fig. 1, beneath the water's surface, *AD*, is termed a *submerged orifice*; an opening having an open top, as shown at *C*, the crest, in Fig. 2, is termed a *weir*. In both, the form of outlet, for the most part in practice, is rectangular. This is more especially true with respect to *weirs*.

In Fig. 1, representing a vertical section through a

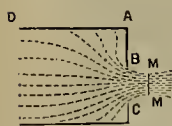


FIG. 1.

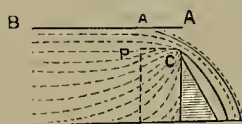


FIG. 2.

rectangular opening, conceive the opening, *BC*, composed of horizontal fluid layers indefinitely thin.

Let *l* = horizontal length of opening.

h = *AB* head with respect to top of opening.

h₁ = *AC* head with respect to bottom of opening.

x = head additional to *h*, and due any horizontal fluid layer indefinitely thin in the opening *BC*.

dx = thickness of such fluid layer.

v = velocity due (*h* + *x*) per second.

Q = discharge of water in cubic feet per second.

Then by (13) $v = (2g)^{\frac{1}{2}} (h+x)^{\frac{1}{2}}$ (16)

$dQ = l (2g)^{\frac{1}{2}} (h+x)^{\frac{1}{2}} dx$. (17)

Integrating (17) between the limits of *x* = 0, and *x* = *h₁* - *h* = *BC*.

$$Q = \frac{2l}{3} (2g)^{\frac{1}{2}} \left(h_1^{\frac{3}{2}} - h^{\frac{3}{2}} \right) \quad (18)$$

Equation (18) expresses the quantity of water, in cubic feet, which will flow through a *submerged orifice* under the general conditions imposed. It is, however, alike applicable to *weirs*.

For, by making *h* = 0, there results

$$Q = \frac{2l}{3} (2g)^{\frac{1}{2}} h_1^{\frac{3}{2}} \quad (19)$$

which expresses the quantity of water in cubic feet which will flow over a *weir* under the general conditions imposed.

The true *mean* velocity of a stream through the *submerged orifice* under the given conditions, is

$$v = \frac{2}{3} (2g)^{\frac{1}{2}} \left\{ \frac{h_1^{\frac{3}{2}} - h^{\frac{3}{2}}}{h_1 - h} \right\} \quad (20)$$

Some hydrolicians assume that the mean head is equal to the distance between the surface and the middle of the submerged orifice; hence, deduce that the mean velocity is by (13).

$$v = (2g)^{\frac{1}{2}} \left(\frac{h_1 + h}{2} \right)^{\frac{1}{2}} \quad (21)$$

Comparing (20) and (21), omitting the common factor $(2g)^{\frac{1}{2}}$;

$$v : v_1 = \left\{ \frac{h_1 + h}{2} \right\}^{\frac{1}{2}} : \left\{ \frac{h_1^{\frac{3}{2}} - h^{\frac{3}{2}}}{h_1 - h} \right\} \quad (22)$$

In refutation of the assumption that the mean velocity of a stream of water flowing from a *submerged orifice*, takes place at the middle of the opening, the following illustrations are presented. By substituting the respective values of the given heads and vertical widths in equation (22), there result:

When the vertical width is equal to one-half the head above it, the velocity is found one-sixth of one per cent too great; when it is equal to the head above it, the velocity is found one-half of one per cent too great;

When it is equal to twice the head above it, the velocity is found one and one-ninth per cent (.0111) too great;

When it is equal to three times the head above it, the velocity is found one and two-thirds of one per cent (.01645) too great;

And when we pass to the limit of the weir, by making *h* = 0, the velocity becomes six per cent too great.

The assumption that the mean velocity takes place

at the middle of a rectangular opening, is thus shown erroneous. It may, perhaps, approximate the truth with sufficient accuracy for most practical purposes, when the vertical width of the opening is less than the head above it; but is inadmissible when the width in comparison is greater.

The formula obtained on the assumption, that the mean velocity takes place at the middle of the opening, is commended by its simplicity of expression. But its application, in case the ratio of the head to the vertical opening is large, involves the use of a coefficient of flow, varying with that ratio. The formula so encumbered would evidently be more complex and tedious of application than that, namely (20), which it seeks to evade or displace.

Water in motion is subject to resistances, which retard its velocity and diminish its volume of flow. Modifications, therefore, are requisite to be made in the theoretical formulas of hydraulics, so that they shall embrace the measure of these resistances, and thereby more fully meet the requirements of practice. These modifications are effected for the most part by coefficients, whose values have been determined by experiment. A coefficient, as here used, corresponds to that part of the theoretical quantity, as velocity and volume, remaining after it has been diminished in amount equal to the loss due resistances overcome. With respect to the velocity of water flowing through *orifices*, a multiplicity of experiments, during a period of many years, have been made with extreme care by the ablest hydrolicians. The tabulated results of these experiments, differing with respect to head and size of opening, vary from .572 to .795.

If the theoretical velocity of water flowing through a rectangular opening with thin sides or lips be taken as a *unit*, then will an average of the experiments referred to, closely approximate .62.

This fraction is very generally adopted—that is, for the entire opening, the theoretical velocity is, to the average experimental velocity, as 100. to .62.

Let it not be inferred that the actual velocity of the flowing water is 62 per cent of the theoretical velocity. Water, in flowing from a reservoir, approaches the opening or outlet in convergent lines. This convergence continues a short distance beyond and outside the outlet, as shown at *m m*, Fig. 1, where occurs the minimum cross section of the stream, and where the velocity is nearly equal to the theoretical velocity. The area of the outlet being taken as the *unit*, the area of this cross section is equal to .637, while the velocity of the stream at this point is equal to .974 of the theoretical velocity. The coefficient of discharge there is equal to the product of these coefficients of cross section and velocity. Let *c* = this coefficient of discharge; then *c* = .637 × .974 = .62 nearly. (23)

In weir openings, the experiments of J. B. Francis, C. E., make *c* = .622. The top contraction seems to have no separate coefficient in the formula volume. *C*, the coefficient of discharge, is also the coefficient of average velocity, at and for the entire opening, but not as hitherto remarked for obtaining the actual velocity, as it occurs at *m m*, Fig. 1. Introducing this coefficient (.622), or modifier $(2g)^{\frac{1}{2}}$ into equations (20) and (21) and making $(2g)^{\frac{1}{2}} = 8.025$ as found, and there results:

$$v_1 = 3.33 \left\{ \frac{h_1^{\frac{3}{2}} - h^{\frac{3}{2}}}{h_1 - h} \right\} \quad (24)$$

$$v = 4.99 \left(\frac{h_1 + h}{2} \right)^{\frac{1}{2}} \quad (25)$$

TO DETERMINE THE VELOCITY OF WATER FLOWING THROUGH A RECTANGULAR OPENING.

Rule 7.—From the square root of the cube of the head of water on the bottom of the opening, subtract the square root of the cube of the head on the top of the opening. Divide the remainder by the difference of these heads, and multiply this quotient by 3.33, the product will be the required velocity.

Rule 7.—Corresponds to Equation (24).

Rule 8.—Multiply the square root of one-half the sum of the respective heads on the top and bottom of the opening, by 4.99.

Rule 8.—Corresponds to Equation (25).

Ex. 13.—In a rectangular opening, the head on the top of the orifice is 2.25 feet, and on the bottom of the opening is 4 feet, what is the average velocity of the flow of water at the outlet?

Cal.—By Rule 7, or formula (24),

Square root of the cube of the head on the bottom of the opening $(4)^{\frac{3}{2}} = 8$;

Square root of the cube of the head on the top of

the opening $(2.25)^{\frac{3}{2}} = 3.375$.

Difference between heads $4 - 2.25 = 1.75$.

Thus: $3.33 (8 - 3.375) \div 1.75 = 8.8$ feet.—*Ans.*

Cal. by Rule 8, or formula (25),

Half sum of given heads $(4 + 2.25) \div 2 = 3.125$, 4.99 times the square root of this quotient.

$4.99 (3.125)^{\frac{1}{2}} = 8.814$ feet.—*Ans.*

Dividing the result obtained under Rule 8 by result obtained under Rule 7.

$8.814 \div 8.8 = 1.0016$.

It is seen that in this case, Rule 8, corresponding to formula (25) gives a velocity nearly one-sixth of one per cent too great.

TO FIND THE AVERAGE VELOCITY OF WATER FLOWING OVER A WEIR.

Rule 9.—Multiply the square root of the head over the crest by 3.33.

Rule 9 corresponds to formula (24) by making the head on the top nothing.

Rule 10.—Multiply the square root of one-half the head over the crest by 4.99.

Rule 10 corresponds to formula (25) by my making the head on the top nothing.

Ex. 14.—In a rectangular outlet, open top, the head on the bottom of the opening is one foot, what is the average velocity of the flow?

Cal.—By Rule 9.

Square root of the given head $(1)^{\frac{1}{2}} = 1$.

Then $3.33 \times 1 = 3.33$ feet.—*Ans.*

Cal.—By Rule 10.

Square root of one-half the given head:

$(.5)^{\frac{1}{2}} = .7072$.

Then $4.99 \times .7072 = 3.53$ feet.—*Ans.*

Dividing result obtained under Rule 10 by that obtained under Rule 9,

$3.53 \div 3.33 = 1.06$.

It is hereby seen that Rule 10 gives a velocity six per cent too great.

Substituting the values of $(2g)^{\frac{1}{2}} = 8.025$,

and *c* = .622 of (23) in (18).

$$Q = 3.33l \left(\frac{h_1^{\frac{3}{2}} - h^{\frac{3}{2}}}{h_1 - h} \right) \quad (26)$$

When *h* = 0, (26) becomes

$$Q = 3.33l h_1^{\frac{3}{2}} \quad (27)$$

Formula (26) is adapted to finding the discharge of a rectangular submerged orifice, and formula (27) the discharge of a *weir*. In the latter case, when the depth of water on the crest exceeds three inches, and does not exceed two feet, and the length of weir is not less than three times this depth, J. B. Francis, C. E., a most eminent experimentalist, determined by careful experiments made on a large scale, and under the most favorable circumstances, that the loss by means of end contraction, is equal to one-tenth the depth of water over the weir for each such contraction.

Introducing this modification in (27) and there results:

$$Q = 3.33 (l - 0.1 nh_1) h_1^{\frac{3}{2}} \quad (28)$$

In which *n* denotes the number of end contractions.

For a weir one foot in length with water one foot deep, Nystrom's Mechanics makes the coefficient 3.135 instead of 3.33.

TO FIND THE DISCHARGE OF WATER OVER A WEIR, WITH CORRECTION MADE FOR DEPTH ON CREST.

Rule 11.—Deduct from the length of the *weir*, one-tenth the depth of water over the crest, for each and every end contraction (usually two), multiply the corrected length so found by 3.33 times the square root of the cube of the depth or head of water on the crest.

Ex. 15.—The length of *weir* being 3.01 feet, cut in two inch planks, and the full depth *h*, over the bottom of the notch 1.023, what is the discharge in cubic feet per second?

Cal.—By Rule 11.

Loss in this case by two end contractions:

$1.023 \times .2 = .2046$.

Corrected length: $3.01 - .2046 = 2.8054$ feet.

Square root of the cube of the given head:

$(1.023)^{\frac{3}{2}} = 1.035$; hence,

$Q = 3.33 \times 2.8054 \times 1.035 = 9.67$ cubic feet.—*Ans.*

Working this example by the *weir* formula given in Weisbach's Mechanics, whence the example is taken, there results:

ENGINEERING NOTES.

ONE of the greatest engineering projects of the age is the proposed sub-oceanic tunnel by which it is proposed to connect the Scottish and Irish coasts. The distance by the proposed route is twenty-one and a half miles, to be driven at a great depth owing to the remarkable trough which skirts the Scottish coast at about a third of the distance between the shores. Sir Charles Crawford, who has given the project great study, considers that the work could be completed within eight years. He states that such a tunnel would bring the coal fields of Ayr within forty miles of the manufacturing of Belfast; would make the magnificent harbor of Lough Swilly the port of call for the transatlantic liners; would bring America nearly 24 hours nearer England, and pour into Ireland such a vivifying stream of life and commerce as would do more to spread comfort and prosperity than decades of remedial legislation. As regards the difficulties of ventilation, he thinks either air engines, daily brought nearer perfection, or electricity, now working a tramway within a score of miles of Donaghadee, or the continuous wire rope, so largely used in America, would enable us to dispense with the smoke-breathing locomotives, and with it banish the bugbear of asphyxia. The enormous traffic which would be created it is confidently expected would easily provide the one and a quarter million dollars for interest on the expenditure of \$10,000,000—the estimated cost of the work.

RUNNING ENGINES WITH WATER WHEELS.—Whenever more power is needed, either constantly or at seasons of low water, or when variable work is being done, a steam engine may be attached to the line shaft which leads from the water-wheel by means of its main band passing over a pulley on side line shaft (situated as near the wheel as practicable), said pulley to have such diameter as will permit both the engine and the water-wheel to make each its own regular speed. The effect of this is as follows: When the supply of water is ample for the work, the governor on the engine will shut off its supply of steam, or nearly so, and the steam will be retained in the boiler, little fuel being consumed. But when the supply of water fails, or the work is greater, for longer and shorter intervals of time the speed of the water-wheel is decreased, when this governor instantly opens the steam upon the engine, which in turn supplies just the amount of power needed to supplement and maintain the requisite speed of the line shaft. So that, as long as the power from the water-wheel is sufficient to overcome its own friction and that of the line shafting, so long will its own water be utilized, even when it would be insufficient alone to accomplish any work at all beyond overcoming said friction.

TRACTION AND STRAIN ON THE BROOKLYN (N. Y.) BRIDGE.—Mr. Roebling, engineer of the bridge, has written a letter in response to inquiries sent to him by Professor Stranahan, of the Bridge Trustees, stating that the bridge could be used without detriment by Pullman cars and loaded freight cars, the weight of which does not exceed thirty tons; but that locomotives of that weight, by reason of their shortness and the concentrated weight, would strain certain parts of the bridge beyond safe limits. Locomotives on the bridge should, he says, be limited to about 18 tons weight, which would strain the bridge in minor parts about the same as Pullman cars weighing 32 tons. Such a locomotive could draw two Pullman cars or two freight cars up the grade of the structure. Mr. Roebling adds that he is convinced from the experience of the past year and a half that, as soon as increased switching facilities are provided in New York, so that three or more cars can be run in a train, the rope traction system on the bridge can not be excelled by any other in respect to regularity, economy, average speed, and number of passengers transported.

AN IMPORTANT IRRIGATION ENTERPRISE.—The irrigating ditch projected to commence near La Grange, on the south side of the Tuolumne river, and conduct the waters of that stream fifteen miles to the plains, from which point it will be distributed over the agricultural sections of that region, promises to be a success. The estimated cost of taking out and delivering the water at the point designated is \$184,000. The canal will be forty feet wide and carry five feet of water. After the canal reaches the plains the cost will be nominal. It is expected the main canal will be 35 to 40 miles in length. Once the water is brought on these plains, Stanislaus county will be equal to any other part of the State.

GUN COTTON FOR STEAM.—An application of gun cotton is said to have been made in such a manner that it will eventually supersede the use of steam for the purposes of light locomotion and driving small machinery. Details of the invention are withheld until a public exhibition of its utility is made.

AN UNDERGROUND SYSTEM OF RAILWAY FOR PARIS.—A Government bill has been presented in the French Chambers for the construction of 25 miles of underground railways in Paris at a cost of 210,000,000 francs, the State guaranteeing 5 per cent.

USEFUL INFORMATION.

HOMOEOPATHIC PERFUMES.—The odoriferous molecule of musk must be incomprehensibly small, when we are told the particles one grain of musk had, in a radius of 90 feet, disengaged in one day. No microscopic power has yet been conceived to enable the human eye to see one of these atoms; yet the organs of smell have the sensitiveness to detect them. We cannot imagine their smallness, as it is stated that the same grain of musk undergoes absolutely no diminution in weight. A single drop of the oil of thyme, ground down with a piece of sugar and a little alcohol, will communicate its odor to 25 gallons of water. Haller kept for 40 years papers perfumed with one grain of ambergris. After this time the odor was as strong as ever. Bordenave has evaluated a molecule of camphor sensible to the smell to 2,262,584,000th of a grain. Boile has observed that one drachm of asafoetida exposed to the open air had lost in six days the eighth part of one grain, from which Keill concludes that in one minute it had lost one 69,120th of a grain.

A PEA SHELLING MACHINE.—A pea-shelling machine has recently been invented, in operation which the peas are placed upon the platform of the machine and fed by hand to a drum through a hopper at the top. They are then submitted to the action of the beaters, which open the pods and allow the peas to fall through the meshes of the wire-cloth. In consequence of the oblique arrangement of the beaters, the pods continue to advance toward the extremity of the drum, where they fall into a chute. The unshelled peas are caught at the upper part of the drum by the rods that project into the interior, and are thus struck by the beaters, so that the shelling is perfect before the peas drop into the box beneath. The results obtained with this machine are remarkable, and its performance is important, since it can do as much work as several hundred women in the same length of time.

TO REMOVE DRY ROT.—A Russian professor has been experimenting, says the *Architect*, on the best way to remove dry rot. He says that a thorough draught will destroy the parasite within 24 hours. If the action of draught be assisted by that of sunlight, a few hours will often suffice to put a stop to further damage. A concentrated solution of common salt is very efficacious, and the stronger it is used the more rapid its action. The action of a concentrated solution of cupric sulphate (blue stone, blue vitriol) is still more energetic and complete than that of common salt. Crude carbolic acid is rapid in its action and cheap, but inconvenient to use. But he considers that the best, cheapest, and most convenient material to employ is the tar obtained when birchwood is distilled for acetic acid: the under surfaces of the flooring are painted with the tar.

SOLUBLE GLASS AS A PRESERVATIVE.—Three coats of soluble glass, each applied at an interval of a day, the *Pottery and Glassware Reporter* says, are sufficient to preserve porous materials indefinitely at a cost of about 15 cents per square yard. When applied upon old materials it is necessary to wash them thoroughly with water first. The degree of concentration of the solutions to be used varies with the materials. For hard stones the solution should mark 7 to 9 degrees Baume; for soft stones with coarse grit, 5 to 7 degrees; for calcareous stones of soft texture, 6 to 7 degrees. The last coating should always be with a dilute solution of 3 to 4 degrees only.

IMPROVING GYPSUM.—It is asserted that gypsum becomes harder by placing it, after calcination, for a few minutes in a mixture of water with eight per cent of sulphuric acid, and then calcining again. We think this quite likely to be so, as gypsum often contains quicklime, which by this treatment is also changed into sulphate or gypsum. Alum is also known to harden plaster casts, and is now proposed to immerse the freshly burnt gypsum in a solution of 10 parts of alum in 90 parts of water, and then to calcine again. Casts made of such plaster can be polished like marble.

TOUGHENED GLASS.—The original method for toughening glass consisted in plunging the vessel while hot in an oil bath heated to 392 deg. F. The glass was thus hardened, but became very brittle. T. Lubisch recommends solutions of starch or gum, heated to 212 deg. F., the glass vessel to be plunged in the liquid while glowing, and before it has lost its redness it is transferred to an oven and allowed gradually to cool down. He claims that his method is much superior to that of the original process.

A GOOD IDEA.—Some one in the London *Field* suggests that if a man wants a carriage or implement photographed so as to make a working copy to scale, all that is necessary is, when the photo is being taken, that a clear and distinct three-foot rule be placed on the carriage; this is photographed along with the carriage, and no matter what the size of the print or negative, will always be a true scale. It enlarges and diminishes in exactly the same proportion as the carriage.

BUTTERNUT WOOD FOR SHOES.—Quits a demand has sprung up for the butternut wood for

making wooden shoes. These shoes are coming into extensive use in breweries and other industrial establishments where the floors are damp. They are much warmer than the best leather soled shoes under such circumstances, and have not the oppressive condensation of moisture characteristic of gum.

IMPROVING COMMERCIAL COPPER.—The French society for the encouragement of natural history has awarded the prize of 1000 francs for the discovery of a useful alloy to M. Marches. The alloy is prepared by mixing three parts of copper with one of manganese, and adding it in small quantities to the molten copper, after refining and just before casting. As copper so treated with manganese is only very slowly acted upon by sea water, it is capable of very important applications.

STEAM PIPE JACKETING.—The Stettin Vulcan Works make use of wool for clothing steam pipes. A lead cylinder is laid around the pipe, and the space between, which is about one and one-half inches, is filled up firmly with wool. This lead cylinder being drawn back, the wool as exposed is tied down with wire, and finally linen is sawed over the whole.

ETCHING OF IRON AND STEEL.—F. Kick, of Paris, with the following mixture: Hydrochloric acid, 1 pint; water, 1 pint; concentrated solution of antimonious chloride, 1 drop. The last ingredient is added to prevent rusting of the etched parts. Soft and fine-grained metal is more easily acted on than any other sorts.

LUBRICANT FOR HEAVY BEARINGS.—The following is said to be a good lubricant for heavy bearings: Dissolve the best of white lead in good machine oil, make it pretty thick, take all the clotty substance away, then add this remainder, and you will find a good lubricant.

A GOOD COATING FOR IRON.—A varnish compound of 120 parts of mercury, 10 parts tin, 20 parts green vitriol, 120 parts water, and 15 parts hydrochloric acid of 1.2 specific gravity, furnishes a good coating for iron exposed to the wet.

CEMENT FOR PETROLEUM CISTERNS.—A useful cement which hardens very quickly, is formed of litharge mixed with glycerine. It may be used for water and steam pipes, as well as for lining cisterns for petroleum oils.

COST OF AN OCEAN STEAMSHIP.—The estimated cost of a new Pacific mail steamship is put at \$750,000.

GOOD HEALTH.

Hay Fever and Its Cure.

Hay fever people will be glad to see the nature and treatment of their complaint described in simple terms, readily understood by every one who comprehends the author's meaning.

These unhappy individuals, according to Dr. Sajous, of Philadelphia, possess, "as a result of heredity or of disease implicating markedly the nervous system, nerve centers which have become abnormally sensitive, and are therefore inordinately influenced by the external elements to which they respond."

As a result of local disease the nasal mucous membrane becomes hyperæsthetic, and transmits to the abnormally sensitive nerve centers the impressions made by the "external irritants" (pollen, etc.), which results in a paroxysm of "hay fever."

These are the three conditions necessary for a paroxysm, and when one is absent, as is the case with the external visitants a portion of the year, and all the year in certain regions, it will not take place. Hence to cure the disease is to render the hyperæsthetic nasal membrane oblivious to the annual visitation of the external cause. The writer maintains that this can be done by cauterizing the hyperæsthetic portions of the nasal membrane, which he has accomplished with pleasing and permanent results by means of the galvano-cautery or acids.

He describes these hyperæsthetic areas as consisting of three—posterior, middle and anterior. The posterior area is implicated when reflex asthma is the most prominent symptom; the anterior, when the head symptoms alone are present; the middle is the starting point of all the symptoms combined.

He recommends that abnormal conditions of the nasal cavities, such as hypertrophies, polypi, exostoses, etc., be eradicated before using the superficial cauterization. The best results are obtained by instituting treatment six weeks at least before the onset of a paroxysm, though it may be conducted during a paroxysm, resulting sometimes in an arrest of it or a beneficial modification. Immunity depends on the thoroughness with which the treatment is conducted.

It would seem, says the *Medical Record*, from the perusal of Dr. Sajous' monograph on the subject, that the hay fever might become unknown, provided its victims would put their hyperæsthetic nasal membranes under the treatment of an adept in rhinology. The banishment of hay fever from the list of diseases would be a boon to all except the hotel keepers of those resorts where, since the "external

irritant" does not lurk in the atmosphere, the cause is removed and a cure is effected.

With the mechanism of the disease still in mind there remains one other method, which will be as much superior to that advanced by Dr. Sajous as his is better than the now prevailing method of changing abode, namely, that of finding a remedy which will set directly upon the abnormally sensitive nerve centers. We commend this to investigators.

What Pneumonia Is.

Pneumonia has already become alarmingly prevalent in this city. Residents, but more especially visitors, in San Francisco, are quite apt to needlessly expose themselves to attacks from this disease, which is quite apt to follow a sudden exposure to cold winds when in a heated state, as after brisk walking, or on emergence from the overheated and vitiated atmosphere of public assembly rooms. In this connection we especially commend the perusal of the following paragraph from an exchange:

Pneumonia is inflammation of the lungs. When the inflammation is on the lining of the chest, it is pleurisy. The two may be combined. Pneumonia is a dangerous disease, and requires prompt action. It is preceded by a chill, from which it is sometimes difficult to restore the natural heat. The chill is followed by a high fever, in which the heart beats rapidly. Chills may come from other causes than pneumonia, but unless sure of the cause and sure that it is not dangerous, it is safe to suspect a coming pneumonia, and to send at once for a physician. On no account attempt to manage the case without one. The disease is too serious to warrant such an attempt. Until he arrives, do what you can to equalize the circulation and temperature. Keep in bed between woolen blankets or sheets, increase the temperature of the room, apply to this affected parts old soft cotton (not linen) cloths wet in hot water, in which has been mixed one-half of a teaspoonful of mustard to a quart of water, and to this apply heat from tins or bottles of hot water or hot bricks. Rubber water bags are best; apply heat in the same way to the feet. Do not increase the quantity of mustard. The object is to excite action in the skin, but to avoid irritation that would hinder or destroy action. As these cool, replace them at once with others, not allowing the temperature to reduce at all. On no account must the patient get out of bed.

For medicine give aconite, four globules, every half hour; this is homoeopathic. When he perspiration returns and the patient can sleep, let him sleep; continue the heat for a time, and when it is reduced let it be done with great care. If the patient needs food let it be of a plain, simple kind. Avoid cold drinks until the natural condition of the skin is restored.

INDUCED NERVOUS CONDITIONS.—Prof. Charcot recognizes the force of the statement made by American investigators, that the nervous symptoms designated "railway spine" would be better called "railway brain." "Those grave and tenacious nervous conditions," says M. Charcot, "which follow upon collisions, and which make it impossible for their victims to pursue for months, or even years, their accustomed occupations, are often no more than hysteria. Hysteria in the male should be known and recognized in legal medicine, since large interests are involved in the matter, and it may come before a tribunal affected by the deeply-rooted prejudices against the word hysteria." Five years ago, when systematic attention was first given to male hysteria, Klein was able to collect but 80 cases of the affection, but Batault has lately brought together a list of 218 cases. M. Charcot says that such cases are not more frequent than formerly, but that the affection has become better studied and more easily recognized.—*Progress Medical*.

SAFE FROM DISEASE.—There are certain constitutions which do not take disease readily. Such a case was Capt. Rackliff, who lived to be over 180 years old. He had been exposed on shipboard to yellow fever and other infectious diseases, and had bent over sick men and taken their breath, had washed and prepared them for their watery burial after death, but never incurred any disorder. The scarlet fever, the plague, diphtheria and other epidemics discriminated and turned aside mysteriously from him. This is the way it should and might be with thousands of the human race if only the laws of health were properly understood and observed. The human body was perfect in the original make up, but it has sadly degenerated by heredity and by personal neglect. Man was intended to, and might, die only of old age.

WHAT ARE THE CAUSES OF NERVOUSNESS?—It would be difficult to answer this question. There are too many of them. This may be said, however, that as a rule nervousness and anemia go together. If there is too little blood circulating in the body and the brain is large and active, nervousness will be sure to be present. So we may say that the best preventive is to improve the character and quality of the blood. When this is deficient, the nervous condition is not kept up to a high standard, but becomes weakened and lowered. This is all there is of it.

PEACH LEAVES pounded to a pulp and applied to a bruise or wound from a rusty nail, or a simple cut, will give immediate relief.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

WILL START.—*Amador Sentinel*, Sept. 9: It can now be regarded as certain that the Kennedy mine will soon start. Breece & Co. have struck a five-foot ledge of rock that is claimed to be very rich in the Black Hills. About 40 men have been let out at the Empire mine, Plymouth, on account of the shortness of water. There is a rumor that operations will soon be commenced on the Bright mine, on Schrober's hill. W. E. Stewart has sold the Light-house mine to Mr. Flagg for \$2000. Mr. Flagg will work the mine on a small scale at first, until he determines the exact character of the purchase. It is stated that the Alpine mine, of Plymouth, which has lain idle for many years, is to be started in operation shortly. New York capital has been interested. The name of the Tellurium mine, of Pine Grove, has been changed to the San Joaquin. Fifty-five feet of the old shaft, or rather the place where it was, has been re timbered. It is expected to continue this work to a depth of 300 feet. The calculation is to rig up new hoisting works as soon as it can be got at. Julius Leszynsky has made an agreement with the Mahoney Mining Company by which he will commence work in that mine within three months and within four thereafter spend \$10,000 in developing the same. He then has the privilege of surrendering the mine free of encumbrances. Should he choose to go on he is to spend \$25,000 more. After which he is to receive a deed to one-half the mine. Should it take less than \$35,000 to put the mine on a paying basis, the difference between that amount and the amount actually expended is to go into a common pot. This agreement has the appearance of being genuine, and it is probable that work in accordance with its provisions will shortly commence.

IDLE.—*Amador Ledger*, September 12: The Hadley mine, above Volcano, is idle. A large body of water was encountered in sinking, which was too much for the present pumping facilities to control. Work has therefore been suspended until next spring, when better pumping machinery will be secured. The Gillick mine, near Volcano, continues to turn out immensely rich ore, which is accumulating on the dump, no crushing having been made as yet. The claim is owned by T. Gillick and Dr. Phillips, both working miners. They are crosscutting at a depth of 80 feet, and have struck two quartz ledges, one from two to four feet wide, the other about 2½ feet, both of free milling rock of very high grade. The Empire mill at Plymouth is kept running only during night time, owing to the scarcity of water. It is supplied by the company's ditch, conveying water from the Consumes river. About 40 miners have been discharged, on account of the works being reduced to half-time. W. E. Stewart has sold the Light-house mine, situated near Butte City, to T. E. Flagg for \$2000. The new proprietor intends to proceed to develop it at once. Five more stamps are to be added to the mill, making 10 stamps in all. The Zeife mill was stopped Monday to enable connection to be made with the new pipe recently laid from the reservoir to the mill. The stamps were in motion again early Tuesday morning.

Calaveras.

GLENCOE.—The arrival of E. A. Hanke, of San Francisco, has caused a general stir in our local mining circles. The gentleman purchased P. Corcoran's one-third interest in the Gold State Mining Company, and has immediately assumed superintendency. By the direction of the company a crew of miners have been put to work to find the most feasible points for the extraction of paying ores. The outlook is of the finest and the company has the community's most cordial support. The recent developments in the Hidden Treasure mine are of a highly encouraging nature, and have given new life to mining projects in this locality. Rock having been taken from this mine that shows the auriferous metal in abundance, and practical assays attest its running over \$200 per ton free milling gold, \$75,000 is the asking price of a one-fourth interest. The Sierra Queen is yielding an abundance of \$50 rock from a ledge without limit. The facilities for extraction are first-class. Donnelly & Young are being well rewarded for their tedious labors in "bottoming" Old Mosquito Gulch near its discharge into the Mokelumne river. They have reached the bedrock from which they are taking a liberal amount of the yellow metal. T. J. Posey has arrived from the Bay City and resumed operations on the Craig and Posey tunnel. He reports his intention to push the tunnel ahead 200 feet. At this juncture the erection of a five-stamp mill will be in order to grind the quartz. Glencoe is on the jagged edge of a mining boom that soon will set her afloat.

THE ORO PLATA.—*Cor. Calaveras Citizen*: The Oro Plata mill and mine now in such successful operation will soon have to close down on account of the scarcity of water. The extreme hot weather of the past several weeks has been a severe draft on the water supply in the reservoir, which is now nearly exhausted. The meager fall of snow in the mountains last winter is another cause of the present deficiency of the water supply, for as early as the first of July the loss by evaporation was greater than the river or springs could keep up. The water company have ample water shed and abundant facilities for a largely increased water capacity, and doubtless will in the near future utilize the depressions or valleys that are almost natural reservoirs in near proximity to the large reservoir, and thus assuring an abundant supply of water the driest of seasons. The Oro Plata Mining Company is a permanent institution and is of incalculable value to this vicinity. Thousands of dollars have been unsparingly expended in practically demonstrating the feasibility of erecting reduction works to work low grade ores at a figure so low as to yield a profit, and I venture the opinion that at no mill in this State can ore be extracted and milled any lower than at these works. The past week the company, under Supt. Morse's guidance, one of the Tustine pulverizers, of which the company have four, has been altered to wet crush, and during the week was running on hard ore. It works splendidly with an increased capacity over dry crushing, fulfilling the

expectations of Supt. Morse, who was sanguine of carrying out successfully this end in view. When the rainy season sets in, giving assurance of an abundant water supply, the remaining three pulverizers will be correspondingly altered, which, in connection with the 15-stamp battery, will be equal to a 60-stamp mill, the bullion shipments then largely increased will not only redound to the credit of the management, but will mark an era of healthy improvement in mining in this district not witnessed heretofore. The ore body is still as promising and apparently as inexhaustible as ever, and doubtless will richly reward the perseverance, the time, and money spent to develop it.

Inyo.

PROSPECTING.—*Independent*, Sept. 12: The process of concentrating ores lately introduced at the Maxim mill, is already giving quite a stimulus to prospecting along the Inyo range. A few days ago Joe Groves brought in some ore from prospects found by him in Mazurka canyon, that would pay well to concentrate. This ore is found near Independence Station on the C. & C. railroad, and if an ore body is found will be very convenient to get to the mill.

WAUCOBA MINES.—Last week Albert Bierstadt left San Francisco for New York. It is his intention to return to Independence about six weeks hence, when he will begin work on mines at Waucoba. The movement is the result of investigations made by Mr. Bierstadt and party during their visit to this region a few weeks ago.

Mariposa.

THE FRANCIS MINE.—*Mariposa Herald*: John Mitchell of the Francis mine, was in Marysville Wednesday, and from him we learn that everything is progressing favorably at this mine. The mill will be in running order in two weeks, and would have been ready sooner but a defect was discovered in the boiler that made it necessary to send to San Francisco for a new one. Two tunnels in the Francis are being cleared out, and as soon as the face of the drifts are reached the work of extracting the ore will be commenced. The same company are sinking a shaft on the Moore Hill mine, which is located about three-quarters of a mile down the creek from the Francis, and the prospects are most favorable. Should this mine give promise of permanency a mill will also be put on it. Only 14 men are now employed by the company, but if they make this venture pay they will go largely into the mining business in this county.

Placer.

THE BOULDER.—*Placer Herald*, Sept. 12: Last week we mentioned that the Boulder mine, near Ophir, was about to be started up by a San Francisco company. Work has already commenced, and from the improvements undertaken the managers are evidently well backed, and have full confidence in their undertaking. They are laying out to put up hoisting works, a mill, a boarding house, and all necessary appurtenances to a first-class mine. This vein has yielded well in the past, and worked economically and systematically, it ought to, and no doubt will, pay.

THE BLUE WING.—This mine is owned by the Walker Brothers, of Salt Lake, and is at present worked by Messrs. William Kitto & Co., who are taking out some very good ore from the mine. The men at work there are pushing developments at the bottom of the mine, and as they have a 12-months' lease of the property, they will undoubtedly do well. The Blue Wing is located right in the heart of Walkerville town.

THE RISING STAR mine is looking very well and the usual quantity of ore is being extracted. During the past week connection has been made with the winze running from the 400 to the 500-foot level on the vein. When the Rising Star is cleared of the litigation hanging over it, which now encumbers it materially, it will be one of the most valuable properties in the camp.

THE MOULTON.—Superintendent Clark informs us that the Moulton mine is looking about as usual. The usual quantity of ore is being produced, with no perceptible difference in the supply. The work of sinking the main shaft below the 500-foot level has been commenced, and no trouble is experienced with water. The winze on the 500-foot level is going down ahead of the shaft. Everything in and around the mine and mill is working in a very satisfactory manner.

MINOR NOTES.—The work of sinking the Anaconda shaft below the 900-foot level is still in progress. The Anaconda and St. Lawrence mines look splendid. Superintendent Miller, of the Montana Copper Works informed our reporter yesterday that the mines over which he superintends never looked better than they do at present. The Parrot mine is holding its own in fine shape. Over 300 tons of ore are taken out daily, and yet there is enough mineral in sight to keep this up for nearly a year and a half. The shaft is going down as rapidly as possible. The Parrot is a grand property.

OPHIR ITEMS.—*Placer Argus*, Sept. 12: The Boulder mine near Ophir is about to be re-opened and thoroughly prospected; in fact work was begun on it Monday morning. Sam Howe, of Oakland, an experienced miner, is the superintendent. Four men are at work in the Gold Blossom mine. They are working for the company under Mr. Burlingame. They are reported to be doing first rate.

Plumas.

PRATTVILLE.—*Cor. Greenville Bulletin*, Sept. 12: We made a visit to the Savercool mine lately. Everything is in fine shape at the mill, under the ward of Alex. Cameron; ready to start up whenever that long-wished-for time may arrive. That is a fine property to remain idle so long. The reports of some of the "finds" over on the Big Flat continue current. Those who have struck the pay are very quiet as to both the extent and richness of the "finds." Hobart is working some eight men at Sunnyside, and, we are pleased to hear, is receiving good pay. Water is so scarce that a good many men are not at work at their diggings, or are doing but little. The Dutch Hill ditch has been entirely dry on its lower course for some time. The supply of water in the feeders is so short that a sufficient head of water cannot be gotten to run through the length of the ditch.

Sierra.

THE ALASKA MINE.—*North San Juan Times*, Sept. 12: The Alaska mine at Pike City, Sierra county, 12 miles from this place, is turning out gold in immense quantities, and the deeper the earth is

penetrated the richer the rock becomes. To better facilitate the production of the precious ore the Alaska Company are about adding 20 stamps to their mill and also another 7000-pound pump. The machinery is now in transit and has been passing through this place for a week past. The pump now in use is requisite to keep the mine clear of water, and the new one is designed for use in the event the present one gives out of needs repairing. The object is to prevent the stoppage of the mine. Col. Bates, the manager of the Alaska, is doing splendid work. He has the mine in first-class order and works it economically. The Colonel is of the opinion that the Alaska may be ranked among the best mines in the State, and we think so too.

NIGGER CANYON.—*Mt. Messenger*, Sept. 12: Mr. Antone Demartini informs us that work is progressing rapidly on the wagon road leading to his quartz ledge in the above-named canyon, about 40 men being employed on the road, the millsite and the mine. The wagon road leaves the river at Charcoal Ranch and is about three miles long with an easy grade. The mill will be in two batteries of four stamps each, run by a Pelton wheel three feet in diameter under about 130 feet pressure. J. W. Brown is making 200 feet of 15-inch pipe for this mine. The supply of water at present is about 50 inches, which is ample to run all the machinery that will ever be needed. He has two ledges, one a very large one and the other about 2½ feet wide. The most work has been done on the small one, the rock from which is very rich, it being almost entirely black sulphuretted ore, easily worked. All parts of the mill are already completed, ready to put together as soon as the road is done. Four capitalists from San Francisco are visiting the Young America quartz mine, Sierra City, and inspecting the Phoenix and other quartz properties, with a view of purchasing. Flattering prospects have been discovered on the Florence quartz ledge. For a distance of 1800 feet the ledge has been traced, and where sunk upon averages five feet in width and prospects exceedingly well. Bald Mountain Extension Co., Forest City, cleaned up last Sunday 206 ounces. The pay channel is 140 feet wide and well defined. The gravel averages about \$5 per carload. Regular monthly dividends will soon be declared. Work is progressing rapidly on the American Hill quartz mill, and a large part of the machinery is already on the ground. A large force of men has been busy for the past two months making the needed improvements. The mill will undoubtedly be in running order long before winter sets in. The Young America Co. had a very satisfactory clean-up on Monday, September 7th, after 17 days' run, the ore averaging \$70 per ton. Their mine looks fine. A dividend will be declared on the first run. Within four or five weeks 20 stamps will be running and the business and assay offices will be completed in eight or ten days. Mr. Van Slyke has received another iron hoisting tub for his Butcher Ranch quartz mine. We understand that he has his whim so arranged as to hoist rock from two shafts about 100 feet apart. The mine is paying well.

Shasta.

COPPER CITY.—*Redding Independent*, Sept. 12: The Winthrop mill began operations Tuesday with two furnaces. On Monday they will start in full blast, working from twenty to twenty-five men and running night and day, putting through from 10 to 12 tons of ore. A new strike in the mine shows rock that will assay as high as \$800 to the ton. Dr. Graham and Newt. Greer have discovered a ledge of coal four to six feet wide, just back of the Winthrop mill. John Lowden has secured a half interest in a rich mine discovered by an impetuous prospector about four miles from Redding near Rock creek. The surface indications appear to be as rich as the Shearer mine, and great clumps of rock show seams of almost solid gold. That it is immensely rich for a short distance down there is no question.

THE SHASTA BAR TUNNEL.—From Mr. Ed. Jones, who was engaged on the Shasta Bar tunnel, on the Upper Sacramento, we learn that the tunnel is now completed, and the company are now engaged in building a dam on the river to turn the water into the tunnel. When this is done the bed of the river for a considerable distance will be drained, and it is this river-bed that the company propose to work for gold. It is supposed, by the prospects along its banks, to be very rich, and it is to be hoped that it will prove so, and richly repay the company for their expenditure, but of course it cannot be known till it is tried. The running of the tunnel, for which Mr. Ed. Hume was the contractor, will cost some \$19,000, and the dam will cost \$7000 more, making an expenditure of at least \$26,000 to test the scheme. If it proves a success it will be a big thing for its owners. The water will be turned into the tunnel in a few days, and then it will soon be known whether it "pays big" or not.

MILL.—*Shasta Co. Democrat*, Sept. 12: Hon. Reuben Clark started his re-stamp quartz mill on the Harrison mine yesterday. All the machinery works well. Since Mr. Clark took hold on his property he has taken out fully 400 tons of good ore. The new Copper City mill and furnaces on the Winthrop mine started up the latter part of last week. Everything about the mine is working like a charm, and there is a big body of high grade ore in sight, assays from which run up as high as \$6000 to the ton. Last week TenEick, Haskell & Co., who recently made the rich strike on Slickrock, took up to the mine a small hand crusher with which they will test the milling capacity of their rock. The boys are hard at work sinking on the vein, and the prospects for a good mine are most flattering. From Mr. Stickley, who has been up at the T Shasta tunnel on the Sacramento, we learn that the tunnel has been entirely completed, and the dam will be finished this week. Mining operations on the claim will now be commenced soon. The prospects are that the company will realize big money on this investment. Mr. Porter, a young mining man of San Francisco, arrived on the train last Friday evening and, in company with a Mr. Alexander, Saturday morning went up on Salt creek and located a promising gold-bearing quartz claim, naming it the Shasta Prince. The vein appears to be a strong one, the quartz blue, highly mineralized, with rich sulphurets, and altogether greatly resembles the rich ore in the Scheerer & Rattler mine. George McDaniels, Anson Seabring, Mr. Speak and another gentleman whose name we failed to learn, about three weeks ago made a discovery of a quartz vein about three miles southeast of town that promises to develop into a real bonanza. They have sunk on it about 10 feet and at that depth

the vein is strong 12 feet wide between walls. The quartz is of a deep blue cast, carries spar, and also a big per cent of sulphurets, which, when roasted and tested with acids, salt and potassium, yields big results in fine gold, but not a color will it yield by the simple mortar and pan test. The frequent results of the crude acid and roasting test has led the boys to believe that they have a big piece of mining property, and we sincerely hope they have. Monday they shipped a large sample to Thos. Price to be assayed and analyzed.

Trinity.

A BRIGHT OUTLOOK.—*Journal*: This week in conversation with two of the owners of the North Star mine, in the East Fork Mining District, the *Journal* reporter was enlightened on the recent doings at that very promising mine—one of the best in the district—which is now looking better than ever. On the dump now lie over 140 tons of splendide ore. There are five men at work taking out more ore, cutting timbers and rushing things right along in a ship-shape manner. The company have five locations: North Star (the boss, on which the bulk of the work is now being done) which is from 2 to 5 feet in width; Comet, Linnie and Freshwater, which show up quite handsomely; and last but not least the Little Chief, a small ledge from 12 to 14 inches wide, which will turn out a chief in the way of producing the "precious," as recent prospects prove very emphatically that it is a veritable bonanza. The company held a meeting in Weaverville this week to make final arrangement for the purchase of a Hammond 5-stamp mill which is manufactured at the Napa City Foundry. The meeting terminated favorably and the order for the mill is now at the foundry, and will be shipped immediately. The mill will arrive at the mine in about two weeks, and in about a month will be grinding out money for the owners. The North Star boys are as happy as a clam in high tide.

NEW MILL FOR DEADWOOD.—The new Huntington mill which will be erected on the Vermont Mine, in Deadwood district, by Mr. A. P. Minear, has arrived and is now being put into position. It will be put in motion next week, when good reports may be expected.

Tuolumne.

LOCAL MINING NOTES.—*Union Democrat*, Sept. 12: The Oakland mine has hung up its stamps for want of water. Sinking is being steadily prosecuted on the Jumper mine at Quartz Mountain. The Stanislaus River Mining Company have stripped the gravel down to bedrock, and are washing away night and day. A. E. Walton of San Francisco went up to look at the Riverside mine Thursday. It is believed that there is a movement on foot to commence extensive operations on that mine shortly. Quite a number of parties have taken advantage of the low water to work the bars in the Tuolumne river. Several gangs of men are at work in the river between Jacksonville and Red Mountain Bar. W. S. Fielding is pushing operations in a systematic manner on the Hogle & Dagnar mine at Sugar Pine. The property is developing finely. A new boarding house has been erected for the accommodation of the miners. Gus Wiedekind is working a streak of gravel at Pine Log, and appears to be making a good thing of it. He has been taking out nuggets weighing from one to three ounces. The tramway and ore bins at the Buchanan mine have been completed, and the work of erecting the mill will soon commence. The ditch is progressing well along, and the saw-mill is busy cutting lumber for the new works. About 100,000 feet has already been cut. The mine is in splendid working shape. A large steam pump has been put in the main shaft of the Lamphier to drain the lower levels of the increased flow of water. The scarcity of water which has caused the stoppage of so many mills does not interfere with the Lamphier, it being run by steam power. It is pounding away night and day on rock from the South shaft. Judge Clark is pushing things at the North Star mine. The new hoisting works are in complete working order, and are in steady operation. The mine is being developed by night and day shifts. It was intended to begin ore crushing about the middle of the month, but the failure of the water supply will delay milling operations for some weeks yet. Glowing reports continue to come from the Dead Horse mine at Summerville. Explorations have developed the existence of an extensive body of high grade quartz. The rock while making a rich return by free milling process, contains a heavy percentage of high grade sulphurets. Messrs. Hayward & Hobart, who own the property, will doubtless soon put up reduction works. R. A. Sawyer of Groveland was in Sonora last Sunday. He is the owner of some very promising mining property on Mt. Gibbs near Tioga, which he has been developing this summer. He exhibited some extraordinary rich silver ore taken from one of his mines. He has sunk down on his lead in seven places, and everywhere finds an abundance of rock of the character shown. He says the lead averages about 12 feet in width. He is now in communication with capitalists who desire to purchase the property. Gust Jackson, one of the owners of the Forty-nine mine near Don Pedro's Bar, was in town Tuesday. The mine, he says, is looking very well, and is being developed by a force of five men. They are now down on the vein 135 feet, but are running a tunnel to tap it at a still greater depth. The vein wherever explored averages about four feet in width of good milling quartz. The rock contains a heavy percentage of sulphurets. Colonel Whitlock and Professor Wilbur of Chicago, Col. C. W. Tozer, owner of the Potter mine at Angels' camp, and W. G. Long, visited the Willietta mine at Jacksonville Wednesday for the purpose of making an examination of the property. Negotiations are now being conducted with a view to selling the mine to an Eastern company, and the gentlemen named were viewing the property in the interest of the proposed purchasers. Should the pending sale be concluded, an enterprise would be inaugurated that would be of enormous benefit to Tuolumne county, and would attract attention to the vast capabilities of the great mother lode on which the Willietta is located.

FROM GROVELAND.—*Cor. Tuolumne Independent*, Sept. 12: The mill on the Kanaka mine is now in running order, and is very much better than the Sweepstakes mill the owners first built. Mr. Chas. Schneider, one of the pioneer quartz miners and millmen of this coast, has remodeled the mill, and put in one of his patent aprons, which is the very perfection of a gold-saver. Mr. Schneider was, in early days, one of the firm of Waas, Molitor & Co., who were assayers and coiners of \$50 slugs, and

owned the mines on the Mariposa Estate until Gen. Fremont lawed them out of their property. Count Wnas, and Messrs. Molitor, Capt. Eusebi Kustel, were civil engineers and officers on the staff of Kossuth, and fled to this country for political reasons. Some of these celebrated Hungarians had been gold miners in their own country, and on their arrival here engaged in the same business, and have had much to do with the introduction of gold mining apparatus on this coast—they were, in fact, the fathers of the present gold quartz stamp mills. The original builders of the Kanaka mill somehow got the cam-shaft on the feed side, instead of on the discharge side, and this is the only defect in the mill; but Mr. Schneider thinks he can remedy this, without tearing up the whole battery-frame, in case the mill does not work well in its present shape.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Enterprise*, Sept. 12: The station from the east side of the deep winze for the 3100 level being fully opened and completed, the main drift has been swung around due south instead of following a southeast course, as was at first contemplated. This is in order to connect more speedily and directly with the main drift coming from the Combination shaft, which has already gone west 130 feet and is getting into the eastern outskirts of the great ore channel. For this reason it was necessary to make the course of the drift from the winze directly south, following the vein. As before stated, the face of the drift is in ore, and at the south side of the station, close to the winze another drift has been started swinging sharply around to the westward. This will form a west crosscut, and is intended to explore the vein from the deep winze to the west wall. In passing out of the station from the winze this drift cut through some very good ore adding much to the ore possibilities of the south drift. These two drifts south and west will be watched with intense interest during the next few days by all concerned in the bonanza promise and success of the Hale and Norcross mine. Never was the management of any mine more squarely in earnest than in this, or more evidently desirous of developing a genuine bonanza.

CON. CALIFORNIA AND VIRGINIA.—From the Jones lease section, above the 1550 level, about 50 tons per day continue to be extracted, which is shipped to the Eureka mill, on the Carson river, for reduction. This ore assays about \$12 per ton. From the 1750 level, about 130 tons per day are extracted on company account, assaying about \$14 per ton. This is shipped to the Morgan mill for reduction. The Morgan mill, running by steam, is not dependent upon the Carson river for motive power. The northeast drift on the 1650 level has been extended 45 feet during the past week, making a total distance of 170 feet.

CHOLLAR.—The main west drift from the Combination shaft, 3100 level, has reached a distance of 130 feet, and the face is in the east quartz vein of the ledge. It will probably be through it to-day and into the clay seam which lies between that and the main vein. It will be continued into the main vein to a suitable point for a lateral drift north to connect with the lateral drift coming south from the Hale and Norcross deep winze. After this connection is made, a good drift of air will be secured, and the main west drift will be continued to the west wall and a south lateral drift be run into the Chollar ground.

SIERRA NEVADA.—On the 550 level the main west crosscut has been extended 36 feet during the week, making a total length of 236 feet. The material in the face is very hard porphyry, with streaks of clay and quartz, and it is not quite so dry as heretofore, considerable dampness being apparent, almost amounting to a seepage of water. This drift is heading toward a very favorable quarter for ore development and a material change for the better may be looked for at any time.

MEXICAN.—On the 500 level the middle crosscut east is being pushed ahead, and is now about 140 feet in length, running in heavy wet clay, porphyry and quartz. A strong flow of water continues coming from the crosscut west on this level.

CROWNS POINT.—The machinery repairs are about completed, and some little prospecting work is being done in both this and the Belcher. The repairs to the Mexican mill are also completed, the dam and flume are in substantial order, and there is water enough in the river to run about half the stamps. It is stated that quite a number of miners are to be put to work shortly in both the mines, extracting some of the best of the low grade ore for milling.

OPHIR.—The repairs to the old Mexican shaft being completed, a station has been opened at the 350 level for a drift west for the old workings in the ore vein, which lie about 60 feet west from the shaft. Considerable good ore was left at that point in years past, which can probably be made to pay under the present cheaper and more advantageous system of working.

GOULD AND CURRY.—West crosscut No. 1 on the 1000 level has been extended 43 feet during the week, making a total length of 341 feet. The material in the face continues to be vein porphyry, clay and quartz, showing no change since last report.

UNION CONSOLIDATED.—The main lateral drift north has reached the Sierra Nevada south line and is in barren quartz and porphyry. It is proposed to run a crosscut west from this main drift in Union ground.

YELLOW JACKET.—The old workings from the 1300 up to the 400 level continue their regular yield, keeping a large force of men employed, and the Brunswick mill, on the Carson river, running to its full capacity.

ALTA.—The main drift west on the 700 level is making excellent progress in very hard rock, and has attained a distance of nearly 140 feet from the main north lateral drift.

BEST AND BELCHER.—West crosscut No. 2 on the 1,000 level has been extended 45 feet during the week, making a total length of 185 feet. Face in vein porphyry, quartz and clay.

American District.

REVIVAL.—*Silver State*, September 12: There is said to be quite a mining excitement in what was known in early days as American district. This district is situated on the east side of the Lower Humboldt range, about 20 miles south of Unionville. The mine were never prospected to any extent, and the district was abandoned years ago. Recently L. F. Dunn discovered a large lead there, which contains rich ore and promises to be a valuable mine. Besides this, placer mines have been discovered in the banks along the creek and several claims have been located. Gold is found in all the canyons of the Humboldt range, but none of the placers have been worked to any extent except Spring Valley, which is a few miles north of American Canyon. The Spring Valley mines, which have been principally worked by Chinese, have produced at least a million dollars in gold dust.

Burl District.

MINING BOOM.—*Eureka Sentinel*, Sept. 12: There is, according to the statement of ex-Assessor H. V. Mundel, of Elko county, quite a mining boom in Burl district, in that county. All the old locations have been relocated, and Walker Bros., from Salt Lake, and other parties from the East have a considerable force of men working in the different locations. Walker Bros. will put on an additional force of 20 men.

Eureka District.

TUNNEL.—Messrs. McEwen and Addison, tributaries in the Eureka tunnel, are extracting some very rich ore from a point 1100 feet in from the mouth and immediately above the roof of the main tunnel. Mr. Addison has been one of the most fortunate tributaries that ever worked in the property, and by those who have seen his new "find" it is believed that it will lead to a chamber of ore equally as large as the famous one that bears his name.

Patterson District.

AT WORK.—Harvey Carpenter came in from his ranch in Lincoln county Sunday night. He reports the miners at work on Patterson mountain, of which mention has been made several times in these columns, doing well. They are extracting some rich ore, which they intend to ship at an early day to either Taylor or Salt Lake for reduction. Their vein of mineral is narrow, but they have faith in its widening out as depth is attained.

Telephones District.

A NEW MINING REGION.—*Tuscarora Times-Review*, Sept. 11: Mr. J. W. McDonald came in last evening from Telephone, a lately organized district eight miles from Mountain City. The new district was organized at a miners' meeting held on the 4th inst. The boundaries are as follows: On the north by Hicks' district; on the south by Alleghany creek. The east and west boundaries are 2½ miles respectively from the Telephone mine. J. W. McDonald was elected Recorder. Mr. McDonald has been working the Telephone since the first of May, and has recently struck the main ledge from which he is extracting a considerable amount of rich ore. Mike Enright, an old Tuscarora miner, has located the southern extension, which is likely to develop as favorably as has the original location. Mr. McDonald intends building a couple of cabins, laying in a supply of provisions and vigorously prosecuting work on the Telephone during the winter.

Willow Creek District.

THE WILD DEER MINE.—*Silver State*, Sept. 11: Gilbert Ross, of Dun Glen, returned yesterday from a visit to the Willow creek mines. He says the Wild Deer the only mine in the district except the Ohio on which much work has been done is opened systematically and shows a good vein of fair ore. The owners are preparing to make another run with the mill and they have ore enough in sight to keep it running some time.

ARIZONA.

GLOBE DISTRICT ITEMS.—*Silver Bell*, Sept. 7: The Miami mill is running on Red Cloud and Cotton Tail ore. E. S. Spencer is at work on his placer claim in Lost Gulch. Simon Billings and Ben Fox have a lease on the Davy Crockett mine. Kingsbury has struck some very rich ore on the Eureka mine, Lost Gulch. Penrod and Jackson are still at work on the Talk mine at Rambos camp. The Letcher Bros. and F. Knapp have commenced work on the Centennial mine No. 2. Ed. Lidolph & Co. are fitting up the Isabella mill for the purpose of working the ore they last mined from the Golden Eagle. Johnnie Koons sold the extension of the Gibson mine on Pinal mountain to Fred Oates last week. The ore prospects well in gold. Tidwell & Coplin have leased Mike Whalen's mine near the Irene springs, and have four men at work on it and are taking out some very good ore. Frank Bissig, Harry Hancock and Tommy Morrell have leased the Rescue mine from L. J. Webster and have commenced work on the west tunnel. Billy Sylvester is still driving a tunnel on his copper claim. He is now in about 75 feet and from all indications is liable to have a very large mine; it is situated between the Buffalo and Takoma mines.

ALASKA.

THE DOUGLAS ISLAND MINES.—*San Francisco Examiner*, Sept. 15: Alaska mining interests are monstrous resources yet to be developed. The country, however, is no place for poor men, or men of moderate means. M. de Porte has spent three years in Alaska, and has come directly from the Treadwell mine, on Douglas island, in which Senator Jones holds a large interest. The Senator is now at the mine, having gone up some weeks since. "The discovery of gold," says M. de Porte, "is in its infancy, and I believe the best ledges are not yet known. But it requires money, and lots of it, to open them up. The mining must be done on a grand scale. I think the Treadwell mine, with its new 20-stamp mill and improved facilities for reducing the sulphurets, will pay \$100,000 per month. The ledge is 600 feet wide, and for free gold alone pays about \$10 to \$12 per ton. The sulphurets will pay about \$100 per ton. The mine is situated almost at the water's edge, and steamers can run right up to the mill. A tunnel has been run under the ledge into the hill for 560 feet, and a shaft sunk from the top to the tunnel. The quartz is located at the top of the shaft, and the broken rock is thrown down the shaft and is run out through the tunnel to the mill. The mill is consequently run at a comparatively small expense. It is now being run night and day employing a force of about 100 men, of whom only 15 are white men, the rest being Indians and Chinamen." Prospectors are discovering ledges in the vicinity every day, but they are practically worthless

unless one has a large capital to work them. This same Douglas island is fairly seamed with ledges. The water supply at the island is controlled, however, by the Treadwell company. In the mountains, back of Juneau, which is on the mainland, about three miles from Douglas island, are several rich ledges.

COLORADO.

CARBON.—*Boulder News*, Sept. 11: The lessees on the Silver Star lode have struck it rich. Two men working on pay keep three men sorting and passing dirt. The ore averages \$200 per ton. The contractors are not doing so well.

SPRINGDALE.—This usually quiet camp has been unusually quiet of late, and items of interest to the general public are remarkably scarce. There is some little mining work going on, but in most of the mines there is little being done. Mr. C. V. Clark, who is working on the Rip Van Dam tunnel, under lease, has made what may prove to be a valuable strike of ore. He began work a few days since at the place in the long tunnel where some \$2000 worth of ore was taken out by W. R. Lafourcade; and soon uncovered a streak of exceedingly rich ore. Mr. Clark intends to raise through to the surface, and as he has found the same kind of ore on the surface, it is highly probable that the intermediate ground will pay well for stoping.

IDAHO.

OLD OWYHEE.—*Wood River Times*, September 7: "Joe" Lennon, an old mining and millman, well known throughout the mining States and Territories, came in to-day to look after some of his mining interests in the Lost River region. He will probably go out to that section to-morrow, and return here in about two weeks, after which he will go back to Silver City, Owyhee, where he has an important sale pending. Mr. Lennon says that General Cunningham, who has leased the Poorman mine, is doing well, though it is too soon yet to ascertain results. He is about to ship two lots of 60 or 70 tons of "stull ore" to two mills for a test, and if the result is satisfactory, at least one mill thereafter can be kept going—for a while at least. General Cunningham is working to men. P. A. Reagan's brother, who has the run of the Oro Fino, has uncovered from \$50,000 to \$70,000 worth of ore by putting about \$2000 worth of work on the property. He will do well. Other abandoned properties are being looked into, and Mr. Lennon says that the outlook for old Owyhee is very good.

THE NEW DISTRICT.—R. J. McPhee has returned from Alton district, to winter in this region, with his family. He reports quite a number of prospectors in the new district, who have discovered very promising veins of milling ore of a high grade. The Cleveland, the mine upon which the most work has been done, shows at least \$50,000 on the croppings, of chloride and sulphurets ores. The formation is a micaceous granite of a soft character, easily drilled and good blasting. The district is but 20 miles in a southeasterly direction from the old Warrens diggings. Water, wood, mining and building timber and ore being abundant, the district has every requirement for prosperity except milling facilities. There is therefore a good opportunity for practical millmen who are looking for favorable locations. Mr. McPhee states that his company intends to resume operations there as early as practicable next spring, to push developments. He will also either take in a small mill to test the ore, or ship a trial lot or two either to Ketchum or Weiser.

MONTANA.

THE ALICE.—*Butte Miner*, Sept. 9: The new hoisting machinery at the Alice mine is working and runs as smoothly as any hoisting engine ever put in action. The work of raising the hoisting works and putting on the new roof has been commenced, and will be pushed to a completion as rapidly as possible. The Alice mine never looked better than it does at present. The stopes on the 300, 400 and 600-foot levels are looking unusually well and are producing the usual quantity of ore. The south crosscut on the 800-foot level is in 80 feet from the shaft, and has to be carried in 100 feet more before the vein is encountered. The north crosscut on the same level is in 60 feet, and will have to be driven 150 feet more before the ledge is cut. In about two weeks the new double-deck cages will be in operation at the Alice. The two mills are working to their full capacity, and everything is running in a highly satisfactory manner. The mills produced over \$100,000 worth of bullion in July. The affairs of the Alice Company were never in a better condition than they are at present, and Superintendent Hall thinks the company have many long years of prosperity before them.

MAGNA CHARTA.—This mine looks exceptionally well, in fact better than it ever did. The stopes and drifts on the 100, 200 and 300-foot levels are looking grand, and the usual quantity of ore is being extracted from these points. The recent strike in the 300-foot level is extending east and is improving in size and in the quality of its ore as it goes east. The 400, 500 and 600-foot levels are being opened up for work. It will be a long time, however, before stoping will be started at these points, owing to the fact of there being so much ore in sight on the upper levels. The work of cutting the south station and running the north crosscut on the 700-foot level, is going bravely on. The Alice Company have a very valuable property in the Magna Charta mine.

THE NEW CONCENTRATOR.—*Butte Town Talk*, Sept. 9: The mason work for the new Liquidator concentrator, near Meaderville, has been completed, and a large force of men is now engaged in putting up the machinery and erecting the building. The works when completed will be first-class in every respect and of a capacity of about 150 tons daily. The Liquidator, under the able management of Wm. McDermott, has been thoroughly opened up and developed, and they now have several thousands tons of ore in sight. It is one of the best properties in the camp, and will add materially to our bullion output when the new works are completed, which will be in about 30 days.

BIG CLEAN-UP.—*Helena Independent*, Sept. 9: The Glover mining company yesterday evening deposited at the First National bank in this city eight bars of gold and silver bullion, weighing about 950 pounds. This large quantity of precious metal

is the result of last month's (August) run on the Glover mine, near Marysville. The bullion is valued at \$6 an ounce, making the whole amount to nearly \$70,000.

NEW MEXICO.

NOTES.—*Socorro Bulletin*, Sept. 12: John Baly and F. Ryan are sacking mineral from their argiferous copper property. General Strickler will ship it for them, and he expresses the opinion that it will net them after all expenses are paid, not less than \$25 per ton. The Brittenstein Mining and Milling Company's 50-ton concentrator is being rapidly placed in a condition to drop its stamps, and the Pajarito and Carnero mines are exploited with full day and night shifts. Woodyard, Gochenauer and C. T. Brown are putting capital without hesitation into the Magdalena Queen. The property is showing up finely, and a rich dump of mineral attests its value. Negotiations are pending for the sale of the Magdalena Queen group of mines, embracing several of the most valuable claims on the summit of the Magdalena. McMillen and Row have, at 200 feet, a formidable body of ore in the Iron mountain district which will average not less than \$13 per ton in gold and silver. Thirty-five men are working in the Juanita, and that mine ships 23 tons of ore per day. It is undergoing extensive exploitation and development. The Merritt Mining and Milling Company of this city shipped two silver bricks last Monday, and will send two more to market to-night. It is rumored that the Graphic Mining and Smelting Company will add two 60-ton furnaces to their present capacity. A force of miners are working in the Graphic mines, and the construction of good roads to it is being effected. The Kelly is exploited with full shifts, and ships about 500 tons of ore to the Billing works weekly. Pat Leedy and M. McLeish continue to sink on their Bonaparte, and are raising pay mineral. As we go to press authentic information reaches us of a rich strike in the Magdalena Queen.

OREGON.

PINE CREEK NOTES.—*Cor. Bedrock Democrat*, Sept. 7: Last Tuesday, Jack Mahan and partners, struck an extension of the Union ledge and the rock shows up equal to that taken from the original discovery. The ledge crosses a gulch and runs somewhat south of the first location. About two tons of ore from the Emmet mine has been crushed in Howard's amarra, but I am not informed as to whether a clean-up has been made. The ore shows free gold, but my opinion is that free milling ore is scarce here, and that a more scientific process than that of amarra working will have to be brought into use before any great amount of wealth will find its way to a returnable market. I do not make this assertion as an "expert" but believe it expresses the opinion of those competent to judge after careful study of ore in sight. Work is completed on the contracts of the bonded mines, but it is not publicly known whether or not the mines have been accepted. Money for paying workmen in fulfilling their contracts, has not yet arrived to pay them off, but no doubt is expressed as regards the men being paid for labor well done. Just now they need it and ought to have it. It is the same old story—not a ledge discovered but enlarges and improves upon development, and to-day confidence in the Pine Creek mines is more solidified and openly expressed than at any time since their discovery, but if anything is to be done this season in the way of erecting mills and putting in machinery there is no time to lose.

NOTES.—*Jacksonville Times*, Sept. 5: J. C. Neitz and brother are at Galice creek on a prospecting tour. Parks' mill at Sterling is engaged in sawing 30,000 feet of lumber for Ankeny & Co.'s reservoir. Wm. Bybee had a quartz mill hauled from Josephine county last week and will have it put up in this section. J. Klippel & Co. have finished wing-damming the Applegate, and will soon commence mining the bed thereof. Eli Taylor is in Jacksonville again, having been on a prospecting tour in Josephine county for several weeks past. He thinks he has found a promising gravel mine.

UTAH.

REVIEW.—*Salt Lake Tribune*, September 11: The week has seen the dissipation of the summer weather, and early fall weather is upon us. The season of mining activity is at its height. The negotiations for the purchase of Martin's Horn Silver, at Lava Creek, Idaho, are in suspense as far as known, but as Mr. Paddock has returned and gone north, very probably the sale will be consummated this week, if indeed it has not been already. The shipments of the metals from this city for the week ending Saturday, September 5th, inclusive, were 2,261,078 pounds. The receipts of bullion and ore in this city for the week ending September 5th, inclusive, were \$53,718.65 in bullion and \$21,480 in ore, a total of \$75,198.65. The receipts of the week before were \$70,290.49 of bullion and \$14,992 of ore, an aggregate of \$85,282.49. No shipments of the Ontario have been reported for the week, the total output for the year standing at \$1,033,411.71. Two gold bars from the Kentuck mine were received on the 5th inst., valued at \$15,000. The Stormont sent up during the week two bars of silver, valued at \$3300. The product of the Hanauer smelter for the week has been 10 cars of bullion of the value of \$23,340. The Germania produced during the week four cars of bullion, valued at \$11,888.65.

A party of old prospectors leave here this coming week for the extreme southern portion of this Territory on a new discovery. We hope they will strike it big.

The mines in North Star continue to improve and Mr. Campbell feels more hopeful than ever as to the permanency of the deposits. In the Hickory a fine body of ore has been developed at a greater depth than has heretofore been attained. But it has taken lots of money and perseverance to accomplish it. Mr. Campbell's pay roll is now greater than the Horn Silver.

THE LEACHING WORKS.—The works have been running steadily for 40 days and nights, leaching 27 tons of tailings every 24 hours during the time. The new works will have a set of Cornish rolls attached for crushing ore, and the capacity will be 75 tons per day. The company will depend principally on custom ore, and chlorides will receive terms that will enable them to work ore that before was heaved over the dump as waste.



1850. 1885.
RANKIN, BRAYTON & CO.,
...BUILDERS OF...
MINING MACHINERY.

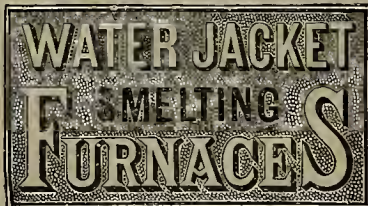
San Francisco: 127 First Street. Chicago: 160 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., of any DESIRED CAPACITY.

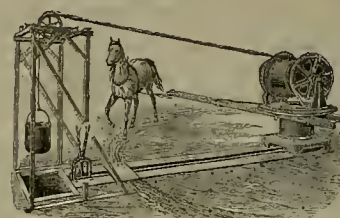
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



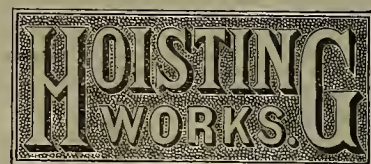
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery. Frank & Co.'s Woodworking Machinery. New Haven M'fg Co.'s Machinists' Tools. Bement & Son's Machinists' Tools. Bickford's Power Drills. Blake's Improved Steam Pumps. Perry's Centrifugal Pumps. Perin Band Saw Blades. Sturtevant Blowers and Exhausts. Shimer Matcher Heads. Brainard Milling Machines. Turbine Water Wheels. Bradley Cushioned Hammers. Massey's Steam Hammers. Schlenker's Bolt Cutters. Holloway Fire Extinguishers. Williamson Bros' Hoisting Engines. Atlas Engine Works Engines and Boilers. Payne's Vertical and Horizontal Engines. Otto Silent Gas Engines. Clapp & Jones' Steam Fire Engines. Pickering Engine Governors. Judson Engine Governors. Tanite Co.'s Emery Wheels and Machinery. Nathan and Dreyfus Oilers. Korting Injectors and Ejectors. Disston's Circular Saws. New York Belting and Packing Company's Rubber Goods. Lane and Bodley Saw mills. H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

→ A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market. SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

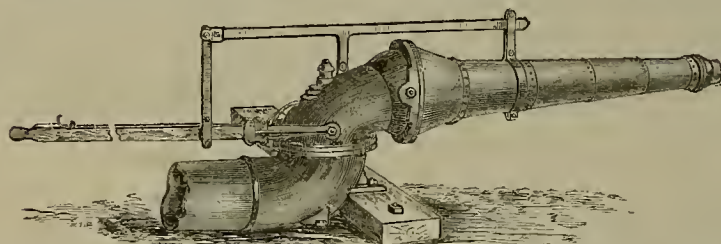
FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

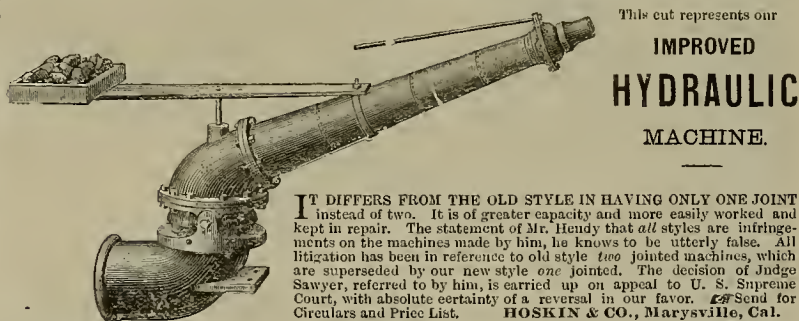
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

Prizes furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

**IMPROVED
HYDRAULIC
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

DEWEY & CO.'S

Scientific Press



Patent Agency.

[ESTABLISHED 1860.]

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

GEO. H. STRONG.

DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS.
Elevator, 12 Front.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY
SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

... MANUFACTURERS OF ...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,
MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Mullies, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the demand
for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL. **H. KUSTEL.**

METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.

Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.

Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

San Francisco Cordage Factory.

Established 1856.

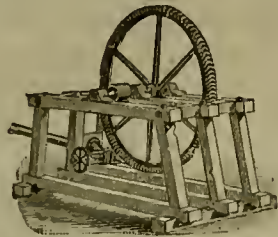
Constantly on hand a full assortment of Manila Rope,
Sisal Rope, Tarred Manila Rope, Hay Rope, Whale
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

N. W. SPAULDING
SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

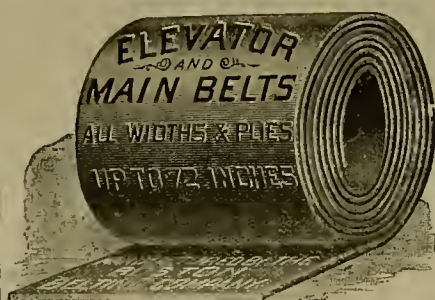
Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Cata-
logue. 17 and 19 Fremont St., San Francisco.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of
all kinds of
Chemical Stoneware
—FOR—
Manufacturing
Chemists.
Also Chemical Brick
for Glover Tower.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.



GOLD QUARTZ and PLACER MINERS'
SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics'
Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer
Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on
every order.

The most extensive and successful manufacturer of these plates in the
United States. Will fill orders for delivery in Rocky Mountain and Pacific
Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought
gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND

NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.

E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL,
The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE

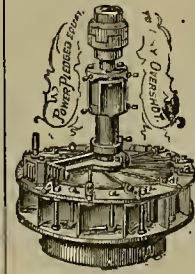
Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL and HYDRAULIC PLANTS

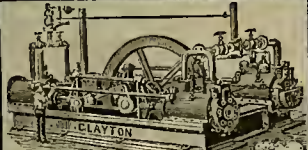
LOGGING, PORTABLE, STATIONARY, MARINE

AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

"CLAYTON" IMPROVED
MINING PUMPS
AIR COMPRESSORS
For CATALOGUES, ESTIMATES, Etc., Address,
Clayton Compressor Works,
Near Brooklyn Bridge, **BROOKLYN, N. Y.**



Pasteur and Jenner.

EDITORS PRESS:—I have read the article on the philosophy of vaccination in the SCIENTIFIC PRESS of the 25th ult., and venture to offer a few observations thereon. Professor Tyndall has become the champion of Pasteur and his inoculations for the abolition of splenic fever in sheep, and rabies in dogs, of cholera in fowls and zymotics in the human family, and claims that as Jenner has extinguished small-pox epidemics by means of vaccination, Pasteur will just as effectually put an end to these other maladies by means of his attenuated viruses. Professor Tyndall demands a free vivisection table for England to assist in this brilliant enterprise of imparting a mild infection of everything to everybody. The major premise in this case is assumed, but not proven. Small-pox, so far from being extinguished, as is presumptuously claimed, has appeared in a most virulent form in London, where, during the past few months, 7000 vaccinated and protected patients have been admitted into the small-pox hospitals; so, also, in Birmingham, Liverpool, Sunderland, Durham and other towns where vaccination has for thirty-two years been vigorously enforced upon recusants under penalties of fines, seizure of goods and imprisonment. About a hundred medical nonconformists—men of blameless character—many of whom have had children injured or killed by vaccination, are summoned as criminals before the various tribunals every week, and thousands of intelligent parents and good citizens, who regard vaccination with contempt due to a mischievous and dangerous delusion, are being driven into active rebellion against these cruel laws.

In several large towns, as Leicester, Bingley, Keighley, Baubury and Dewsbury, the machinery of coercion has completely broken down, and the vaccination laws, in this words of the *Times*, are "practically a dead letter." The Guardians at Bradford have recently instructed their vaccination officer not to prosecute further, as such coercion has entirely failed in its effect. The people prefer to spend the local taxes in promoting public health by the more rational and effective method of municipal and personal hygiene, and as a result, small-pox has no abiding-place in these populous unvaccinated communities. In Leicester, a city of 130,000 inhabitants, where the vaccinations (in spite of unrelenting coercion) are considerably less than one-third the registered births, cases of small-pox are of the rarest occurrence, and when these occur, investigation has shown they are imported from London or other well-vaccinated cities. In Keighley, Yorkshire, a town of 35,000 inhabitants, vaccination has been repudiated for years, the repudiation being due to sad experiences of its mischievous effects, and the official reports show that out of each hundred births, only 12 are vaccinated. It has been observed that infantile mortality has diminished concurrently with the abandonment of vaccination, as in those cantons of the Swiss confederation, which have abrogated the compulsory laws. The dangers attending the operation can no longer be concealed, and are proved by the steady augmentation of all inoculable affections in England, such as skin disease, scrofula, blood-poisoning, phlegmon, and vaccino-syphilis; the last loathsome malady, according to the Registrar-General's Returns (Nos. 392 and 433), has increased fourfold per million of births since the vaccination laws came into operation in 1853. The recent Medical Vaccination Census (Dr. Makuna's Transactions) shows that out of 334 physicians, medical officers of health, and public vaccinators who gave evidence to the Exeter Hall Committee, 242 testify to having met with diseases communicated by vaccination, and 33 of these certify to fatal cases of vaccination within their own experience. And if these results are so frequent, the inconspicuous injuries from the operation must deteriorate infantile health throughout the kingdom, and weaken the capacity to meet the ordinary maladies incident to early life.

How much longer is this miserable survival of class legislation, this mischievous bolstering-up of a ridiculous medical error to be submitted to?

At the recent International Anti-Vaccination Congress, held at the Hotel de Ville, Charleroi, Belgium, at which all the leading European States, as well as the United States, were represented, statistical evidence was adduced from official reports, showing that while vaccination had had no effect in arresting or diminishing various outbreaks, it was itself the cause of a serious augmentation of certain diseases.

Many cases of injury to emigrants, arising from their vaccination before being permitted to land in the United States, were brought before the Congress, and a resolution calling upon the Government to repeal the law was passed unanimously.

WILLIAM TEEB.

7 Albert Road, Regents Park, London, Eng., Aug. 27th.

THE Clayton Steam Pump and Air Compressor Works have removed their office and salesrooms from 14 and 16 Water Street, Brooklyn, to 43 Day Street, New York. This old established manufactory is well and favorably known from the character of its products, and its patrons on this coast will be glad to hear of its steady progress.

SAVED! my eyes by using Muller's pebbles. 135 Montgomery street, near Bush, opposite Occidental Hotel.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Argenta M Co.	Nevada.	18.	10.	July 29.	Sept. 1.	E. M. Hall.	327 Pine St.
Andes M Co.	Nevada.	27.	25.	Sept. 3.	Oct. 25.	B. Burns.	302 Montgomery St.
Benton Con M Co.	Nevada.	14.	10.	Aug. 21.	Sept. 30.	W. H. Watson.	302 Montgomery St.
Blue Bluff M Co.	California.	9.	21.	Aug. 21.	Sept. 26.	L. S. Adsett.	419 California St.
Benton Con M Co.	Nevada.	14.	10.	Aug. 25.	Sept. 30.	W. H. Watson.	302 Montgomery St.
Buchanan M Co.	California.	13.	15.	Aug. 25.	Sept. 28.	P. J. Sullivan.	121 Post St.
Con Pacific M Co.	California.	7.	25.	Sept. 27.	Sept. 30.	S. Gardner.	330 Pine St.
Cueva Santa M Co.	Mexico.	6.	25.	Aug. 5.	Sept. 11.	W. L. Oliver.	323 Montgomery St.
Equitable Tunnel M Co.	Utah.	32.	10.	Aug. 3.	Sept. 15.	C. J. Collins.	312 Montgomery St.
Eintracht Gravel M Co.	California.	19.	05.	Aug. 11.	Sept. 16.	H. Kunz.	239 Sansome St.
Eschequer M Co.	Nevada.	22.	20.	Aug. 31.	Oct. 7.	C. E. Elliott.	309 Montgomery St.
Giant M Co.	Nevada.	1.	25.	Sept. 18.	Oct. 13.	J. M. Eubank.	401 California St.
Golden Fleece M Co.	California.	2.	30.	Aug. 31.	Oct. 5.	F. Schumeyer.	Phelan Block
Holmes M Co.	Nevada.	9.	1.00.	Aug. 3.	Oct. 5.	C. T. Bridge.	224 California St.
Hale & Norcross M Co.	Nevada.	86.	50.	Aug. 4.	Sept. 8.	J. R. Lightner.	309 Montgomery St.
Independence M Co.	Nevada.	15.	20.	Aug. 20.	Sept. 23.	J. W. Pew.	310 Pine St.
Johnson Gravel M Co.	California.	2.	01.	Sept. 3.	Oct. 15.	G. White.	313 Front St.
Martin White M Co.	Nevada.	20.	25.	Aug. 21.	Oct. 7.	J. J. Sooville.	309 Montgomery St.
Navajo M Co.	Nevada.	12.	30.	Aug. 21.	Oct. 5.	J. W. Pew.	310 Pine St.
North Belle Isle M Co.	Nevada.	8.	10.	Aug. 20.	Sept. 24.	J. W. Pew.	310 Pine St.
North Star M Co.	Nevada.	31.	20.	July 28.	Sept. 1.	A. Jennings.	401 California St.
Orinall M Co.	Alaska.	3.	10.	Aug. 22.	Sept. 23.	C. Robinson.	339 Kearny St.
Peer M Co.	Arizona.	30.	30.	July 31.	Sept. 2.	A. Waterman.	309 Montgomery St.
Sulphur Bank M Co.	California.	4.	50.	Aug. 29.	Oct. 9.	T. W. Wintham.	336 California St.
Summers Con M Co.	California.	4.	05.	July 16.	Aug. 31.	F. E. Lutz.	330 Pine St.
Union Con M Co.	Nevada.	31.	20.	Sept. 14.	Oct. 13.	J. M. Eubank.	401 California St.
Virginia Creek M Co.	California.	2.	10.	Sept. 11.	Oct. 16.	J. M. Quay.	406 Montgomery St.
Willow Creek M Co.	Nevada.	1.	1.00.	July 24.	Sept. 7.	E. E. Elin.	310 Pine St.
Young America M Co.	Nevada.	2.	10.	Aug. 6.	Sept. 8.	E. M. Hall.	327 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Sept. 24.
Eureka Con M Co.	Nevada.	F. W. Lucovick.	323 Montgomery St.	Annual.	Oct. 19.
Hazard Gravel M Co.	California.	F. W. Lucovick.	317 Powell St.	Annual.	Sept. 18.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	06.	Mar 16.
Mahabattam S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept 1.
Mt Diablo M Co.	Nevada.	F. W. Heath.	318 Pine St.	25.	July 30.
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	25.	Feb 13.
Plymouth Con G M Co.	Nevada.	W. Van Norden.	Pres. 23 Nassau St. N. Y.	50.	Apr 6.
Silver King M Co.	Arizona.	J. Nash.	323 Montgomery St.	25.	Sept 15.
Syndicate M Co.	Nevada.	J. Stoddard Jr.	419 California St.	10.	Sept 8.

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.								
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.				
Sept 9-16																								
Thursday .....	.07	65	SW	Cy.	.00	80	N	Cl.	.00	74	NW	Cl.	.00	68	W	Cl.	.00	77	SW	Cl.	.00	73	S	Cl.
Friday .....	.05	65	S	Fr.	.00	77	N	Cl.	.00	78	NW	Cl.	.00	68	W	Cl.	.00	71	SW	Cy.	.00	72	S	Fr.
Saturday	—	63	S	Cy.	.00	82	N	Cl.	.00	80	NW	Cl.	.00	74	NW	Cl.	.00	73	E	Cl.	.00	72	W	Cl.
Sunday .....	.07	69	NW	Cy.	.00	86	N	Cl.	.00	85	NW	Cl.	.00	74	W	Cl.	.00	77	W	Fr.	.00	72	W	Fr.
Monday .....	.00	74	S	Fr.	.00	90	S	Cl.	.00	87	S	Cl.	.00	65	SW	Cl.	.00	83	W	Cl.	.00	71	NW	Cl.
Tuesday .....	.26	65	S	Cy.	.00	86	S	Cl.	.00	84	S	Cl.	.00	64	SW	Cl.	.00	86	SW	Cl.	.00	71	W	Cl.
Wednesday .....	.06	66	N	Fr.	.00	84	N	Cl.	.00	79	NW	Cl.	.00	67	W	Cl.	.00	65	W	Fr.	.00	74	W	Cl.
Totals .....	.51				.00				.00				.00				.00				.00			

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy. foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Mining Share Market.

There is very little interest in the stock market just now. The dealers are watching the progress of opening up the 3100 level of the Hale & Norcross with interest. The *Enterprise* says that the fact is that the opening of the 3100 level from the deep winze has just commenced, and has not progressed far enough to ascertain or define anything. The face of the drift is only 35 feet from the winze, and being swung around due south is not crosscutting the ledge at all. Moreover, it must be considered that this one small opening in the great lode is a worm-hole in a pumpkin as compared with the great space of ground it has to explore. Its face was reported at headquarters to be all in ore last evening, and, although not assaying very high, the indications for running directly into a heavy vein of good pay ore were excellent, almost amounting to a certainty.

The main drift west from the 3100 level of the Combination shaft, which will eventually connect with the drift from the Hale & Norcross deep winze, has nearly reached the main ore vein. Low grade ore extraction goes steadily ahead in Yellow Jacket, and it is again rumored that ore extraction is shortly to be resumed in Crown Point and Belcher.

Bullion Shipments.

Argus, Sept. 10th, \$9931; Mentor, 10th, \$16,567; Albambra mill, 13th, \$15,000; Barber's mill, 13th, \$8000; King 13th, \$8674; Calico mill, 13th, \$5610; Willow Creek, 5th, \$3000; Germania, 8th, \$4932; Hanauer, 8th, \$9100; Stormont, 8th, \$3500; Crescent, 8th, \$3390; Queen of the Hills, 8th, \$1400; Leon, 8th, \$410; Crescent, 10th, \$2600; Germania, 10th, \$2319; Hanauer, 11th, \$2200; Germania, 11th, \$2466; Queen of the Hills, 11th, \$1300; Hanauer, 12th, \$2200.

The banks in Salt Lake City report the receipts for the week ending Sept. 9th, inclusive, of \$53,718.65 in bullion and \$21,480 in ore, a total of \$75,198.65.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, department 10, San Francisco.

IRON MOUNTAIN MINING CO. Sept. 15. Location, Shasta Co. Capital stock, \$9,000,000, in 90,000 shares. Directors: Thos. H. Hobson, George N. Wilcox, Edward P. Figg, Wm. O. Smith, N. W. Tallant, L. A. Garnett and John O. Earl.

GRAY EAGLE MINING CO. Sept. 15. Capital stock, \$1,000,000. Directors: S. Keeling, H. W. Gray, T. G. Durning, H. M. Rosecrans, L. P. Waller and E. W. Griswold.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 27.	WEEK ENDING Sept. 3.	WEEK ENDING Sept. 10.	WEEK ENDING Sept. 17.
Alpha	.95	1.30	.75	.70
Alta	.31	.25	.30	.25
Andes	.20	.25	.30	.25
Argenta	.20	.25	.30	.25
Belcher	.95	1.10	1.10	1.50
Belmont	2.25	2.35	2.35	2.10
Bell	.40	.45	.40	.40
Bullion	.40	.45	.40	.40
Sonanza King	.40	.45	.40	.40
Belle Isle	.06	.20	.05	.05
Bodie Con.	1.75	1.90	1.80	1.60
Benton	.05	.05	.05	.05
Boile Tunnel	.05	.05	.05	.05
Bulwer	.25	.25	.25	.25
California	2.00	2.05	1.70	1.85
Challenge	.25	.25	.25	.25
Champion	.25	.25	.25	.25
Chollar	1.30	2.10	1.80	1.90
Confidence	1.25	1.25	1.25	1.00
Con. Imperial	.10	.10	.10	.10
Con. Virginia	.10	.10	.10	.10
Con. Pacific	.10	.10	.10	.10
Crown Point	1.30	1.50	1.10	1.15
Day	.10	.10	.10	.10
Eureka Con.	5.50	6.25	5.50	4.50
Eureka Tunnel	.25	.25	.25	.25
Exchequer	.25	.25	.25	.25
Grand Prize	.25	.25	.25	.25
Gould & Curry	1.40	1.45	1.35	1.35
Goldstock	.65	.65	.65	.65
Hale & Norcross	6.25	6.50	6.12	6.37
Holmes	.15	.15	.15	.15
Independence	.15	.15	.15	.15
Julia	.15	.15	.15	.15
Justice	.20	.20	.20	.20
Martin White	.20	.20	.20	.20
Mono	1.75	1.80	1.75	1.50
Mexican	.90	1.00	.85	.85
Mt. Diablo	.25	.25	.25	.25
Northern Belle	.25	.25	.25	.25
Navajo	.60	1.45	.70	.65
North Belle Isle	.120	1.40	.120	.120
Occidental	1.25	1.40	1.25	1.35
Ophir	1.25	1.40	1.25	1.35
Overman	.35	.35	.35	.35
Potosi	.90	.95	.85	.90
Pinal Con.	3.00	3.15	2.80	3.00
Savage	3.00	3.15	2.80	3.00
Seg. Belcher	1.45	1.50	1.45	1.35
Sierra Nevada	1.45	1.50	1.45	1.35
Silver Hill	1.45	1.50	1.45	1.35
Silver King	1.45	1.50	1.45	1.35
Scorpion	.40	.40	.40	.40
Syndicate	.40	.40	.40	.40
Tioga	.40	.40	.40	.40
Union Con.	.85	.95	.85	.90
Utah	.80	1.00	.80	.75
Yellow Jacket	1.80	2.50	2.10	2.15

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Sept. 17.	500 Hale & Nor.	5.00
400 Alta	300 Navajo	.750
100 B. & Belcher	100 Overman	.300
50 Bodie Con.	500 Ophir	1.100
200 Bullion	800 Sierra Nevada	1.300
150 Bulwer	450 Sierra Nevada	1.100
450 Con. Va. & Cal.	200 Syndicate	.300
30 Chollar	200 Scorpion	.100
20 Confidence	100 Utah	.600
250 Gould & Curry	300 Yellow Jacket	1.800

In Ophir and Park Canyons, some 50 miles northwest of Belmont, there are practical evidences of a better future, but these are about the only sections in Nye county, Nev., in which there is any decided activity.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Redwood—Cargo prices are at present as follows: Rough, merchantable, 3/4 M ft., \$14.00; Rough, clear and surfaced, \$24.00; 1x10 Rustic, No. 1, \$28.00; 1x10 Rustic, No. 2, \$20.00; 1x8 V Rustic, No. 1, \$23.00; 1x8, tongued and grooved, \$23.00; 1x4, tongued and grooved, beaded, \$23.00; 2 in. x 3, Battens (board measure), \$30.00; Shingles, 7/8 in., \$2.00.

Pine—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft. lengths, \$10.00; do do to 60 ft., \$17.00; T and G Flooring, 1x8, \$28.00; do do 1x6, \$25.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain M and G Flooring, 1x6, \$30.00; do do do 1x4, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., 3 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:

Pine, Rough	\$15.00
" " No. 2	12.00
" " 2 in lengths	13.00
" " 40 to 50 feet lengths	10.00
" " 60 " 60 "	17.00
T. & G. Flooring 1 x 8	28.00
" " 1 x 6	28.00
" " 1 x 4	28.00
" " No. 2	21.00
Vertical Grain T. & G. Flooring, 1 x 6	30.00
" " 1x6, 1x4	32.00
Stepping	37.50
Furring, 1 x 2, per lineal foot	3 c.
Redwood, Rough	17.00
" " No. 2	13.00
" Surfaced	30.00
" " 1 x 8	28.00
" " 1 x 6	28.00
" T & G. 6 in. 12 ft. and over	28.00
" " 7 to 12 ft.	25.00
" " under 7 ft.	30.00
" Rustic	30.00
" " No. 2	25.00
" T & G. Beaded 12 ft. and over	30.00
" " 7 to 11 ft.	25.00
" " under 7 ft.	20.00

List of U. S. Patents for Pacific Coast Inventors.

[From the official list of U. S. Patents in Dewey & Co.'s Scientific Press Patent Agency, 252 Market St., S. F.]

FOR WEEK ENDING SEPTEMBER 8, 1885.

- 325,643.—STATION INDICATOR—M. Anthony, S. F.
 325,810.—MINERAL SEPARATOR, F.L.—A. G. Herbe, Los Angeles, Cal.
 325,782.—FRUIT DRIER.—Blatchley & Hatch, S. F.
 326,012.—HOSE PATCH.—S. T. Brooks, S. F.
 325,055.—PORTABLE SPOOL HOLDER—Edward Carlson, S. F.
 325,788.—MILL STOCK FEEDER—Geo. Cottrell, S. F.
 325,799.—SCREW PLATE.—B. Elmore, Shasta, Cal.
 325,792.—DISH WASHER—Sally M. Fenton, Salinas, Cal.
 325,840.—BAG BEATER, E.D.—E. W. Hough, Oakland, Cal.
 325,804.—CRUSHING MILL.—F. A. Huntington, S. F.
 326,042.—INKING PAD FOR HAND STAMPS—C. A. Klinkner, Oakland, Cal.
 324,840.—BALING PRESS—L. B. Lathrop, Hollister, Cal.
 325,681.—WATER FILTER—O. S. Linden, S. F.
 325,083.—LID FOR GAS STOVES—Sarah B. Long, S. F.
 325,054.—FRUIT AND VEGETABLE PRESERVING APPARATUS—L. H. Moore, S. F.
 325,866.—GLASS CASE FOR CLOCKS, ETC.—J. G. Schullweis, S. F.
 326,072.—DISCHARGE PIPE FOR DREDGERS—A. W. Von Schmidt, S. F.
 325,777.—FRUIT DRIER—B. A. Wright, Pasadena, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise,) at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

BALING PRESS.—Levi B. Lathrop, Hollister. No. 325,843. Dated Sept. 8, 1885. This patent covers improvements on former inventions by the same patentee. A number of details of construction are described which greatly improve the original design.

MILL STOCK FEEDER.—Geo. Cottrell, S. F. No. 325,788. Dated Sept. 8, 1885. The invention relates to that class of feeders used for delivering mill stock to rolls, purifying machines, etc., and the invention consists in the construction and in a combination of devices for making an effective machine.

DISH WASHER.—Sally M. Fenton, Salinas, Monterey Co. No. 325,792. Dated Sept. 8, 1885. The object of this invention is to provide a means for firmly holding the dishcloth and for wringing it effectively and conveniently. The cloth itself does not have to be handled, but is held in loops, which are capable of separation so that the cloth may be wrung.

SCREW PLATE.—Benton Elmore, Shasta. No. 325,799. Dated Sept. 8, 1885. This is a screw-cutting plate of novel construction. It consists of two parallel jaws or plates, having the adjacent faces grooved and formed so as to cut threads upon any bolt or piece of metal which may be inserted between them; the opposite end of each plate having transverse extensions, so that the plates may be opened or closed by the movement of the levers. Strong springs are so attached as to press upon the backs of the plates and force them together, and adjusting screws determine the spaces which shall be left between them while at work.

FIRE ESCAPE.—There is on exhibition at the Mechanics' Fair an ingenious system of fire escape intended to be attached to high buildings, which is the invention of O. Hanson, of Walnut Grove. A large working model has been made which attracts much attention. It represents the invention as attached to the highest building in New York. This invention consists of an elevator and ladder which may be attached to any building, at slight expense, for use at any time in case of fire. The occupants of any of the rooms, even the highest, may be removed in safety by means of this appliance.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- JARED C. HOAG—California.
 J. J. BARTELL—Sacramento and San Joaquin.
 A. C. KNOX—Nevada (State).
 G. W. INGLE—Arizona.
 E. L. RICHARDS—Los Angeles and San Bernardino.
 W. B. TURNER—Idaho and Montana.
 GEO. McDOWELL—Tulare, Kern and San Luis Obispo.
 HUGH ELIAS—Nevada Co.
 J. DE PUE, Colusa and Butte Co's.
 B. E. LEVY, Contra Costa and Stanislaus.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

The Pacific Rolling Mills.

The exhibit in the Mechanics' Fair, which most fully illustrates our mechanical advancement on this coast, is that of the Pacific Rolling Mills. All of the articles are of utility in railroad and building construction and similar work. There is nothing for mere ornament.

The main feature is of course the steel, which is a comparatively new product on this coast, but which, now that it can be obtained here in desired shapes, is coming into use in many forms in displacing iron. The Rolling Mills are now making a large number of various articles from this product. The steel made here is as good as any manufactured anywhere. They have spared no expense in procuring a first-class plant and skilled workmen, and are prepared to compete with other manufacturers in cast or rolled steel. Steel railroad rails are exhibited which have been twisted cold, so as to show the strength. Then there are steel axles for railroad trucks, locomotives, etc.; samples of all kinds of rails for steam and street railroads; large steel frogs; spikes of various kinds and sizes; railroad targets for changing switches; links and pins bent and doubled up cold, to show strength, etc.

There is also on exhibition a large double crank shaft made for the U. S. steamer *Adams* at Mare Island. It is specially noticeable for its beauty of finish. The shaft is made of the finest quality of wrought iron.

There are turn-buckles of different sizes, one of them weighing 1180 pounds. This is six inches in diameter, and was cut with tap and die, the taps and dies having been made at the mills.

Bolts from 3/16 up to any size required are made at these mills. Nuts of various kinds and qualities are exhibited, both punched and forged. There are eye-beams for girders of different dimensions, lag bolts, washers, large and small, quoits, wagon tires, angle iron, etc. There is one steel screw 2 1/2 inches in diameter and 20 feet long which was made with a die, and the thread is more perfect than if made on a lathe. This is for the new dry dock of the Union Iron Works. There are many rude forms made from rolled steel which are jumbled up, tied in knots, and all sorts of fantastic shapes. This is specially interesting as showing the strength and toughness of the material and its freedom from brittleness. There are several examples of heavy steel castings, in the shape of minions, etc.

The whole display is very tastefully made up, and is brilliantly lighted by the Pacific Coast Electrical Construction Co. (Keith's dynamo machines). The large sign of "Pacific Rolling Mills" is formed of washers. There is also a large star formed of lag bolts; a representation of a pair of calipers made of different sized washers; a pair of dividers formed of hot punched rivets, and a heart of the same things. Inside of this are samples of the different little steel forgings made at the mills. The credit of the fanciful arrangement is due to W. C. Wilcox, who has charge of the display. He has made it attractive and artistic, and especially so when the character of the materials is considered. The whole exhibit is very creditable to the mills and to San Francisco.

A Handsome Premium.

The publishers of this paper have had printed on fine paper and handsomely bound, a neat little volume, entitled "A Beautiful Poetic Review and Friendly Offering." It was written by Dr. J. R. Bradway, orator of Oakland Council, American Legion of Honor, and read in short sections by the author at different meetings, eliciting much praise from his listeners. The work is embellished with fine lithographic portraits of several noted poets whose writings are mentioned in the work. We believe the book will prove a pleasant and attractive keepsake in every family—it can be so readily taken up and read at leisure moments may occur. It will be mailed for 25 cents to subscribers (old or new), upon paying 12 months in advance for this paper. Or to those who pay one year and three months in advance we will send this beautiful souvenir free, postpaid.

Lost Papers.

If any subscriber fails to receive this paper promptly after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscriptions up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz:

- | | |
|--|-----------------------------|
| 1. World's Encyclopedia, 791 pages, with 1,200 illustrations, worth \$1.75. | Postpaid for 50 cts. |
| 2. Patent Binder (cloth cover) with metal of this paper in gilt. | Postpaid for 50 cts. \$1.00 |
| 3. To New Subscribers, 12 select back Nos. of the MINING AND SCIENTIFIC PRESS. | Free .75 |
| 4. Any of Harper's first class periodicals, 15 per cent less than regular rates. | |
| 5. Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates. | |
| 6. Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates. | |
| 7. Picturesque Arizona, 380 pages, in cloth and gilt. | Postpaid for 25 cts. 1.25 |
| 8. Californian, 100 pages, Magazine, 1880 to 1882 (5 Vols.) single Nos. | Postpaid for 3 cts. .35 |
| For volume, unbound, 5 Vols., Postpaid for 20 cts. | 2.00 |
| For volume, bound, cloth back and stiff paper sides. | Postpaid for 40 cts. 2.50 |
| 9. Picturesque California Homes (40 building plans and estimates). | Postpaid for \$1 3.50 |
| 10. Dewey's Patent Newspaper File Holder (18 to 30 inch). | Postpaid for 25 cts. .50 |

NOTE.—The cash must accompany all orders. If too much is sent for any article or publication, the balance will be returned immediately. Address this office, No. 252 Market St., S. F.

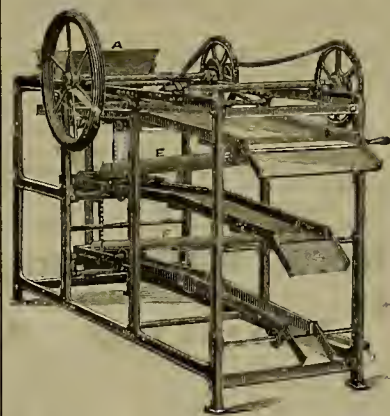
P. S.—No. 11 is really a valuable premium to newcomers and others who appreciate the better class of stories and a good standard of California literature.

- | | |
|---|---------------------------|
| Webster's Dictionary, 631 pages, with 1,500 illustrations. | Postpaid for 50 cts. 1.50 |
| Grant Lithograph, size 24x19. | Postpaid for 50 cts. .50 |
| Cleveland Fine Steel Plate, size 12x18. | Postpaid for 10 cts. .50 |
| Grant Steel Plate, cabinet size. | Postpaid for 5 cts. .25 |
| De Groot's History of Mining in California. | Postpaid for 5 cts. .25 |
| Beautiful Poetic Review, a handsome, entertaining and instructive souvenir of real merit. | Postpaid for 25 cts. .50 |

Send for any further information desired. Readers will please inform their new neighbors and others concerning our paper and these offerings. On application, sample copies of this paper will be mailed free to the address of any persons thought likely to subscribe.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans or quicksilver used. Frano all rollable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.

Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.



FLOUR AND OTHER MILLS.
Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

L. PETERSON,
INVENTORS. MODEL MAKER,

253 Market St., N. E. cor Front, up-stairs, S. F. Experimental machinery and all kinds of models, tin, copper and brass

Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street, Elevator, 12 Front St., S. F.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

Iron and Machine Works.

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Coeks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henriksen's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all Kinds at Greatly Reduced Rates.

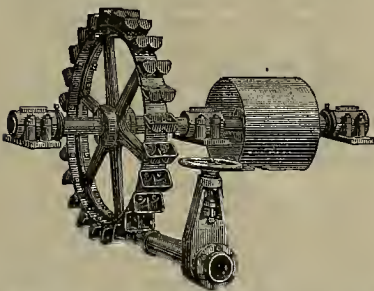
STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90.2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

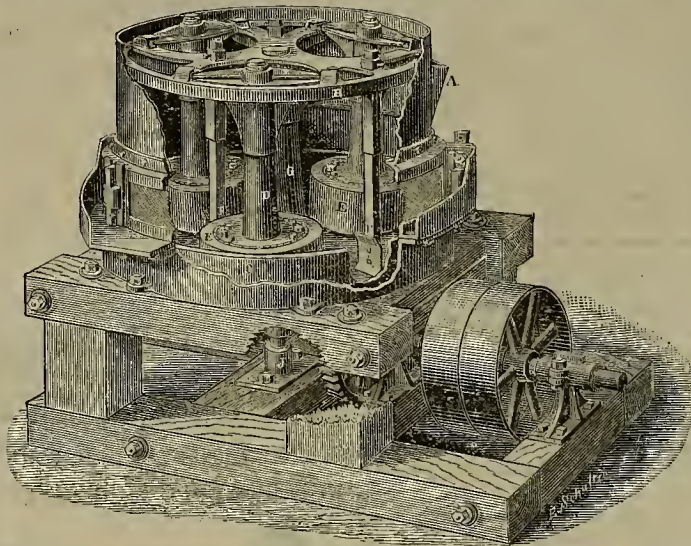
This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,

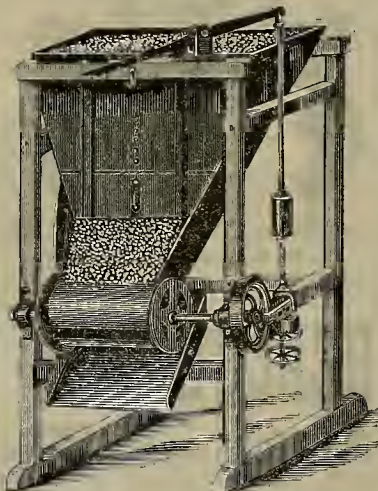
45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.

THE ROLLERORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required. In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, SAN FRANCISCO, CAL.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

— FOR —

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
— 1883 —
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and
Engine Works
22 Fremont Street,
SAN FRANCISCO.



"ACME" DRAWING PAPERS

QUEEN & CO'S

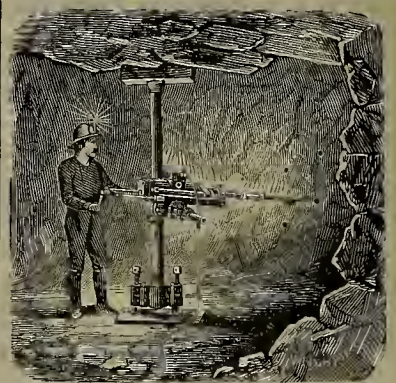
PROFILING and CROSS SECTION PAPERS



Extra Fine
Swiss
Instruments

QUEEN & CO'S Improved TRANSITS and
LEVELS, TAPES, CHAINS, RODS, RULES,
and Drawing Materials of every description. List and
description of our Ten Catalogues sent on application.
JAMES W. QUEEN & CO.,
924 Chestnut St., Philadelphia.

DEWEY & CO.'S SCIENTIFIC PRESS PATENT
Agency is the oldest established and most successful on the Pacific Coast. No. 252
Market St., Elevator 12 Front St., S. F.



INGERSOLL ROCK DRILLS

.....AND.....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
Ports, will do 20 per cent more work than
the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

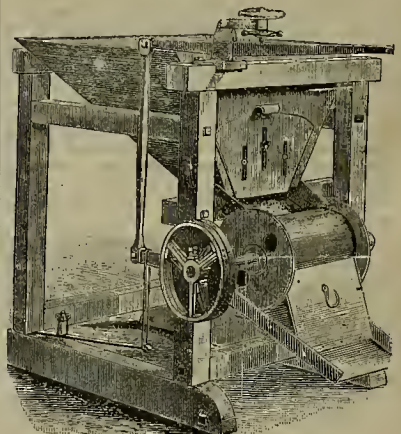
BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



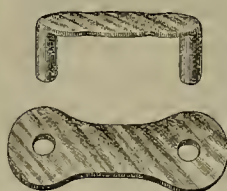
This form of Ore Feeder is well adapted for its peculiar
work.

Manufacturers of the Celebrated "Chal-
lenge" Ore Feeders for any character of
ores; also "Stanford Improved" Ore
Feeders and Tullock's Ore Feeders for
dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco.

Smith's Patent Belt Fasteners.



Are positively un-
equalled for fastening
Leather, Rubber,
or Cotton Belting.
THE ONLY FASTENER
that will run under
tighteners, on patent
rolls in flour mills, and
Electric Light machines.
Easier to apply
than Lacing and
far more Econom-
ical.

Patented Sept. 20, 1881; Aug. 15, 1882; June 16, 1884.

PRICE LIST.

No. 1—For large drive belts, per box of 100.....\$2 00
No. 2—For Cotton drive belts, per box of 100..... 1 75
No. 3—For Rubber drive belts, per box of 100..... 1 50
No. 4—For single Leather belts, per box..... 1 25
Combination Punch with guides and nippers..... 1 25
Reamers for taking fasteners out..... 35
TRY THEM! They will save you loss of Time,
TEMPER and MONEY. Manufactured by

H. D. EDWARDS & CO.,

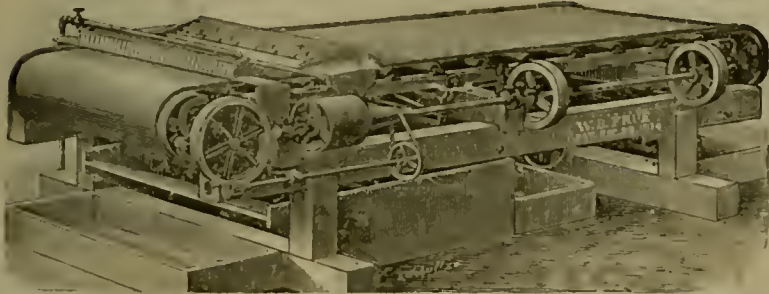
Nos. 16, 18 and 20 Woodward Ave., DETROIT, MICH.

Manufacturers of Oak Leather Belting, Agents for J.
B. Hoyt & Co., N. Y. Belting and Packing Co., Eureka
Fire Hose Co., Cotton Belting Mill Supplies. FOR SALE
BY Dunham, Carrigan & Co., San Francisco, Cal.

California Inventors

Should consult
DEWEY & CO.
AMERICAN
AND FOREIGN PATENT SOLICITORS for obtaining Patents
and Caveats. Established in 1859. Their long experience as
journalists and large practice as Patent attorneys enables
them to offer Pacific Coast Inventors far better service than
they can obtain elsewhere. Send for free circulars of infor-
mation. Office of the MINING AND SCIENTIFIC PRESS and
PACIFIC RURAL PRESS, No. 252 Market St., S. F. Elevator,
12 Front St.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1880, Dec. 22, 1874, Sept. 2, 1870, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street, - - - SAN FRANCISCO, CAL.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Barbed Wire. Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Bars.

WIRE CLOTH. Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.
J. O'B. OUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

PATENT

LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning
and Salivation

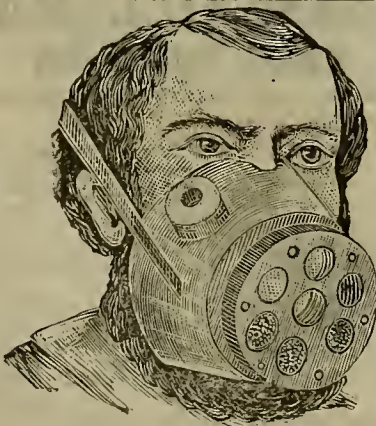
The most perfect appliance for people engaged in Smelting, Dry Crushing, Gnuam Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn. The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chests, Cement and Sluit Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Out and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (inch).

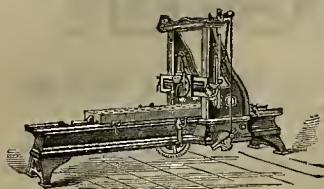
Orders Promptly Executed.

DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



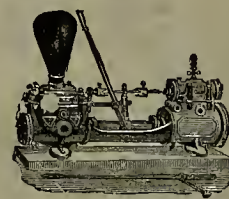
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

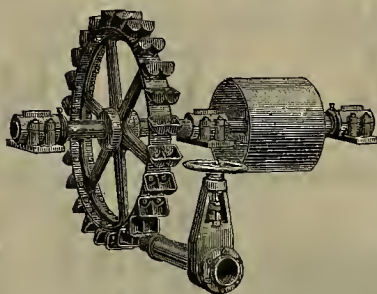
Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.

SEND FOR CIRCULARS.

**PELTON**
HURDY-GURDY WATER WHEEL.

SOLE AGENTS FOR

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Leffel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.

**JOSHUA HENDY MACHINE WORKS,**

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street, - - - - - San Francisco, Cal.

MANUFACTURERS OF

NEW and Dealers in **SECOND-HAND BOILERS, ENGINES and MACHINERY**
OF EVERY VARIETY.

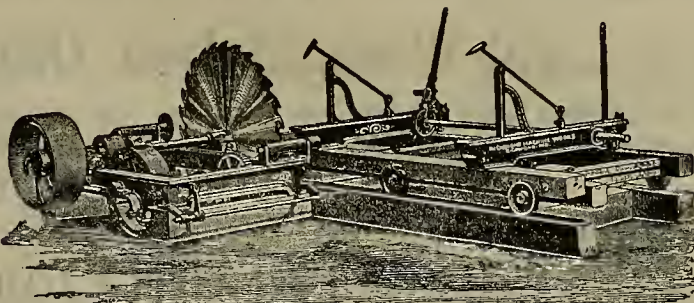
Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER AND RUBBER

BELTING.

IMPROVED SINGLE AND DOUBLE CIRCULAR SAW-MILLS.

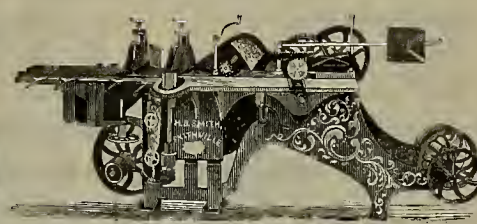
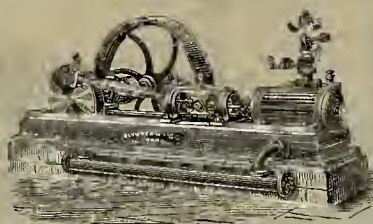
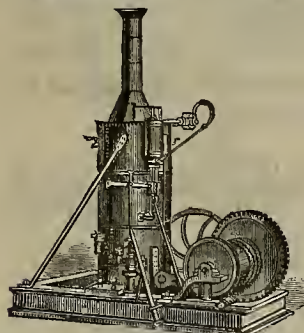
SHINGLE MILLS.

STATIONARY, PORTABLE,

.....AND.....

Hoisting Engines

.....AND.....

BOILERS.**WOODWORKING****MACHINERY,**

.....COMPRISING.....

Band Saws,

Stickers,

Planers,

Shapers,

Etc., Etc.

MINING, QUARTZ, AND SAWMILL MACHINERY.**AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.**

Agents for the Sale of BAKER ROTARY PRESSURE BLOWERS, AKRON (Ohio) HOT-POLISHED SHAFTING, WILBRAHAM ROTARY
PISTON PUMPS, BLAISDELL & COMPANY'S MACHINISTS' TOOLS.

JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO. San Francisco, Cal.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

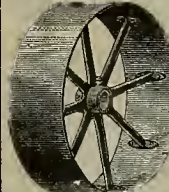
Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington
Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and
Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street - - - SAN FRANCISCO, CAL



PAT. OCT. 25, 1881.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 26, 1885.

VOLUME LI
Number 13.

Sediment Collector and Water Purifier.

The engravings on this page show Spaulding's patent sediment collector and water purifier for boilers. As a result of two days' experiment with this device recently, it was found that they evaporated 1008 gallons of water with 1250 pounds of screenage that cost \$6 per ton. With another kind of coal screenings costing \$3.50 per ton, they evaporated 1050 gallons of water with 1725 pounds. These are very remarkable results.

The engravings show the details of the apparatus. *A* is the front boiler. *B*, side wall of furnace and shell of boiler broken away to show boiler and tubing. *C*, smoke from furnace passing under boiler and through tubes, *D*, up through flue to chimney in the rear. *E*, hot water supply pipe passing into boiler under the flues in boiler, and returning far enough or water to obtain sufficient heat to separate all lime and sediment from the water while in the pipe before being emptied into sediment collector, *F*, then flowing up into the boiler in a pure state, thus preventing the boiler from being encrusted. Under these conditions the boiler is opened only once in six months for cleaning. In a boiler set this way steam rises from 30 to 50 pounds during the night, the machinery being ready to run in five minutes after arrival of engineer.

G is the steam pipe for blowing out the hot water feed pipe, *H*, which is made of two inch pipe cut in pieces about four feet long, so they can be taken out and cleaned by being slightly heated, which it is necessary to do about every two years, if the water is very dirty.

I shows the system of pipes connecting the boiler and sediment collector, *F*, put together by means of flange couplings below the grate bars. By means of these pipes it is claimed that they gain one-third more fire space, or in other words, make about one-third more steam with a given amount of coal than by the old way of setting up a boiler. *J*, blade inside of sediment collector for stirring up sediment so it will blow out of collector into sewer when valve is opened. *K*, grate bars, set thirty inches below boiler. *L*, blow off pipe from sediment collector. *M*, steam pipe to engine. *N*, space four inches between boiler and brick-work on each side, and ten inches over top of boiler formed by an arch over boiler leaving a chamber for heat from furnace, it being closed at each end of boiler down to water line to prevent any draught or blaze over steam space of boiler, thus equalizing the heat on all parts of the boiler. *O*, back pressure check-valve to prevent water from flowing out of boiler when steam is blown through hot-water feed pipe for cleaning it.

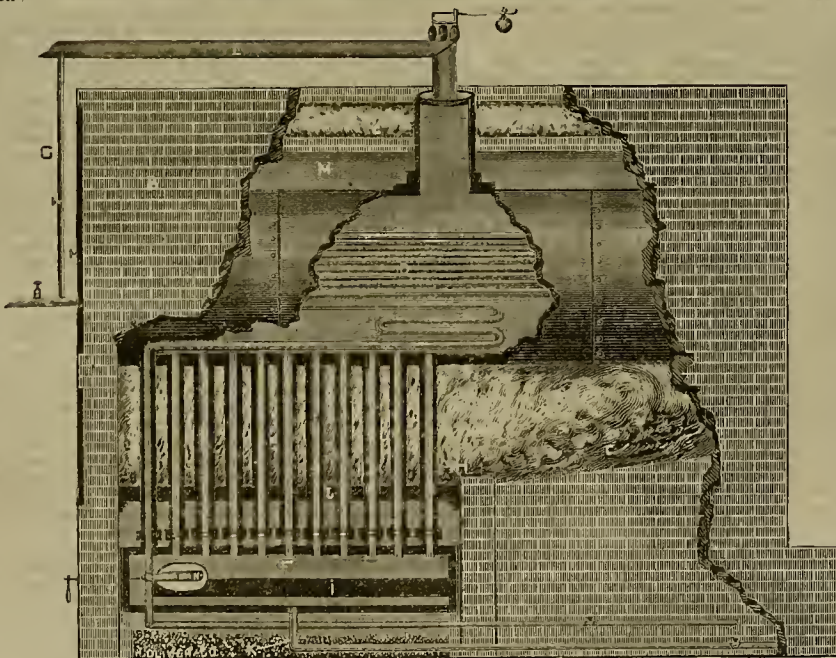
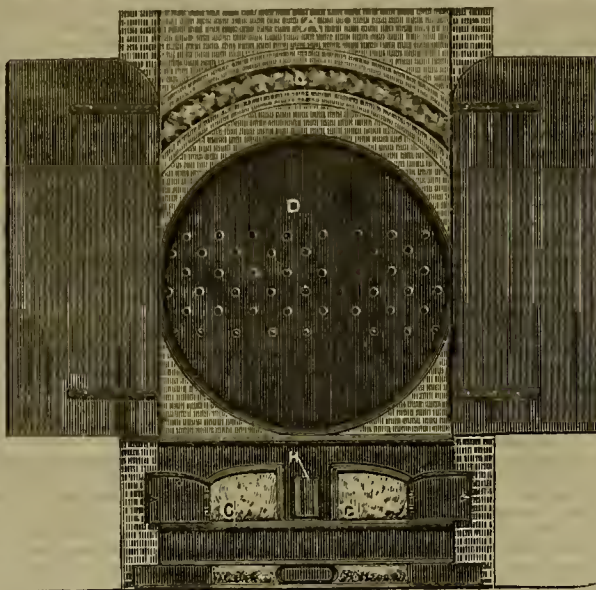
Mr. J. Spaulding, 335 Tehama St., in this city, is the inventor of this plan. He refers to Wm. McAfee & Son, boiler makers, 210 Spear St., who have knowledge of the results accomplished by it.

GREAT activity is reported along Snake river, and especially along the bar between the upper and lower Salmon falls. On this bar about 100 men are at work, most of them for a New York company. A ditch two miles long, carrying 3000 miner's inches of water, has been built by a New York company.

Russell Process in Calaveras County.

West Point, Calaveras county, is a district that has been neglected, but a correspondent writes us that it will at no distant day come to

The roasting is being done in a chamber shaped like an assayer's muffle, open at both ends. The ores, when roasted, are worked by amalgamation in a pan, and are said then to realize 97 per cent of fire assay. For the successful



SPAULDING'S PATENT SEDIMENT COLLECTOR AND WATER PURIFIER.

the front once more as a bullion producer. The ores are base and require special treatment. At and near the surface the gold was free, from the decomposition of the sulphurets, but on reaching the water level the mines were generally abandoned. Strange as it may seem, there never have been chlorination works there. Mr. Russell, of the Russell Reduction & Mining Company, has erected works for his process at West Point. The plant is of about 15 tons' capacity, and excellent work has been done up to the time the water failed, this being an unusually dry season.

reduction of these base ores the Russell process is expected to solve the problem. The ores when roasted can be worked by either the pan or by chlorination, as the mine owner chooses; but the pan does all that can be expected or required. When there are tellurides, the furnace gold product, owing to the peculiar construction of the furnace, in not volatilizing the gold that is held in combination with tellurium, will, it is claimed, be in excess of the fire assay. One mine which our informant examined contains a very large percentage of very base sulphurets, and the gold could not amalgamate

in the ordinary way. Mr. Russell built a small furnace at the mine for roasting the ores, and the result was that the gold was easily amalgamated without further manipulation.

New Ore Mill.

Wm. C. Stiles, of this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a crushing and grinding mill for ores, etc., in which there are conical corrugated disks mounted on parallel shafts, two cones being placed back to back upon one shaft and revolving between two other conical disks mounted on the other shaft, so as to revolve close to the faces of the double cone.

The frame has boxes on the side for the shaft upon which are fixed disks having conical faces, the apexes of which converge towards the shaft. Upon these conical-faced disks are fixed sections, the inner faces of which are ridged or corrugated to form grinding surfaces.

The other shaft has also disks with corrugated sections similar to those described; but on these the apexes of the conical faces diverge from each other as they extend toward their shaft and their bases are close together. The disks are sufficiently separated to allow the double cone upon the other shaft to fit between them. The angles of the conical faces being the same it will be manifest that those upon the latter described disks will fit between those upon the other disks, the contiguous faces running parallel with each other.

In order to prevent the ridges on the grinding surfaces from coming into contact with each other, if the cones should be adjusted so as to touch, narrow flanges are formed around the exterior and interior edges of the grinding sections, and a little higher than the corrugations, so that these flanges will touch and prevent the corrugations from rubbing against each other.

The grinding sections are preferably formed of steel, and are so secured by bolts that they are removable and changeable. The boxes in which one of the shafts turns have lugs which pass down through slots in the frame and through holes in rods or bars beneath to which they are secured. These bars or rods extend horizontally beneath the frame and through holes in its end, by which they are guided and held in place. Strong springs act upon the ends of the bars which project beyond the ends of the frame, and thus draw them with the boxes and the double-cone toward the cones between which it travels. If any hard, unyielding substance should pass between the cones the springs would allow them to separate until it passed.

Material is fed into a hopper and discharged from it between the contiguous surfaces of the cones and is discharged, as ground, below. A pulley communicates motion to one shaft and its cones, while the other cone, is driven by the friction created by the passing material, or by direct gearing, if desired.

THE Pennsylvania mine, Jackson Creek mountains, Nev., will soon have a 10-stamp mill, which is being moved from South Mountain to Big Creek, near the mine.

THE hydraulic miners at Osceola, Nev., only average about two hours' work a day, on account of scarcity of water.

Discovery of Californian Gold.

Address Delivered Before the Society of California Pioneers, Sept. 9, 1885, by John S. Hittell.

Mr. President and Fellow Pioneers:—At this celebration by our Society of the 35th anniversary of the admission of California as a State into the Union, in accordance with the invitation given to me by the committee of arrangements, I am to address you in reference to the discovery of the gold deposits of the Sierra Nevada. The subject is appropriate for the occasion, because of the recent death of Marshall, and of the comments made upon it by many newspapers on both sides of the continent. I shall give a narrative of the main facts of the discovery, consider to whom it is due, and his measure of credit, and say something about the manner in which he has been treated by the Government and people.

The end of a notable man's life—and Marshall was so notable that his name is an imperishable part of the history of California—makes an epoch in local events. It revives and strengthens public curiosity about him, and calls for a review of his achievements. People then take an interest in biographical details which, at other times, would seem trivial. Then it first becomes possible to close the account of his credits and discredits, and state the final results with the certainty that they will not be changed by any subsequent action on his part.

A native of New Jersey, born in 1812, James Wilson Marshall had a mind, active but not very well balanced, a moderate education, a healthy, strong and well proportioned body, much energy and industry, and the handicrafts of carpenter and wheelwright. When a young man he moved to Missouri, where he spent several years before starting in 1843 for California by way of Oregon. He spent a winter in the valley of the Willamette, and in the spring of 1845, continued his journey by land, until he arrived at New Helvetia, which was then the chief settlement of white men in the Sacramento valley, situated at the point where immigrants coming to California by way of the Humboldt river first reached the navigable waters of the Pacific, and where boats ascending the Sacramento river from the bay found the first house and land above the level of frequent winter floods. At this advantageous position John A. Sutter, a native of Baden but of Swiss parentage, had established himself and erected several adobe buildings, surrounded by an adobe wall. The Americans generally called the place Sutter's Fort. The proprietor had made friends with the surrounding Indians, and all, within many miles, considered themselves his servants, and were ready to work for him in peace and fight for him in war. He had herds of horses and cows; he cultivated much land, mostly in wheat, and he had a store where all the staple articles consumed in the vicinity could be purchased. He was the earliest settler in the Sacramento valley, and for more than ten years was its richest man.

Marshall sought and found employment at New Helvetia as a carpenter, and remained there till the outbreak of the Bear Flag insurrection, when he joined the Americans in arms until they disbanded, to accept the welcome authority of the United States. Then he served in Fremont's battalion until the spring of 1847. Returning to New Helvetia he found that Sutter was anxious to erect a saw-mill. For more than a year the only supply of lumber at the fort had been furnished by the whipsaw of Baptiste, a Frenchman at work in the Sierra Nevada about 50 miles away; but it was unequal to the demand for the completion of a flour-mill, which Sutter had commenced at Brighton on the American river. This was to be finished before the harvest of the next year, when, it was confidently expected, a large immigration would arrive by land, and the number was to increase every year. The newcomers would generally settle in the Sacramento valley and obtain their supplies at New Helvetia. But even if they should not be so numerous as was anticipated there would always be, as there had been, a good market for flour, which Sutter could furnish as cheaply as any rival, since he had the land, the laborers, the oxen and the plows, and he would even have the mill.

To him in June, 1847, Marshall made a proposition to become his partner in the saw-mill enterprise, taking charge of the construction and management. The offer was accepted, and one stipulation of the agreement was that if California should remain under the dominion of Mexico, land at and near the mill should belong to Sutter, who had been naturalized under the Mexican law; but if the territory should finally become part of the United States, then Marshall, as an American citizen, should be the proprietor. The lumber produced, or its price, was to be shared between the partners, no matter in whose name the title should stand. This stipulation was perhaps suggested by Sutter, who feared that his property, as a Mexican citizen, would be confiscated by the conqueror, if the United States should retain the country. The traditions of European warfare, as known to him, did not lead him to anticipate the generous clause of the treaty of Guadalupe Hidalgo, promising full protection to the property rights of the Mexicans in California; and if he had anticipated it, he could scarcely have foreseen how its obligation would have been disregarded.

The enterprise was to be soon commenced,

so, without delay, Marshall started out to find a suitable place, which must be in the mountains, for the wood of the valleys was crooked and brittle. By Sutter's advice he first went to the canyon of the Cosumnes, but an examination of it proved that the water power needed could not be procured there without great expense. He crossed the intervening ridge to the American river, and there at Coloma found the desired combination of timber, power and convenient accessibility by wagon from New Helvetia, which was to be the only market for the lumber. Large yellow pine trees were abundant in the vicinity; a valley a quarter of a mile wide and half a mile long offered a route for a race with sufficient fall, and a site for the mill high enough to be secure from floods, and a distance by wagon route of not more than 50 miles from Helvetia, which was near enough for the purpose. The valley, and the gentle slopes of the surrounding hills contained much tillable soil, which has since come into cultivation, and afterwards Coloma was one of the first places in the Sierra Nevada to become noted for its vineyards and orchards. If instead of a site for a saw-mill, Marshall had been seeking a beautiful mountain home accessible by wagon from New Helvetia, he could not have made a better choice. Among the numerous pleasing productions of the landscape art in our State, one of the most interesting, as well as most truthful to nature, is Charles Nahl's view of Sutter's mill, made from a sketch taken in 1851, by his brother Arthur, and painted in duplicate. Many features of the scene, including the form and color of the hills, the character of the vegetation, and the bright mountain sky, are the same now as they were 36 years ago.

We have no direct evidence that Coloma had ever been seen by any white man before Marshall. It is not on any route of travel used then or since, across the Sierra from the mouth of the American river. Before 1847, other Americans, possessing some skill as lumbermen, had gone from New Helvetia into the mountains searching for a saw-mill site accessible by wagon, and had returned with the report that none could be found. The credit of the discovery and selection belong exclusively to Marshall.

The work began in August. Marshall had taken with him seven white men, including P. L. Wimmer and John Scott, besides ten Indians from the fort. The only white woman in the party was Mrs. Wimmer, who was to cook for the white men. The little colony was isolated. It had no visitors or excitements. All the white men were toilers, and their relations with the Indians of the vicinity were most amicable. Their work advanced steadily, until the 19th of January, 1848. The mill had been erected, the race had been dug, and the water had been turned in. The tail race was, however, not deep enough; the water, instead of running away from the wheel, backed up under it and thus diminished the power. The tail-race could have been deepened by shoveling, but Marshall thought it would be cheaper to let a strong current run through and wash out the sand and gravel, and for this object, the water was turned on at night. No note was taken of the date at the time, but afterwards Marshall thought it was the 19th, and certainly not before the 18th, nor after the 20th of January, when walking along the bank of the tail-race to see what effect the water had had during the night, his attention was fixed and his curiosity excited by some particles of bright yellow color in the race, where the water was perhaps six inches deep. He picked up one. It weighed about the fortieth of an ounce, worth 50 cents, and was of a metallic nature. He wondered whether it was gold; he had read that pyrites is the only mineral resembling gold in a state of nature, and that it can readily be distinguished from the precious metal by its want of malleability. He put his little specimen on a cobblestone, and beating it with another stone saw that it was highly malleable. Of an excitable disposition, and much influenced by first impressions, he was fully convinced that he had found gold, and anxious to communicate the good news to others. He was alone at the time, and he hastened back to the mill and told William Scott, the first man whom he encountered, of his luck, and the others were soon afterward informed. Mrs. Wimmer happened to be boiling soap that day, and she threw the piece into her soap-pot and it was afterward tried with vinegar, but as neither test led to the formation of any verdigris, the general opinion in the camp, at first unfavorable to the gold theory, turned in its favor. Every day Marshall became more sanguine, and every day the men walked along the race to pick up the gold exposed by the washing of the water, and in a few cases loosened a little of the gravel by digging.

On the fifth day after the discovery, having collected several ounces of specimens, Marshall, too much excited to work quietly at a saw-mill, started off on horseback to tell the good news to his partner. Sutter tested the metal with nitric acid, weighed it in and out of water, declared that it was undoubtedly gold, and expressed his readiness to go the next day to the mill. Then for the first time he saw Coloma. He looked at the race, picked up some of the gold, and requested all present to keep the discovery to themselves. He feared that an excitement would disturb the business of the saw-mill, and not only deprive him of the profits which he hoped for it, but also prevent the completion of his flour-mill, to which he attached great importance. He thought

that the lumber for his other mill could be sawn within six weeks, and for that brief period, at least, they ought to keep the secret. All promised, or at least none made any objection to accede to his request, nor was there any good reason why they should not. Sutter had been a kind employer to them and it would have been unfair to leave his enterprise incomplete, for the mill was not yet in running order. Besides, not one of them had any experience in gold washing, or knew the extent of the auriferous deposit, or could clearly foresee a profit for himself in the abandonment of his occupation, with its regular and certain wages. The men then at the mill, and hired by the firm of Sutter and Marshall, were Charles Bennet, Wm. Scott, P. L. Wimmer, James Bargee, Alexander Stephens, James Brown, Ezekiel Parsons, Henry W. Bigler, Israel Smith and Wm. Johnston. These, with Marshall, were the only white male adults, and so far as known all are now dead except Mr. and Mrs. Wimmer, living at San Diego, and Mr. Bigler, at St. George, Utah.

Sutter returned to New Helvetia and the saw-mill work at Coloma went on as before, though every day a search was made in the race for gold. It had no definite market value yet, but as it accumulated, the men began to think of using it in making purchases. About the middle of February one of the mill laborers went to Sutter's Fort and offered it there as money to a trader, who at first thought his customer was crazy, and at last, having consulted Sutter, accepted the new currency. About the end of February, when the six weeks of secrecy solicited by Sutter had nearly expired, Charles Bennet went to San Francisco, which was already the chief commercial center of the territory, for the purpose of learning whether the Coloma metal would be accepted there as gold and if so, what it was worth by the ounce. The watchmakers said it was gold, and they bought it. Of the price paid to Bennet we have no information, but then, or not long afterward, Mr. Russ, after whom the Russ House was named, obtained dust at \$4 an ounce, though it was worth about \$19 in New York.

Before Bennet had disposed of his gold in San Francisco, he met Isaac Humphrey who had been a placer miner in Georgia. Immediately upon seeing the Coloma specimens, he declared that their large size and the circumstances under which they had been collected implied that the diggings must be rich and extensive. He tried in vain to induce some of his friends to go with him to the new gold field, but they had no faith in his opinion, so he and Bennet went alone.

On the 7th of March they arrived at Coloma. The work at the mill was going on as usual. Nobody there was engaged in mining, or knew how to use a pan or rocker. The next day, having tried several places with a pan and got good prospects, Humphrey made a rocker and began to wash the auriferous gravel. The laborers at the mill had heard that he was an experienced gold miner, and they watched him with interest. The implements required were made so easily, the methods of procedure so simple, and the results so large that the mill work was very much disturbed, but was not abandoned, partly because Marshall had the only provisions, wagons, horses, oxen, tools and other necessaries of life; and it was foreseen that if there was much mining, there would be a demand for lumber to make houses and fences. On the question of the richness of the gold deposit and its influence in attracting people, Humphrey spoke emphatically. He said there had been great excitements in Georgia, but that State had no placer that approached Coloma in richness. Four days later another man who had had experience as a gold miner, made his appearance. This was Baptiste, the Frenchman, long a resident in Mexico, who for the last two years preceding his visit to Coloma, had been employed by Sutter to saw out lumber by hand. He agreed with Humphrey that the diggings were wonderfully rich, and he, too, at once began to work with a rocker. The zealous application of these two men to their toil, each working by and for himself, was a strong confirmation of their opinions as expressed to all inquirers, and thus gold mining started in the Sierra Nevada, spreading slowly at first, but after a few weeks filling the whole territory with its excitement.

In the beginning of the year 1848, California had two newspapers, both weeklies, published at San Francisco, the *Californian* and the *California Star*. The former made the first printed mention of the discovery on the 15th of March in a paragraph of a few lines, stating that gold had been found at Sutter's mill, and that a package of it worth \$30 had been taken to New Helvetia. The reporter had evidently not seen Bennet, who arrived at the bay a fortnight before, nor heard of the dust sold there by him. The *Star* of March 18th followed its rival in mentioning the discovery, but gave no additional information, nor was any worthy of note obtained before the middle of April, when the *Star* said that its editor was about to take a trip to the country, and would probably report his observations on his return. Although the newspapers did not say so, orders for tools and provisions for the placers must have arrived at San Francisco, and probably letters from Humphrey and others, urging friends to come and share the wonderful harvest of the precious metal; and the recipients of this advice, hesitating to close their shops and leave their families, thought it would be well to have journalistic confirmation of the reports. Some of the

messages from Coloma must have come from Mormons—most of the men hired by Marshall were of that faith—to Sam Brannan, the chief representative of their church in San Francisco, the owner of the *Star* and one of the leading business men of the village. In announcing his rural trip, Edward C. Kemble, the editor of the *Star*, said nothing of his destination or of the gold, and his silence upon these points suggests a fear that he might be laughed at for going off on a wild-goose chase. He went to Coloma, where Sutter and P. B. Reading were with him, and they probably accompanied him from New Helvetia. He saw so little or understood so little of what he saw that he made no report in his newspaper of his trip or his observations, and contented himself with a simple statement in the *Star* of May 6th that the editor had returned. No expression of his opinion of the mines escaped from him until the 20th of May, when he said that a fleet of launches left San Francisco on the 14th and 15th of the month, laden with "superlatively silly" people who had gone off with the supposition that the gold mines were so rich and extensive that 2,000 men could find room to each dig two ounces a day; and he added, "we believe the reputed wealth of that section 30 miles in extent all sham." How can anybody accept the doctrine of journalistic infallibility after such a mistake as that?

Kemble's blunder, however, was not very astonishing. He was a young man, unacquainted with mining. Shallow placer washing, as then conducted at Coloma, makes little impression on the mind of the inexperienced observer, who sees a dirty man rocking dirt in a dirty cradle, into which he pours dirty water with a dirty dipper, occasionally stopping to mash the lumps of clay in the hopper with his hands or to rake out the larger stones from the muddy mass with his fingers. The sight does not fill the aesthetic eye with delight, especially when the miner conceals the result of his toil from the spectator, as he can without difficulty, and as he nearly always does, from motives of prudence. The concentrated sand taken from the bottom of the rocker is put to one side until after the departure of any visitor who shows a meddlesome interest in other people's business, and if the diggings are good, panning out, reserved for the exclusive enjoyment of those entitled to participate in it, is the pleasantest part of the day. Many of you, my fellow pioneers, remember it with satisfaction; you delight in recalling those golden days, unsurpassed in their wonders and excitements by anything recorded in history or invented in fiction, probably never to be repeated in actual life and ever to be preserved in fond memories while we live.

Mistakes like those of Kemble's were not limited to inexperienced men. In 1849, every auriferous district had miners who declared that all the rich ground in the vicinity had been taken up or worked out; that there was no chance for a new-comer to make a living. I often met and heard of such men: In the beginning of October, 1849, a party of raw immigrants who had just arrived overland, going to Reading's Diggings, as the placers in what is now Shasta county were then called, camped for the night on the bank of Cottonwood creek, and soon afterwards saw several wagons, with six or eight men coming from the mines, stop near by. After supper the new-comers went in a body to the other camp to get information. The accounts given to them were of the most dismal description. The diggings were exhausted; the miners generally were not making expenses and were staying in the hope of finding something better; the stock of provisions was insufficient for the winter and the approach of the rainy season would render it impossible to get more before spring; the few rich claims would be worked out within a month and starvation or great misery was inevitable. Questioning elicited much variety of opinion among the party on minor points, but they agreed that they were all disappointed in Reading's Diggings, that the rich ground was small in area and all occupied, that it would be impossible to obtain additional food supplies after the rains came, and that they were glad they would get to the Yuba, where the mines were rich, before the roads should become impassable. After the immigrants had obtained the information, they returned discouraged to their own camp, and for several hours seriously discussed the question whether, though only two days from Reading's Diggings, they should not turn back and seek their fortune elsewhere. They did not doubt the sincerity, the laborious habits, or the sobriety of their advisers, but others equally as honest and perhaps as well-informed, had expressed different opinions, and they determined to go on. The result was that though their labor for the first week were very unprofitable and discouraging, they soon found that the district was rich and abounded with gullies, bare flats and hillsides where the miner could average two ounces a day. The diggings were shallow, the returns were immediate; the gold was evenly distributed over a considerable territory, water was abundant, and there was no lack of provisions, though beans, bacon, flour, dried apples, coffee, sugar and rice, which were the chief articles of food, were sold at the uniform price of \$2 a pound. This high figure did not incommode our party—I was among them—for we had sent a wagon to Sacramento for a winter's supply, and besides could eat beans at \$2 pound with satisfaction when we were taking out two ounces a day.

(Concluded next week.)

MECHANICAL PROGRESS.

Hints on Welding.

A correspondent of the *Wheelwright and Blacksmith* furnishes that journal with the following hints on welding:—Iron-work should always be laid down by the smith red hot, and allowed to cool gradually, and not be cooled suddenly by immersion in water, as it then assumes a crystalline form to a very great extent. But if it is necessary to cool the iron in order to forward the work, it should be made red hot the last thing, and allowed to cool, so that the molecules of the iron shall again assume their normal condition and position, before being strained and tested by work.

It has been said that sand is used as a flux, but whether it is of any use in assisting the iron to assume the semi-fluid state necessary for welding, I am myself rather doubtful, as I know several smiths who never use sand, and I have frequently made good sound welds without its aid, and have not experienced any difficulty. For myself, I find it useful for the purpose of enabling one to get two pieces of iron to be welded about the same heat, for sometimes I find that one piece of iron will get heated quicker than the other, maybe by reason of difference in their sizes, or their position in the fire, and by plunging the hottest piece into the sand, it immediately loses some of its heat by imparting it to the sand, but whether it can be called a flux in the same sense as spirits of salts or resin is to solder, or borax to brass, or limestone to iron ore, I am not aware, but my belief is that it is not.

Steel, though analogous to iron, is more of a composition, as I mentioned before, and the carbon which it contains makes the difference between iron and steel, and also makes it needful to exercise much greater care in the heating process, especially when welding; indeed, it is difficult to weld cast-steel at all, and the welding of cast-steel has led to a great many arguments and debates as to whether it can be welded or not after it has been welded. As I have not heard of anyone claiming to weld cast-steel without the aid of some composition or other, and the action of these compositions is, by their affinity for carbon, and being subjected to great heat, that chemical action takes place, and some of the carbon is extracted, and given off in fumes, and I take it that this carbon is the virtue of the steel, and by extracting some of it, I argue that it cannot be steel to the same degree as it was previous to the welding; but I have recently read in a periodical called *Iron* (which is a magazine of the first class) that cast-steel has been welded, and subjected to all possible tests, and no appreciable difference could be found in the quality or strength of the steel, and, on the authority of this magazine, it appears that this vexed question of the practicability of welding cast-steel has been settled conclusively, but this was also done with a composition, the ingredients and quantities being given. The steel used for spring making is not so highly converted as that made for tools, but still requires great care in welding on the heads, etc. The heat for drawing the points may be described as a pale yellow color; the heat for fitting is as left after tempering. A test for tempering usually employed is to rub a dry ash stick on the steel till it blazes; they are then considered (technically speaking) low enough, but this depends on the judgment and experience of the spring maker, for the kind of steel used, also at what heat the steel is when plunged into the water, and also at what heat the water is when the steel is plunged into it; all influence, to a certain extent, the temper of the steel.

In making welds or shuts in iron or steel, a certain amount is allowed for making the weld, as it has to be upset, that is, made larger by being struck by the hammer or compressed while in a heated condition, and should be lapped short enough, as in the process of hammering together it will draw or elongate, and allowance has to be made for this or the length of the piece of work will not be accurate when finished, and care should be taken to have enough stuff, for if not you would be able to draw it long enough, but it would be at the expense of the width and thickness of the iron, which would, of course, be bad work.

A NEW PROCESS FOR TOUGHENING STEEL.—The French Société d'Encouragement have had under prolonged examination a process invented by M. Clemandot for working steel. The process is described by the *Revue Industrielle* as consisting in heating the metal until it acquires a sufficient ductility, and then subjecting it to a high pressure during cooling. In this way a modification of the structure of the metal is produced, and the material acquires properties analogous to those developed by tempering. Similar processes have been tried in France, but only upon the same principle, that is to say, by operating upon the metal while yet in a state of fusion. M. Clemandot, on the contrary, takes steel already made, heats it simply to a cherry red, and submits it, by means of a hydraulic press, to pressures of from 1000 to 3000 kilos. per square centimeter. After having allowed the steel to cool between the two plates of the press, it is withdrawn with all its new qualities developed, and does not require any further treatment. The result of the process is to impart to the steel a fineness of grain, a degree of hardness, and a notable accession of strength to withstand rupture.

This alteration is most considerable with highly carbonated steel, and in this respect the metal is made to resemble tempered steel, without being in all points identical with it. The cause of this alteration in physical condition is ascribed to the rapid heating and no less rapid cooling of the metal. When the red hot steel is first strongly compressed, the conversion of the mechanical energy into heat serves to raise the temperature of the entire mass, at the same time that the particles of the metal are more closely cemented together. This effect is followed by a rapid cooling, due to the contact of the plates of the hydraulic press with the surface of the metal. The close pressure materially increases this conducting effect of the cold metal.

GALVANIZED IRON WATER-PIPES.—In the course of a paper on the above subject by Dr. F. P. Venable, in the *Journal of the American Chemical Society*, he states that it has long been known that zinc dissolves in water, and that soft water, such as rain-water, dissolves it more easily than hard water. Water containing carbonic acid is especially able to dissolve it. The use of galvanized iron for pipes and tanks being so much on the increase, the subject becomes more and more important, and it is desirable to ascertain as far as possible, to what extent solution of the zinc coating takes place, and how far water contaminated by zinc is injurious to health. The author quotes several investigators as to the latter point, the evidence being to some extent conflicting, but giving a very decided balance on the side of the view that such water is considerably injurious. Investigations made on behalf of the French Government resulted in the prohibition by the Ministry of Marine of the use of galvanized iron tanks on board men-of-war. Professor Heaton has given an analysis of a spring water, with a further analysis of the same water after it had traveled through half a mile of galvanized iron pipe. It had taken up 6.41 grains of zinc carbonate per gallon. Dr. Venable gives the results of an observation of his own, where spring water passed through 200 yards of galvanized iron pipes to a house, and took up 4.29 grains of zinc carbonate per gallon. It therefore seems pretty clear that drinking water should not be allowed to come in contact with zinc.

MAKING LEAD SHEETS BY HYDRAULIC PRESSURE.—We learn through *Engineering* that J. Brundt, of Berlin, proposes to make sheet-lead by hydraulic pressure in a manner similar to that in use for making lead pipes, instead of by the present method of working down a large block of lead to the required thickness by means of rolls. The receiver for the lead is made of such a length as may be required for the greater width of sheet which it is proposed to make. The bottom of the receiver is connected to the pistons of several hydraulic rams, and slides up and down in the receiver. A part of the top of the receiver consists of movable jaws, whose distance apart can be nicely regulated by rack-and-pinion arrangement. These jaws being opened sufficiently wide, a charge of molten lead is run into the receiver, and then the jaws are closed to an opening corresponding to the thickness of sheet required. When the lead has cooled to the point which experience shows to be most suitable, the hydraulic pressure commences, and the lead is slowly squeezed out in the form of a sheet.

SELF-HARDENING STEEL.—It is stated that Mr. Adam Tindel, of the Frankfort Steel Works, Philadelphia, is producing a tool steel which possesses remarkable qualities. Its chief peculiarity consists in its being self-hardening. No process of hardening in water or other liquids nor of subsequent tempering is necessary in its use. A tool from Mr. Tindel's steel is shaped over the anvil as with ordinary tool steel. When the tool is forged it is laid aside to cool in the air. When quite cold it is found to have taken a hardness exceeding that of any steel hardened by the usual process of immersion in water or brine. So hard it is that the teeth of a Stubbs file will be turned by a single stroke across it, and the edge of a finely-tempered cold-chisel completely destroyed in an attempt to cut it, not the slightest impression being left on the Tindel steel. Another peculiarity of the metal is its ductility in forging. It forges and welds to iron quite as readily as tool steel. At the usual heat no difference can be perceived in its capacity for being drawn, bent or tortured from any good quality of cast-steel.

HOW "HARD TIMES" SPOILS WORKMEN.—"Hard times" are apt to be hard on nice, delicate workmen. Perhaps business gets so dull that a nice tool maker must go to work repairing old engines. For a time he uses tools tenderly. He is as careful with them as of old. It makes him wince to see the boys throw nice tools into a box, and then dump them into a drawer or on the bench. Soon our man gets hardened. He begins to "don't care," and quickly gets as bad a tool smasher as any of the gang. "Hard times" not only spoil business, but they sometimes spoil the mechanic as well.

WIRE BELTS.—One of the new uses to which it is proposed to apply steel wire, in a braided or woven form, is for belting for driving machinery of all kinds.

MR. BESSEMER'S steel process patents have yielded him \$600,000 a year for 21 years.

SCIENTIFIC PROGRESS.

Liquid Air.

The electric light and the telephone have been so noisily and repeatedly thrust upon the public notice that the knowledge of them has penetrated every nook and corner of Europe and America; and he who is ignorant of their existence is the just subject of jeers and ridicule. But to call a man an ignoramus because he may not happen to know that the air we breathe has been so compressed that liquid air was the result, would be carrying matters too far; for the praises of this latter triumph of science has been confined principally to scientific journals and to papers read before scientific bodies. This triumph, while it does not deserve the attention which the electric light and telephone have attracted by their innate usefulness, still is remarkable enough to be told to and remembered by all.

We have headed our article "Liquid Air," but the scope of the triumph, of which it is a part, extends to even the lightest and most mobile gases; and indeed all the known gaseous bodies which are not decomposed and broken up into other bodies by great pressure have been made to assume a distinctly visible liquid form. Our fathers were no doubt as firm believers in an atmosphere as we are. They could not doubt the evidence of swaying trees and sailing ships as positive proofs of the existence of some invisible, yet none the less actual, fluid surrounding them. But it has been reserved to the people of the nineteenth century to be the first to reduce the air to a form in which it could be actually seen and felt.

This result was consummated in the presence of several reliable witnesses by two French scientists, Messrs. Pietet and Cailliet, during the week between Christmas and New Year's day of 1877, and has since been repeatedly confirmed. Before this time many other chemical gases had been liquefied, but the oxygen and nitrogen of the air together with hydrogen gas and a few others had defied all attempts. Improvements in the way of applying pressure and in the attainment of very low degrees of cold are the secrets of our present success, for on these two simple agencies combined the liquefaction of all gases depends. That pressure and cold should be used in combination is very material as is shown by many cases where very great pressures have been applied to gases without producing the liquid, which, with much less pressure and the requisite degree of cold, was formed most readily.

It seems a rather simple operation, this subjecting of a gas to pressure and cold to produce a liquid; and there is apparently no cause for surprise that air and other permanent gases should have at last been liquefied. The wonder rather inclines the side of the query why they were not liquefied long since. But when the enormous pressure needed and the degree of cold also requisite are stated, the difficulties that attend the liquefaction of gases can be better appreciated. Mons. Pietet in his liquefaction of oxygen used a pressure of more than 5000 pounds to every square inch of surface, and a temperature of more than 200 degrees below the zero of a Centigrade thermometer. Such enormous pressures as the above are liable to result in accident, but the recent apparatus has entirely obviated all risk in the performance of the experiments.

Even the uninformed can understand the possibility of producing all the pressure needed on this work; but how such low temperatures are obtained is a problem. The solution of this problem is not difficult, being dependent on causing the gas to be liquefied to furnish a great part of the cold itself. If air is to be operated upon, the tube in which it is contained under great pressure, is surrounded by another tube containing liquid carbonic acid gas. This liquid carbonic acid gas can be made by pressure and a moderate degree of cold. To freeze the air a jet in the carbonic acid tube is turned on and the liquid gas rapidly rushes out and resumes the gaseous state, and in so doing absorbs enough heat to lower the temperature of the apparatus to 140 degrees below zero. The remaining work is accomplished by then allowing high compressed air to escape.

Improvement in the Uses of Chloroform.

According to *La Nature*, experiments have shown that the vapor of thirty grams of chloroform, mixed with a hundred liters of air, will kill a dog in a few minutes; while a dose three times as strong, if diluted with a cubic meter of air, produces a sleep without danger, lasting two hours. The tension of the vapor, rather than the quantity, determines the effect; but the operator, in administering the anæsthetic, has to take into account the quantity; so that, under apparently the same conditions, very different results are obtained; and hence arises the difference of opinion among surgeons as to its use.

Six grams in a hundred liters of air have very little effect upon a dog; ten grams produce insensibility for an hour and a half; while fourteen grams cause death in forty-five minutes, and twenty grams in five minutes. In the case of man, with an inspiration of half a liter, these results are produced by three, five, seven, and ten centigrams of chloroform respectively. It will be seen that the difference between the harmless and the dangerous proportions is very slight. Accord-

ingly, the use of chloroform has always been considered dangerous; and in order to make it less so, Mr. Paul Bert has made experiments upon animals, and afterward applied them to man. His experiments with man have extended over two hundred cases, including patients of all kinds of temperaments, with always the same result. He uses ten grams of chloroform vaporized in a hundred liters of air—a dose agreeable to some and to none disagreeable. The most disagreeable effects of the anæsthetic have been felt in the period of repulsion; but Mr. Bert almost entirely removes this. The period of excitement is not great, and only lasts from one to two minutes; while in the case of more than one-third of the adults it is entirely absent. The pulse is a little accelerated during the period of excitement, but remains perfectly normal and regular during sleep. Complete insensibility is produced in from six to eight minutes, and is maintained during the whole time of respiration. After the patient becomes insensible, the quantity of chloroform is reduced to eight grams, and later to six. Painful operations have no effect, except that the respiratory movements are slightly accelerated. There is no nausea, and the amount of chloroform administered is not enough to cause poisoning; while there is no fear of asphyxia, for the amount of oxygen is reduced only by a hundredth.

Tree Rings as an Indication of Age.

When Mr. Henry G. Sheppard delivered his last lecture before the pupils of the Carriage Builders' Technical School there was a short discussion between Mr. Fitzgerald and the lecturer with reference to the relations which the rings in a tree bore to its age. Mr. Sheppard thought that the number of these rings always corresponded to the number of years the tree had lived, but Mr. Fitzgerald intimated that this rule was not to be depended on. In this connection it is worth while to mention some recent observation on tree rings by Professor Bachelant. He said that during a visit to the ruins of Palenque, Mexico, in 1859, M. Charnay caused all the trees that hid the facade of one of the pyramids of the place to be cut down. On a second visit, in 1880, he cut the trees that had grown since 1859, and he remarked that all of them had a number of circles greatly more numerous than their age would warrant, supposing one circle only to be added annually. The oldest could not have been 22 years of age, but on a section of one of them he counted 250 circles. The tree was about two feet in diameter. A shrub not more than eight months old had eighteen concentric circles. M. Charnay found the case repeated in every species and in trees of all sizes. He concluded that in hot and moist climates, where nature is never at rest, trees may produce not one circle in a year, but one in a month. The age of a monument has often been calculated from that of trees that have grown on their ruins. For Palenque 1700 years had been calculated, 1700 rings having been counted on a tree. These observations, however, require the number to be cut down to 150 or 200 years. Professor Bachelant asks if M. Charnay took account of certain colored rings which some tropical trees present in cross-section, and which are to be distinguished from annular circles.

PHOTOGRAPHING THE NEBULA OF ORION.—The late Professor Henry Draper was the first to succeed in obtaining a successful photograph of the famous nebula in Orion. Mr. Common, an English astronomer, is interested in the same field of work. He exhibited at a recent meeting of the British Astronomical Society a series of enlargements of photographs of the Orion nebula; taken with different exposures, varying from a few minutes up to sixty minutes. With the longer exposures, the outer and fainter portions of the nebula were shown, but the inner and brighter portions were obscured by over exposure. It was only by a combination of such pictures that the whole of the details visible in the nebula could be studied. With the longer exposures, regions of the nebula invisible to the eye with the telescope register themselves on the photographic plate. Mr. Common had obtained, with an exposure sixty minutes, traces of many stars invisible to the eye. He had not at present tested what could be obtained by still longer exposure. Reliable photographs of the present condition of this wonder of the skies will be an inestimable gift to the astronomers of the future.

THE RADIANT ENERGY OF THE SUN'S SURFACE.—It has been demonstrated that the sun's surface gives out a radiant energy at the rate of 50 horse-power a square inch. It is proposed to utilize this heat for industrial purposes, as for pumping water, propelling machinery, furnishing steam and hot water, for the sublimation of sulphur and the heating of ores. The device is simple; a reflector, cylindrical in form, with a heat receiver mounted on its axis and parallel to it, is so placed that the heat receiver is made to automatically follow the sun's apparent motion. By this means the heat is obtained and utilized.

THE MOST PERFECT INSULATOR.—S. Wroblewski says that liquid oxygen and nitrogen are among the most perfect insulators. The resistance of copper decreases much more rapidly than the absolute temperature, and approaches zero at a temperature not very remote from that obtained by evaporating liquid nitrogen in a vacuum.

MINING SCIENTIFIC PRESS

A. T. DEWEY. W. B. EWER.
DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 6.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Sept. 26, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Sediment Collector and Water Purifier; Russell Process in Calaveras County; New Ore Mill, 209. Passing Events; Cable Railroad Patents; Gold in China; The Machinery at the Fair, 212. Ore Jigging Machine, 213.

ILLUSTRATIONS.—Spaulding's Patent Sediment Collector and Water Purifier, 209. Jigging Machine for Concentrating Ores, 213.

MECHANICAL PROGRESS.—Hints on Welding; A New Process for Toughening Steel; Galvanized Iron Water Pipes; Making Lead Sheets by Hydraulic Pressure; Self-Hardening Steel; How "Hard Times" Spoils Workmen; Wire Belts, 211.

SCIENTIFIC PROGRESS.—Liquid Air; Improvement in the Uses of Chloroform; Tree Rings as an Indication of Age; Photographing the Nebula of Orion; The Radiant Energy of the Sun's Surface; The Most Perfect Insulators, 211.

USEFUL INFORMATION.—How to Take Off a Hide; Preservation of Coal from Crumbling; Measuring the Height of Trees or Other Objects; Files; Railroad Ballast of Salt; Shop Hand; Peach Wine; To Make Shingles Durable; Shampooing Liquid; A Tall Smoke-stack; Ship Supplies, 215.

GOOD HEALTH.—Neuralgic Headache of Women; Mill Girders; Pneumonia Parasitic; Cured Spines; Civilization and Eyesight; Too Much Blood; Simple Cure for Dysentery; To Keep Mosquitoes Away; Hay Fever, 215.

MISCELLANEOUS.—Discovery of California Gold, 210. Practical Hydraulics, 214. Our Trade with Venezuela, 215.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 216-17.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 220.

Business Announcements.

Pacific Reduction and Metallurgical Works—S. F. Stereoscopic Views—Cubery & Co., S. F. San Francisco Cremation Company.

See Advertising Columns.

Passing Events.

The season for prospecting is about over, and before long those who have been roaming the mountains will have to come into the camps for the winter.

The black sand deposits on the northern coast of Vancouver island are beginning to attract attention.

The discovery of gold on the Chinese side of the Amoor river does not interest miners in this vicinity aside from its interest in the gold product. It is not likely any one will go from here, though already many Russians from the old Amoor gold fields have gone to the new diggings.

At several camps there is an evident desire on the part of mine owners to reduce miners' wages, and there is also a strong disposition on the part of the miners to resist the reduction.

The hottest day of the year was experienced in San Francisco on Monday, the thermometer reaching 87°. In other parts of the State, also, very hot weather has been felt.

Mr. R. G. HUSTON will leave next week for a trip through Idaho and Montana as correspondent for the MINING AND SCIENTIFIC PRESS. He will visit the various districts and mines and write an account of his observations for the PRESS. We hope all our friends will assist Mr. Huston in obtaining the information he desires concerning the mineral resources of the two territories.

THE Manhattan mill at Hamilton, Nev., is working on tailings.

Cable Railroad Patents.

It is surprising to see what a number of "improved" systems of cable railroad construction have come to the surface since cable railroads have proved successful and profitable in this city. Scarcely a week passes that we do not see in the Eastern papers glowing descriptions of plans or systems which are to excel in every way the San Francisco roads. People come here, from Chicago, Philadelphia and elsewhere to see the roads, and immediately think they can make something better. They know theirs will be better without trying them, and somebody seems easily found to pay for the experience. The Philadelphia road, for instance, has practically thrown from \$700,000 to \$1,000,000 into the scrap-heap in trying to carry out an impracticable system of roadbed, etc.

Only last week we saw a description in a New York paper of what was called "a perfect cable road," which is in the hands of the American Cable Company. It proposes to do away with the difficulties of present roads. A prominent feature is to have two cables running all the time, one faster than the other, and either of which may be caught by the grip. This is so that, in case of a jam or block, the cars behind time can catch up. As it has been found by experience here that about 50 per cent of the power required to operate the road is absorbed in moving the cable alone, double cables, with independent supporting pulleys, will be apt to cost something to purchase and keep running. The inventor also has a peculiar roadbed, where he will only have to excavate 18 inches, and no cement need be used, and sand and cobble or macadam will do—a very cheap plan, if it was any good.

Then he has a plan for rounding curves better than one he describes as existing in San Francisco. We have several plans here, all of which work very well. One plan here he described as impracticable, notwithstanding which assertion it has been working several years, without any fault being found in practice. He also has a new form of cable, with a smooth surface and several other novel features. A special thing mentioned is that with the American Co.'s plan no horses need to be kept in reserve; we never heard of any with any of the other cable systems.

Building large and expensive roads on new and untried plans, simply to dodge the royalties on proved systems, has cost companies already hundreds of thousands of dollars. We have gone over most of the ground here already, and if others will only take our experience they will save time, money and trouble.

Because a man invents a thing, patents it, and calls it "improved," it by no means follows that it is better than what is in use. We have more miles of cable road running in this city than in any in the world; we have had the roads longer, we have them under many different conditions; and earlier crudities have been removed. Difficulties have been overcome by experience, and details have been changed to suit circumstances, so that if cable road buildere will come here and see the results accomplished they will do better than to take up with the first wild plan offered, simply because it is new. To their cost the cable road builders elsewhere have found that there are many so called inventors who have no practical knowledge of the subject, and that many of their theories are worthless. Cable roads are too costly to be hurriedly built without well-considered plans, or without some guarantee that the system adopted covers all the points.

Gold in China.

The Russian papers confirm the statement of the discovery of gold on the Chinese side of the Amoor river, and thousands of Siberian gold-diggers have gone to the spot. But the Chinese have also gone there by thousands, and will probably have the best of it. It is stated that the new diggings are of greater extent than the old mines of the Amoor district in Russia, which have yielded largely for years. The Chinese have it in their power, therefore, to greatly increase the gold product of the world. Whether they will let other people work there or not is still to be determined.

The Amoor river is formed by the junction (about latitude 53° N. and longitude 120° E.) of the Shilka and Argoun, which both come from the southwest, the former rising in Russian Siberia, near the headwaters of the Yenisei,

and the latter in Chinese Tartary, not far from the sandy plateau of Kobi.

From this starting place the Amoor presents on its right a tolerably symmetrical curve, which, after receiving at its most southerly point the Songari, from beyond the wall of China, besides other considerable feeders on both sides of either segment, enters in nearly its original parallel, the gulf of Saghalien, about a degree below the Ochotsk sea. The basin of this important river comprehends about 766,000 square miles, and its course is about 2500 miles. Steamboats of light draught ascend it for a long distance. As might be expected in so long a river the climate of its valley varies very much in different parts; in the upper portion of its course there are long and cold winters and short summers; as the river descends into more southern latitudes the rigor of the climate relaxes, and the heat becomes almost tropical; the vegetation is rich and luxuriant; while on the lower Amoor the cold again prevails to a certain extent, and at its mouth the river is ice-bound for more than half the year. Gold has been known to exist in the mountains, and iron is said also to be abundant. The exact locality of these new Chinese mines have not been stated, but they are probably near the deposits which are on the Russian side of the river.

Liquid Fuel.

A few months since we gave an account of the experiments which were being made by the Central Pacific Railroad Company with petroleum as fuel on some of their steamboats. At that time they had tried it upon the freight steamer Thoroughfare, plying between Oakland and San Francisco, and on the transfer boat Solano—the largest ferryboat in the world—on Carquinez straits, running between Benicia and Port Costa.

Since that time they have been able to determine more in detail concerning the results. On the Thoroughfare they saved \$7000 in the cost of fuel in the five months they were using oil as compared with the five months of the same season last year when they were burning coal. Besides saving 44 per cent in actual fuel, they get rid of four firemen, which makes an additional saving of \$240 per month. On the Solano there is not so much saving, the cost being lessened but 17 per cent. She makes short trips, and they burn the fuel while she is in the slip, to generate necessary steam.

The oil costs \$1.70 per forty gallon barrel, or about four cents a gallon. It is estimated by the engineer of the big Water Witch, which is also using oil, though a somewhat different kind from that used by the railroad company, that 100 gallons of oil is equal to a ton of coal, which latter costs about \$7 per ton.

The Oakland ferryboat, Piedmont, has just been altered so as to use the liquid fuel. She has not yet been put at work under the new system, but will be in a few days. The oil is sprayed under the boiler by a steam jet, and is supplied by suitable tanks. A supply tank is kept on the wharf, so that the oil may be led into the steamer's tanks. The supply tank is filled from tank cars, so there is no handling. There is no smoke or soot, and of course no ashes. It is stated that in addition to the lower cost of the liquid fuel, the services of 16 firemen will be dispensed with on the Piedmont. The mechanical alterations to effect the change of system are slight. The other ferryboats will be changed to burn oil shortly.

As the coal used on these steamers was imported, and a good deal of California petroleum will probably be used, the change will be good for this State in utilizing one of its products. The amount of petroleum obtained from California has been steadily increasing for the past five years. In 1879, 19,558 barrels were produced, and in 1884 more than 100,000 barrels, thus quadrupling the yield in the space of five years. California now ranks third among the petroleum-producing States; New York is second, and West Virginia fourth. The petroleum resources of the State are being carefully developed, and the more of the product we can use here the better it will be for California.

SAWTOOTH, Idaho, like many other camps, is in great need of a cheap process for working low grade silver ores. There are hundreds of prospects in the country that have a fair shipment of ore on the dump, but rates are too high.

The Machinery at the Fair.

Although the display generally in the machinery department of the Mechanics' Fair cannot be said to be a representative one of our home manufactures in the machine line, there is much to commend. The large foundries and machine shops are not represented in the exhibits, the dull season probably preventing their going to the expense of displays. In mining machinery there is very little indeed, the dry washing machine for gold placers, Taylor's rock breaker, Macay's filter for leaching process, Stiles' pulverizer, and a machine for transporting dirt by hydraulic power, representing all there is in that line. There are no mills or stamps, no furnaces, pans, settlers, hoisting engines, or any of the miscellaneous mining machinery we might expect. There is this to be said, however: most mining machinery is made to order, and it is mainly of a ponderous character, therefore, it is difficult and expensive to make any special display of this character.

A very fine exhibit is that made by the Dow Steam Pump works. It consists principally of a variety of pumps of different patterns. There is a large tank in the center of the space devoted to these pumps, into which they discharge, and as they are operated during running hours, they attract considerable attention. One powerful pump is the pattern intended for water-works. It is a compound pump, with outside packed plunger. This is the first of the kind ever made here, being entirely new to this coast. There is also exhibited one of the Dow artesian well pumps, a type which is meeting with much favor. The mining-sinking pump made by this firm is also shown. The other pumps are all of California design and manufacture.

Opposite this display is that of Kryger, the flour mill builder. He shows the Livingstone roller mills, of different sizes; the American turbine wheel, the Gilbert four and six reduction mill, Hoyt's belting, and other articles used in modern flour-mills.

Thompson & Evans have a display of their well known and popular fly wheel pumps, which we have before described in these columns.

Running the Keith dynamo machine is one of Parke & Lacy's Westinghouse engines, a compact and easily-cared-for engine, which we recently illustrated in the PRESS. It runs smoothly and noiselessly, and seems just the thing for dynamo work.

The Brush dynamos are run by one of the well known Ohmen engines, designed and manufactured in this city. These engines are extensively used here, and have met with great favor from their economical results.

Mr. Denniston, of the San Francisco Plating Works, has a large silver-plated amalgamating plate. This appliance is one now used at all first-class works in the United States, and has also been adopted in foreign countries. It is found to be very much more efficient in saving precious metal than ordinary copper plates, besides being much less trouble to take care of. Mr. Denniston has deservedly won reputation in the manufacture of these plates, and has built up a large trade in them.

Palmer & Ray, who are now manufacturing printing presses in this city, exhibit several specimens of their handiwork in this line, and also type and printers' material.

John Taylor & Co. have quite an exhibit of assayers' material, such as assay balances, tongs, black-lead crucibles, English and French crucibles, English and French muffles, grinding plates, mortars, hullion molds, chemical glassware in great variety, etc. A prominent feature is the Taylor rock-crusher, for the use of prospectors and assayers for crushing old crucibles, working specimen ores, etc. This machine crushes much faster than the hand mortar and pestle, because of its great leverage and power. It will enable a person to quickly and easily bring to fine powder the hardest ores to be assayed, sampled or crushed. Exhibited with this are the tools to accompany it for prospectors' use, such as a pole, pick, Attwood's combined hammer, rock-splitter, foot-measure and walking stick, sieves, rubber sheet, wooden batea, Buck's patent amalgam mortar, magnets, miner's pan, miner's horn, a gold-dust blower, etc.

Another thing they have there is a prospector's set. This is a little kit of tools and chemicals to enable the prospector (without be-

ing a chemist) to make a quick and correct test of gold, silver and copper. In it is a hammer, with one face flat and the other wedge-shaped for splitting rock, one iron mortar and pestle, magnifying glass, sieve, ore measure, acid measure, spirit lamp, 12 test tubes, test tube holder, glass funnels, package filter paper, bottle nitric acid, bottle ammonia, chloride of tin, alcohol, small box of salt, etc. All the above are packed in a small box, 16 inches long, 8 inches wide, 9 inches high, with hinged lid, lock, and leather strap. It weighs, complete, 15 pounds, and is sold for \$8, with full printed directions.

H. P. Gregory & Co. have quite an interesting display. In it is a 25-horse power Atlas engine, with the latest improvements in the shape of an automatic cut-off. There is also one of the latest improved Blake's Duplex pumps, of which Messrs. Gregory now carry a full line. The most interesting feature of the exhibit is the Otto gas engines, of which there are several sizes. One of these is a 15 horse power double cylinder Otto, and there is also a 7-horse power engine and pump combined, designed especially for raising water for running elevators. One of the small Ottos used in printing offices and for other small power is also shown. We are informed that none of these Otto gas engines use over 20 cubic feet of gas per indicated horse power per hour. A 10-horse power engine running 10 hours per day with gas at \$2 per thousand feet, will cost about \$4 per day. Altogether, there are over 80 of these gas engines in this State, doing various kinds of work. They are most extensively used in repumping water for elevators. By their use such places as boarding houses, etc., are enabled to afford to run elevators. In some places where, with Spring Valley water at 20 cents per 1000 gallons, the cost was \$158 per month when the elevator was put in, the expense was reduced to \$40 per month. In no case is skilled labor employed to run these engines, they requiring no attention beyond cleaning once or twice a week.

The San Francisco Tool Company have a very creditable display of tools of their own make. There is one large centrifugal pump which is capable of pumping 120,000 gallons per hour. It is in operation and throwing a splendid stream of water. It is run by a 6-inch single acting engine. A 7-inch single acting engine of the Tool Company's make is running a dynamo which supplies power for sewing machines, a pump, etc. In the display are drill presses, lathes, different sized pumps, couplings, valves, hangers, etc., all made in this city. There is also one of Bishop's elevators for warehouse work, made by the San Francisco Tool Company. The pumps and engines shown are made in any size from 8 to 20 inches.

Macay's rotary deaerating filter is also exhibited in the machinery department. It is intended for dissolving and filtering in chemical and metallurgical processes.

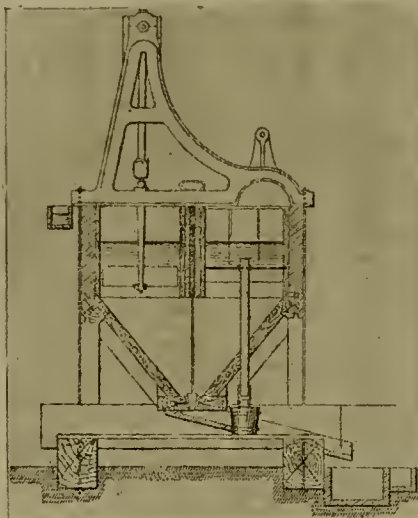
This apparatus is applicable to the extraction of silver, copper and gold from its ores by any leaching process; for the extraction of nitrate or potassa or soda, and also in chemical industries, for washing precipitates and separating the liquid by filtration in a rapid and effective manner. In the extraction of gold, silver and copper by its respective leaching processes, three washings and three filtrates, charging and discharging, can be done in four and a half hours, and it will extract 99 per cent of the soluble metals present in the ore, no matter in what state of division the ore may be, or whether it contains talc or slimes in any quantity. In the extraction of silver by the leaching process, from \$1.00 to \$1.50 per ton is saved by the use of this apparatus, as compared with the common leaching tubs. The apparatus can be made to hold from one to seven tons of ore per charge.

Tatum & Bowen show the well-known Hoe chisel tooth saw, Hoe printing presses and the Davey safety engine, the latter in operation. The Davey safety engine differs from a steam engine in the fact that while a small quantity of steam is used, steam is not the motive power employed to do the work, and only as much is required as would be generated in an ordinary tea kettle, and this at only atmospheric pressure; that is, at the same pressure at which it would flow from the spout of a tea kettle or escape from under the cover of a wash boiler, or from under a pot lid. The only function of the steam being to create, by condensation, a

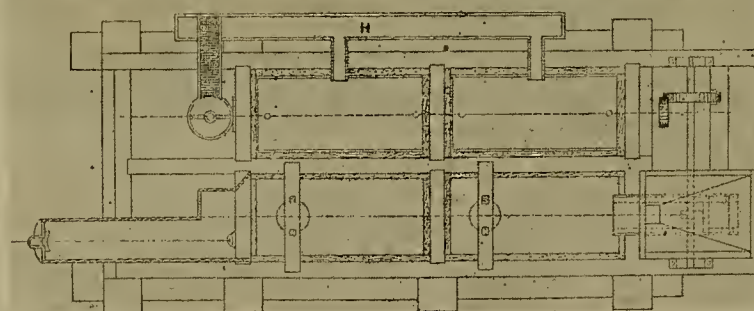
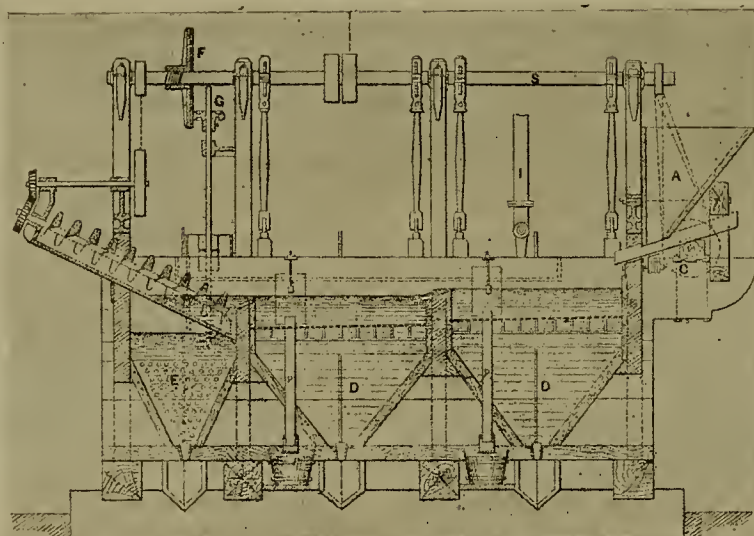
vacuum, which is the motive power. There is absolutely no pressure in the generator, and consequently can be no danger of explosion, under any circumstances whatever. The quantity of water consumed by this engine is very small, only a few gallons per horse power per day, and this may be returned and used over and over again. The cylinder, unlike that of other engines, does not require any oiling or lubrication, being made of bronze, with bronze piston-head and rod. In fact, it is intentionally constructed so that oil cannot be put into it. Unlike an ordinary boiler and engine, in which

Ore Jigging Machine.

At Příbram, Bohemia, they have one of the most extensive ore dressing establishments ever built, and carry on the works on a very large scale. In the matter of ore dressing machinery they have had great experience. We have before described some of the machines, and herewith present engravings of what is known as the "middle jigging machine" for working the 4 mm. stuff. The engravings show the detailed construction in plan and section, and are described by Ellis Clark, Jr., in the transactions



SECTION OF JIG.



JIGGING MACHINE FOR CONCENTRATING ORES.

the water level in the boiler is a matter of vital importance, and any failure of the water supply fraught with more or less danger, the water level of the safety engine is constant and unvarying, and the quantity of water actually consumed so small as to remove all difficulty of keeping up a supply.

Aside from the question of danger attending the use of the ordinary steam engine under careless management, there is probably no one thing which will commend this motor more strongly than the fact that it requires no attention beyond simply lighting the fire, and giving the wheel two or three turns when ready to begin operations. There is no safety valve, no exhaust, no steam gauge, no gauge cocks, no boiler-feed pump or injector, or any of these adjuncts of an ordinary steam engine.

SOME men from San Bernardino county are prospecting Shasta county for tin.

of the American Institute of Mining Engineers. At the head of the jig is a self-feeding apparatus, *A*, worked by a rubber buffer and a cam, *C*, receiving its power from the shaft, *S*. The sieves of 3 mm. (0.12 inch) mesh rest on a slightly inclined wooden grate, which is 36 inches long and 18 inches wide. The jig boxes, *D*, below the sieves are pyramidal in shape, thus preventing the accumulation of material on the sides, as frequently occurs in the case of round bottoms. The piston is constructed of 4-inch timber, its upper surface being on the same level as the sieve, which is thus always covered, preventing the swashing of water and sucking down of air. Each piston is suspended by connecting rods from two eccentrics, the stroke of which can be regulated at pleasure between the limits of 0 and 1.5 inches. The water used in the process passes into the water-box, *E*, one side of which acts as a screen, thus preventing particles of material from passing

into the pump by which the water is lifted out.

This pump consists of a propeller keyed to the foot of a vertical axle, which receives a rapid motion of 220 revolutions a minute by means of the friction wheels, *F* and *G*. It lifts the water from 8 to 12 inches to a sieve for the purpose of freeing it from all foreign matters, such as chips, etc. The water is then conducted through the distributing box, *H*, to the piston boxes of the jigs. During the operation a small quantity of water is necessarily lost; this is replenished from time to time by means of fresh water admitted through the pipe, *I*. The surface of the friction wheel, *F*, is covered with leather so as to produce a better friction, and the wheel, *G*, is slightly bevelled. These two wheels can be brought into closer contact by means of a screw cut on the power shaft in a direction contrary to the motion. The sterile portion of the material passes into the foot of a cylindrical cast-iron trough, set at an angle of 25°, containing an archimedean screw set in motion by spur gearing, by which it is lifted into a car. The diameter of the screw is 8 inches, and that of its axis 2 inches; it has a pitch of 4 inches, and makes 40 revolutions a minute. The material passing through the screen accumulates in the boxes, *D*, from which it is withdrawn from time to time into receivers. The coarser material remaining on the screens forms a bed, the thickness of which can be regulated by raising or lowering, by means of thumb-screws, a sheet-iron cylinder, 10 inches high and 6 inches in diameter. When a sufficient amount of the enriched material has collected on the sieve bottom, it is drawn off through the discharge pipes, *P*, which are from 1.5 to 2.5 inches in diameter.

At the bottom of this discharge is a valve arrangement (moderator) by means of which the outflow of material is regulated. The material from the first sieve passing through the discharge-pipe, as well as that passing through the sieve, is sent to the smelting works. The material passing through the discharge-pipe of the second sieve is sent to the crushing mills, while that passing through the sieve is reconcentrated on fine jigging machines. Stuff from 4 to 12 mm. (0.16 to 0.46 inches) in diameter (*crash-granular*) is generally worked on this jig. Material of 4 mm. requires 160 strokes of 1 inch a minute, and produces 17 cubic feet of concentrated products an hour. The propeller-pump lifts 3.4 cubic feet of water a minute. Material of 12 mm. requires 160 strokes of 1.5 inches a minute, and produces 27 cubic feet of concentrated material an hour. In this case the pump lifts 6 cubic feet of water a minute. In both cases 0.75 horse power is required.

The sterile material which passes away from this jig (*berge*) is exceedingly poor, containing only from 0.25 to 0.37 per cent lead, and 0.004 to 0.005 per cent silver. The amount of water wasted is from 0.75 to 1 cubic foot a minute. In the case of the 4 mm. stuff, the concentrated material from the discharge-pipe of the first sieve contains 0.567 per cent silver, and 51.62 per cent lead; that from the discharge-pipe of the second sieve, 0.046 per cent silver and 3.12 per cent lead.

In the case of the 12 mm. stuff, the concentrated material from the discharge-pipe of the first sieve contains 0.61 per cent silver and 72.75 per cent lead; that from the discharge-pipe of the second sieve, 0.05 per cent silver and 437 per cent lead. The 12 mm. stuff before concentration contains 0.042 per cent (13½ oz. to ton) silver and 4.25 per cent lead.

SIERRA COUNTY MINES.—We have received word that the Bald Mountain Extension Company's clean-up last week was 146 ounces—\$2,712.60—making for the past four weeks' work on the Extension ground a gross yield of \$17,715.66. There will be two more clean-ups this month, and the current expenses of the month are not much over \$5000. The Cornish 10-inch pump when received at the Pliocene shaft will cost from \$2000 to \$2500. The company has purchased the creek with all the accumulated tailings of the lead for the past two years and a quarter. The prospect is fair now that times this winter will be booming at the Extension.

THE MECHANICS' FAIR.—The premium list of the Mechanics' Fair is not yet complete, as all of the committees have not so far reported. As soon as it is complete we shall publish it in full. The Fair closes this week.

PRACTICAL HYDRAULICS.

NUMBER 3.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDAL.]
[COPYRIGHTED.]

$Q=10.22$ cubic feet flow per second, which is five and two-thirds per cent more than obtained by Rule 11, derived from the formula in accordance with experiments of Francis.

This discrepancy would seem to arise mostly from the correction introduced in our rule to compensate for end contracting.

The length of weir being 3.01 feet, and the depth of water on crest .545 feet, the discharge by Rule 11 or formula (28) amounts to 3.887 cubic feet per second, and by Weisbach's formula 4.253, which latter is nine and one-half per cent greater than obtained by Rule 11, or formula 28.

Again, the length of weir being 3.01 feet, and the depth of water on the crest .189 feet, the discharge per second, by Rule 11, amounts to .8133 cubic feet, and by Weisbach formula .753 cubic feet, which latter is nearly seven and one-half per cent less than the discharge obtained by Rule 11 on formula (28).

In the foregoing examples, the length of weir, the respective depth of water on the crest, and the corresponding coefficient of discharge, are given as the data and results of actual experiments made by W. R. Johnson, editor of the first American edition of Weisbach's Mechanics.

The experiments of Professor Johnson are entitled to great consideration. Those of Mr. Francis, however, from which formula (28), or Rule (11) is derived, were conducted on a large scale with extreme care and with the aid of the most improved mechanical appliances, so as to commend their results as the best authority known at present in weir measurement.

In addition to the variation expressed by the factor $(l-0.1nh)$ in formula (28), the coefficient of discharge is found to vary with the head or depth of water on the crest of the weir.

To compensate for this variation, Table 1 is given, to be used with formula (28).

TABLE 1.

WEIR COEFFICIENTS.
Water Supply—Engineering J. T. Fanning.

Depth in feet.	1	1½	2	3	4	6	8	10
Coefficient.....	.083	.124	.167	.25	.333	.500	.667	.833
Depth in feet.	12	14	16	18	20	24	30	48
Coefficient.....	1.000	1.167	1.333	1.500	1.667	2.000	2.500	3.333
Coefficient.....	3.339	3.339	3.400	3.339	3.339	3.338	3.334	3.331

The mean coefficient, as given in formula (28), is 3.33. The maximum, as seen by Table 1, is 3.34.

The mean coefficient 3.33 corresponds to the depths .523 feet and 3.42 feet.

A comparison shows that the mean coefficient is three-tenths of one per cent (.003) less than the maximum, two per cent greater than that corresponding to a depth of one inch or 0.083 feet; four-tenths of one per cent (.004) greater than that due a depth of four feet; and nine-tenths of one per cent greater than due a depth of one-fourth of a foot. The greatest variation occurring in the coefficient of discharge for different depths, between four feet and one-fourth of a foot, is seen to be below one per cent. An equal variation, for the most part, in practice, is likely to occur from various other causes, and too often elude the observation of the engineer.

Ex. 16.—The length of a weir being six feet, and the full depth of water over the crest two inches, what is the discharge per second?

Cal.—By formula (28) modified by Table 1.
Loss in this case by two end contractions.
2 inches=.167 feet; .167×.2=.0334.
6—.0334=5.9666 corrected length.
(.167)²=.06824, square root of cube of given head.
3.285=coefficient as per Table 1, due head of two inches.

$Q=3.285 \times 5.9666 \times .06824=1.307$ cu. feet.—*Ans.*

Ex. 17.—The length of weir being 10.8 feet, and full depth of water over crest four feet, what is the discharge per second?

Cal.—By formula (28) modified by Table 1.
10.8—4×.2=10. corrected length of weir.
(4)²=8, square root of cube of given head.
3.317=coefficient as per Table 1, due head of four feet.

$$Q=3.317 \times 10 \times 8=265.36 \text{ cubic feet.} \text{—Ans.}$$

TABLE II.

Flow for given depths over each lineal foot of a rectangular weir.

Head. Feet.	Flow Cubic Feet.	Head. Feet.	Flow Cubic Feet.	Head. Feet.	Flow Cubic Feet.
.04	.0261	.46	1.0386	1.2	4.3904
.05	.0365	.48	1.1072	1.3	4.9506
.06	.0480	.50	1.1771	1.4	5.5311
.07	.0604	.52	1.2483	1.5	6.1341
.08	.0737	.54	1.3209	1.6	6.7558
.09	.0881	.56	1.3951	1.7	7.3987
.10	.1035	.58	1.4724	1.8	8.0516
.11	.1195	.60	1.5506	1.9	8.7317
.12	.1369	.62	1.6286	2.0	9.4399
.13	.1536	.64	1.7080	2.1	10.1460
.14	.1718	.66	1.7888	2.2	10.8694
.15	.1906	.68	1.8705	2.3	11.6189
.16	.2102	.70	1.9599	2.4	12.3850
.17	.2303	.72	2.0380	2.5	13.1668
.18	.2512	.74	2.1237	2.6	13.9649
.19	.2726	.76	2.2118	2.7	14.7783
.20	.2951	.78	2.2996	2.8	15.6067
.22	.3407	.80	2.3883	2.9	16.4501
.24	.3882	.82	2.4788	3.0	17.3086
.26	.4377	.84	2.5699	3.1	18.1809
.28	.4892	.86	2.6620	3.2	19.0676
.30	.5445	.88	2.7557	3.3	19.9687
.32	.5932	.90	2.8500	3.4	20.7953
.34	.6572	.92	2.9463	3.5	21.7194
.36	.7158	.94	3.0432	3.6	22.6568
.38	.7761	.96	3.1409	3.7	23.6074
.40	.8384	.98	3.2395	3.8	24.5710
.42	.9020	1.00	3.3390	3.9	25.5472
.44	.9717	1.1	3.5522	4.0	26.5360

To obviate the use of a formula so encumbered, Table 2 has been computed. In which the 1st, 3d and 5th columns represent the heads or depths in feet, from the level of still water to the crest; the 2d, 4th and 6th columns represent the quantities discharged per second, for the given depths over each lineal foot of weir. These quantities are the products of the unit length, cubes of the square roots of the given depths, and their respective variable coefficients found in Table 1. If Q denote the tabulated quantity,

so discharged per lineal foot, h , the given head, and c , the variable coefficient due that head, then we shall have the formula by which Table Q has been computed, viz.:

$$Q=c, h^{\frac{3}{2}} \quad (29)$$

Multiplying (29) by $(l-0.1nh)$, the factor for correcting length of weir as in (28), and putting Q equal discharge over a weir whose length is three or more times the depth of water on crest, and there results:

$$Q=Q(l-0.1nh)=c, (l-0.1nh)h^{\frac{3}{2}} \quad (30)$$

Whence, to find the discharge of water over a weir, with corrections made due variable coefficient, and depth on crest.

Rule 12.—Deduct from the given length of the weir one-tenth the depth of water on the crest, for each and every end contraction, and multiply the length so corrected by the quantity in "flow" column opposite the given head in Table 2.

Rule 12 is derived from Eq. 30—middle right hand member employed. The extreme right hand member of the same equation expresses the value of Q in terms of the corrected length, and the head and the variable coefficient as found in Table 1.

This, in fact, is the modified formula of (28), by which examples 16 and 17 were solved.

Ex. 18.—The depth of water being two feet over a crest seven feet in length, what is the discharge?

Cal.—By Rule 12.

$$7-2 \times .2=6.6 \text{ feet, corrected length.}$$

BY TABLE 2.

9.4299 cubic feet=discharge due head of two feet. Whence, $9.4299 \times 6.6=62.30$ cubic feet.—*Ans.*

Cal.—By formula (30), extreme right hand member.

$$7-2 \times .2=6.6 \text{ feet, corrected length.}$$

$$(2)^{\frac{3}{2}}=2.8284=\text{square root of cube of depth.}$$

$$3.338=\text{coefficient by Table 1, due head of two feet.}$$

$$Q=3.338 \times 6.6 \times 2.8284=62.32 \text{ cubic feet.} \text{—Ans.}$$

The calculation in which Table 2 is employed, is seen to be much shorter and far more simple than that in which Table 1 is employed.

Weirs are usually constructed with horizontal crests and vertical ends, forming a notch, through which the flow of water is measured in its passage from a reservoir, or other storing place; or in its passage over a submerged dam across a flume, canal or natural stream. A weir should be free from vibration. Its crest and ends should be chamfered on the downstream side to an edge—say one-tenth of an inch

thick. Its upstream face should be vertical, and its downstream face, so inclined or fashioned as not to resist the flow of water. On the upstream side, the depth of water below the level of the crest should be fully twice as great as the head of water on the crest. The head or depth is the vertical distance, as AC , Fig. 2, between the crest and the level of still water at a point some distance above the weir, as at a . In ordinary practice, the head is measured with a common rule or linear measuring scale, from the top of a post, P , in Fig. 2, set level with the crest. If greater accuracy is required, the "Boyden Hook Gauge" should be employed. Care must be taken that the flow over the vein shall not be affected by the approaching stream. The area of the weir opening should not exceed a fifth part of that of the supply stream. With proper care in taking the data, the weir affords very accurate means of measuring the flow of water.

This, taken in connection with the weir's simplicity and facility of construction, cheapness and wide application, renders it of great practical importance, especially to those concerned in the measurement of flowing water, in places of difficult access. A temporary dam, in illustration, built across a natural stream, with a crest board firmly fitted, level and vertically widthwise to the dam's top, makes a good measuring weir. In flumes and canals, measuring weirs can obviously be constructed with equal facility.

The weir crest being about three feet wide and level, with a rising incline to its receiving edge, Mr. Francis offers the following formula, for approximate measurements, for depths between six and eighteen inches:

$$Q=3.01208 H^{1.53} \quad (31)$$

As this formula is somewhat complicated, the writer would present Table 3, computed from it, which will be found far simpler and less tedious of application.

TABLE 3.

Flow for given depths over each lineal foot of weir, with crest three feet wide.

Head.	Flow Cubic Feet	Head.	Flow Cubic Feet	Head.	Flow Cubic Feet
6 inches.	1.043	10.5 inches.	2.445	15. inches.	4.238
7.5 "	1.467	12 "	3.012	16.5 "	4.903
9 "	1.939	13.4 "	3.607	18 "	5.601

The depth on head being given.

TO FIND THE FLOW OF WATER OVER A WEIR WHOSE CREST IS THREE FEET WIDE.

Rule 13.—From "flow" column, opposite the given head in Table 3, take the number representing the discharge in cubic feet over one lineal foot, which multiply by the given length of the weir.

Ex. 19.—The head being 15 inches, and the length of weir, whose crest is three feet, being ten feet, what is the approximate discharge in cubic feet per second?

Cal.—In Table 3, in "flow" column, opposite 15 inches, given head, find 4.238 cubic feet.

$$\text{Whence, } 4.238 \times 10=42.38 \text{ cubic feet.} \text{—Ans.}$$

TRIANGULAR WEIRS.

A triangular form of measuring weir has been employed with favorable results.



To determine the flow of water through a triangular weir:

Let $h=BC$ represent the head of water in feet, from the apex C to the level, AD , of still water.

p =given ratio between the head, h , and the width of the weir—that is, let $ph=AD$, EF , or any width taken at pleasure.

c =coefficient of discharge.

Q =quantity of flow in cubic feet.

x =any portion of the head h .

$2g$ =force of gravity= 32.2 .

v =velocity due $(h-x)$.

Then in general by (13) will $v=c(2g)^{\frac{1}{2}}(h-x)$ (32)

$$dQ=pc(2g)^{\frac{1}{2}}(h-x)^{\frac{1}{2}}dx \quad (33)$$

Integrating (33) between the limits of $x=0$ and $x=h$.

$$Q=\frac{4pc}{15}(2g)^{\frac{1}{2}}h^{\frac{5}{2}} \text{ cubic feet.} \quad (34)$$

QUADRANTAL WEIR.

In a quadrantal weir—that is, a weir in which the angle $ACD=90^\circ$ —a right angle— $AD=2BC=2h=p$; hence $p=2$. Making $c=.616$; $(2g)^{\frac{1}{2}}=8.025$,

Our Trade With Venezuela.

From all accounts it appears that the people and government of Venezuela manifest a decided preference to trade with the United States in preference to any other country. As an evidence of this preference is the fact of the offer on the part of that government by special concession of the entire basin of the Orinoco—a most magnificent valley—for development by citizens of this country. The Government is anxious to have this valley properly improved, and it prefers to offer special inducements to citizens of this country to settle there, because of their energetic character and their readiness to conform to the laws and customs of the country; and furthermore they prefer this alternative rather than encounter the hazards arising from internal insurrections among their own countrymen. A liberal sprinkling of American capital and American labor, they think, will no doubt also have a powerful influence in producing stability in both political status of the country and in its industrial relations. There can be no doubt as to the partiality of the Venezuelans for the United States, and we have only to exert ourselves in the right direction in order to build up a very remunerative trade with that growing country, so rich in its natural productions. As a guide to what is needed to be done on our part, we give the following extract from a late Venezuela letter to the *Boston Herald*, evidently written by some one connected with the Congressional Committee which recently visited South America:

Standard Complaints Against American Manufacturers.

"I went into the great dry-goods house of H. Rohl & Co., in Caracas, the other day, and was shown a pile of cotton drillings as big as a haystack, every piece being marked 'Best American Drillings, Massachusetts, U. S. A.," when not a yard of it came from the United States, but every thread of it from Manchester, England. Mr. Rohl very frankly explained that the trademark was fraudulent, and was placed upon the goods to deceive the people who want American goods.

"But why don't you buy them in America?" I asked.

"Because the manufacturers in America will not fill my orders," said Mr. Rohl. "I have tried them over and over again, and was finally compelled to send to Manchester for the goods, and have them labeled with bogus trademark. The trouble is that the cotton manufacturers of the United States have not wanted our trade enough to comply with the peculiar demands of this country. These drillings are used for clothing almost exclusively by the common people, and I sell thousands of yards every day. To suit this market they must be of a certain width, of a certain weight, and so many yards in a piece. Your manufacturers do not appreciate the importance of this; they know more about this trade than I do, and when I send them a sample and an order for so many pieces exactly like it, they send me something different. They haven't got the exact article on hand, but say what they send will answer just as well. It won't answer as well; it cuts to waste and the retail merchants will not buy it. Nine out of every ten orders I have sent to the United States have been answered in this way, and I have given up buying there, and send to Manchester, where I can get precisely what I ask for.

"Then again," continued Mr. Rohl, "the American manufacturer will not pack goods to suit this market. All duties in this country are assessed upon the gross weight of the package, and a large part of the goods are sent into the interior on mule-back. The American manufacturer cannot be made to see the importance of packing goods so that the package is deprived of every ounce of surplus weight, and light enough to be carried on the back of a mule. I do not want to pay heavy duty upon a lot of pine boards made into a packing case, when the goods can be sent in light bales just as well, and I do not care to stand the expense of repacking American goods when I can buy the same thing properly packed in Europe. I suppose much of the difficulty lies in the ignorance of American manufacturers, who have not studied the condition of this market, because the demand at home has hitherto been great enough to keep their mills busy. If they want to sell goods here, they should send agents to Venezuela to investigate and inform them as to what is required, as the European merchants do. We have English and German agents calling upon us very frequently, but I don't remember when there was a drummer here from the United States. If your people want this market, they can control it by complying with the requirements of our people."

The statements of Mr. Rohl have been repeated by almost every merchant the commission has seen, and the same complaints apply to all other classes of merchandise, as well as dry goods.

A MANUFACTURER'S WORKMEN constitute his family. If well fed and considerably treated, they will make him rich. If dealt with in a cold, unfeeling and mercenary manner, the more independent will rebel and leave, while the others will perform their tasks with more or less sullenness, careful to give no extra minute of time of unnecessary stitch of work; and the master's profit in that case can only come from low wages, long hours and the exertions of exacting foremen.

USEFUL INFORMATION.

HOW TO TAKE OFF A HIDE.—The hides of farm slaughtered animals have a poor reputation, because of the careless way in which they are stripped. Calf-skins and sheep-pelts are reduced one-half in value by being cut and gashed and improperly stretched. When a hide is stripped off it should be stretched at once and pegged out to dry, with the flesh side upward. If it is rolled up, thrown into a heap and left to dry in that shape, it is so mean-looking that a buyer will offer only half its real value. A few hints in regard to taking off a hide may be useful. The throat should never be slit crosswise, either in killing or taking off a hide. The skin is slit from the chin down the brisket, in a straight line to the tail. It is then cut around each hoof; the hind legs are slit behind over the gambrel, but the front legs are slit up in front, over the knee. This leaves the skin in good shape for finishing the leather. The heads and legs are first carefully skinned, and all cutting the skin is avoided. The skin is then easily drawn off by taking hold of it firmly and pulling it steadily. It is then spread out evenly on a floor and salted with fine salt. If there is but one it is best to stake it out as soon as the salt has taken, and dry at once in a cool, shaded place. If there are more than one they are laid upon each other and salted quite freely, and afterward they are thoroughly dried. If the skins are to be kept on hand they should be closely watched for moths or grubs.—*American Agriculturist*.

PRESERVATION OF COAL FROM CRUMBLING.—Freshly mined coal is capable of condensing several times its volume of oxygen in its pores. The oxygen absorbed enters into chemical combination with the easily oxidized constituents. According as the absorption is rapid or slow, a greater or less elevation of temperature is produced. In the former it may lead to spontaneous combustion. The crumbling coal is, among other causes, a consequence of the absorption and condensation of oxygen in its pores and the chemical changes taking place. The escape of the hygroscopic moisture favors the absorption of oxygen. The pyrites can only produce a promoting effect on the increase of temperature when present in considerable quantities, and then only in the presence of moisture and air. In the dry state they must be regarded as perfectly passive, and may even be detrimental to the warming. Freshly mined coal, therefore, according to a writer in *Van Nostrand's* magazine, placed in an atmosphere of steam can suffer no change. Even with the incomplete exclusion of air, it will be found that the steam will, in general, oppose oxidation and warming, principally by uniform moistening of the pieces of coal.

MEASURING THE HEIGHT OF TREES OR OTHER OBJECTS.—The height of a tree, a steeple, or other object where a continuous shade can be obtained, is very easily and correctly obtained as follows: Suppose you want to find the height of a tree which throws a shadow of 20 feet. In the first place, I should cut a stick, say 3 feet long, stick it up opposite the required tree, and measure the shadow of it. We will suppose the stick throws a shadow of 2 feet: now all I have to do is just to make a simple proportion sum of it.

Shadow of stick 2 feet	:	Shadow of tree 20 feet	:	Height of stick 3 feet
		3		
		240		
		30		

The height of the tree throwing a shadow of 20 feet would be 30 feet; because as 2 feet is to 3 feet, so is 20 feet to 30 feet. By this method you can measure any tree that the sun shines upon, provided there is nothing to hinder measuring its shadow.

FILES.—Cabinet files—In shape like a cabinet rasp. On flat side it is double cut and grade of "bastard." On the oval side it is the same grade of cut or bastard half-round. Warding file—A file in cut and grade of cut the same as "flat." It is seldom made over eight inches in length. In appearance very much like a flat file—differing in three ways. It is forged more to a point than a "flat," and compared with the same length of "flat" file is not so thick, but has more width. Joint file—In shape a thin "equaling." It is cut on the edge only, and is sometimes made with round and sometimes with square edges, according to the wishes of the buyer. It is known also as a "drill" file. As regards thickness, it can be ordered by numbers, according to Stubbs' metal gauge.—*Amateur Mechanic*.

A MILFORD, MASSACHUSETTS, machinist has a top made by himself that will spin continuously for half an hour. It is made of solid iron about the size of a roller skate wheel and has a hardened steel peg. He spins it on the bottom of a tea-cup, and the balance is perfect. The top can be arranged to illustrate several scientific experiments.

RAILROAD BALLAST OF SALT.—There is a vast bed of rock salt in the Colorado desert, near Idaho, and the Southern Pacific Railroad in laying the track to the salt mine, have been obliged to grade the road for 1200 feet with blocks of beautiful lumps of salt crystals. This is the first

instance of a railroad roadbed being laid and ballasted with salt, of which we have any knowledge. The sea that once rolled over this place dried up and left a vast bed of salt about 50 miles in length. The quality is superb and supply inexhaustible. Grasshoppers of enormous size and giant centipedes have been pickled, and are to-day after the lapse of centuries, in full size and perfection of shape.

SHOP HANDS.—A shop where all hands seemed to regard each other as men would be an interesting place to visit, but we do not expect to find anything of its kind this side of the next world. If a man gets hurt and is laid up for three months, the boys will take right hold and patch up a goodly sum to help him along, but if he cuts off a finger or smashes his thumb they will all take a look at it and go back to work saying "good enough for him, always into something that didn't concern him," "can't mind his business, and had to fool around that saw" or "served the cuss his lesson that time; guess the boss won't run on to my job again." And all bands settle down to making life unpleasant for some other poor chap who would gladly meet half way in good fellowship his comrade toilers, but who gets a sunb after trying it once, soon gets as bad as the rest, and hunts up his neighbors' weak points to vent his own sourness upon.

The "largest steel casting" is still under discussion. S. T. Wellman, superintendent of the Otis Iron and Steel Company, of Cleveland, writes to the *American Machinist*: "I see by your issue of July 18th that the Standard Steel Casting Company, of Thurlow, Pa., have made what they believe is the largest steel casting yet attempted in this country, weighing 27,000 pounds. About a year ago we made for our own use a pair of steel rolls weighing each, when finished, 31,000 pounds. The charge in the furnace for each weighed 42,000 pounds. They turned up as perfectly as any iron roll could be made. Besides the above we have made several steel castings which weighed in the rough from 30,000 to 34,000 pounds."

PEACH WINE.—The flavor of the peach is superior to that of any other fruit in the world. Peach wine has been made from the juice of soft ripe peaches, which, it is said, by means of a certain process of manufacture becomes a wine of the most delicious character and the very choicest flavor. It is further said that no alcoholic liquor of any kind, and no alcohol in any shape is added; neither are any drugs or chemicals added. The process is new, and according to the *Insno Independent*, is the invention of S. A. Denmore of Independence, who has taken out a patent for the same.

TO MAKE SHINGLES DURABLE.—Those who have experience say that the durability of shingles may be doubled by dipping them into gas tar and resin—boiled into a pitch—while the mixture is hot. The top need not be coated. This substance fills all the pores of the wood so perfectly as to make the shingles impervious to water, in fact they are claimed to be next to slate in point of durability as roofing material.

SHAMPOOING LIQUID.—The liquid employed by barbers for shampooing is made as follows: Dissolve one ounce potassium carbonate (salts of tartar) in one quart soft water; sprinkle freely on the head, and rub well till a lather is formed; wash off with clean water.

A TALL SMOKESTACK.—A smokestack for a smelting works at Pueblo, Col., has just been completed, which is ten feet in diameter in the clear, and 319 feet high. The stack is made of iron and lined with fire brick.

SHIP SUPPLIES.—It is estimated that at least \$3,000,000 per annum are expended in San Francisco for ship supplies and by the officers and crews of vessels in their visits ashore.

GOOD HEALTH.

NEURALGIC HEADACHE OF WOMEN.—The increasing frequency of neuralgic headache among women must have a cause. There is one of simplicity which has been overlooked, and one to which it is worth while to draw attention. The pain experienced is generally located in one or more of the branches of the second cervical nerve, very commonly those terminating in the scalp at the back of the head. The nerves of the scalp are irritated by the hair being drawn tightly back and put on the strain, not as a whole, in which case the strain would be spread over a large area of the surface, but by small bundles of hair which are pulled back and held in place by hairpins. Relief is experienced by removing the hairpins, but this has only a temporary and partial effect. The injury done is lasting, if not permanent, in its consequences. The present style of dressing the hair should be discontinued, as it in part accounts for the prevalence of a form of suffering which is both intractable and distressing. If it were the fashion for women to wear the hair short instead of long and tied up, there would be less headache than there is.—*Herald of Health*.

MILL GIRDERS.—In a recent paper on mill architecture in the *Journal of the Franklin Institute*, Mr. John Hexamer gave some excellent hints. Speaking of girders he said: "Girders should be solid. When it is necessary to use

compound girders, they should be tightly bolted together, so as to leave no intervening spaces. In storehouses, etc., where there is but little vibration, girders may be inserted in the wall by placing them either on brackets or a short distance into the wall, with beveled edges, without any further anchoring. In mills where the amount of vibration is great, Woodbury advises to securely bind the beam to the wall by embedding in the masonry a flat cast-iron plate with a transverse fin upon each side near the end, one to secure the plate in the wall and the other in a groove across the under side of the beam, firmly secured by wedges driven in at each side of the fin. The bricks in the wall for about five courses above the beam should be laid dry, and the upper edge of the beam slightly rounded, and an air space should be provided at each side of the beams. Under no consideration should the old-fashioned anchorage of fastening the girder on the outside of the wall with a large anchor plate be used, as when the beams burn through the leverage brought to bear on the wall will overturn it."

PNEUMONIA PARASITIC.—According to Mr. Germain See, pneumonia may be epidemic, and he has endeavored to ascertain whether such attacks are distinct from ordinary pneumonia; such a view is demonstrated to be erroneous, and it is clear that there is no pneumonia due to cold; whether sporadic or epidemic, it is always parasitic in origin. The parasite is in the form of an oval micrococcus; it may be separate, or in short chains of four. Inoculated into animals it produces common pneumonia, such as is seen in man; in many cases the microbe has extended beyond the lungs, and, by invading the neighboring organs, giving rise to pleurisy and pericarditis of the same nature as the pulmonary inflammation.

Pneumonia, then, may be considered as a specific parasitic disease, which may be reproduced in animals, but cannot be brought about by physical or chemical irritations introduced into the lungs. It may be absolutely distinguished from such other forms of acute inflammation as bronchitis or broncho-pneumonia, for in them microphytes play but a secondary role, and the first cause of them is cold. Parasitic pneumonia has a regular and definite course, just like erysipelas; its duration does not extend over nine days; for a week there is fever, which then suddenly dies down.

CURVED SPINES.—The chief cause of this deformity is continuous sitting in school or in many other occupations. We lead unnatural lives, sitting three-quarters of the time, while this is the worst position there is for human beings. The injurious effects are most marked in children who grow so rapidly as to be lax in their bearing and who are phlegmatic and naturally indolent. Professor Billroth proposed as precautions against curvature and as suitable treatment for it, gymnastics, swimming, riding, massage, leaning often, work done while standing and lying down, proper desks and tables, an hour or two of complete physical rest during the middle of the day, limitations of mental work, and protection from physical and mental fatigue.—*Herald of Health*.

CIVILIZATION AND EYESIGHT.—Eyesight is not improved by civilization. For instance, in 1812 shortsightedness was almost unknown; now it is very common. We shall, however, eventually remedy this. The proper use and culture of the eyes will in the end prevail. Injury to the eye results from not knowing how to use and care for it. Parents know about how far their children can walk, bow fast they can run, how high they can jump, but not one in 500 parents know anything about their children's eyes, and how they should be cared for. If they would study this subject more we should have fewer poor eyes.

TOO MUCH BLOOD.—Too much blood is as fatal to brain work as too little. The fullness of the vessels and its pressure on the brain cells prevents their healthy action. The body is a machine, like an engine, and we must constantly feed the fires; but it is more than a machine and has secret laws of its own, which suggest we have other duties to do besides feeding the fires and getting up the steam as high as we can. There is such a thing as bursting the boiler by high pressure, and the brain also.

SIMPLE CURE FOR DYSENTERY.—A correspondent of *St. Louis Medical Journal* writes: In 1830, while practicing in Madison county, Ill., I was induced by the representations of an old lady to make the trial in dysentery and diarrhoea, of tablespoonful doses of pure cider vinegar, with the addition of sufficient salt to be noticeable, and it acted so charmingly that I have never used anything else."

TO KEEP MOSQUITOES AWAY.—The *Angler* vouches for the effectiveness of the following mixture for keeping mosquitoes away: Olive oil, three parts; oil of pennyroyal, two parts; glycerine and ammonia, each one part. To be well shaken before applying to the face and hands. Avoid getting the mixture into the eyes.

HAY FEVER.—It is generally supposed that what is known as "hay fever" is a complaint of quite recent origin. A French scientific journal, however, says it can be traced back as far as the 16th century. It was formerly known to the faculty as *coryza a rosarum odore*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE WHITE MINE.—Amador Dispatch, Sept. 17: Mr. Duncan McKenzie, representing a company of capitalists, has bonded the old George White mine near Jackson Gate, and has already commenced work on it in the way of cleaning out the old shaft and getting it in working order. We understand that in the course of three or four weeks a "donkey" engine will be put up for the purpose of hoisting water and rock. They also contemplate putting up a fine quartz mill some time in the near future, if the prospects hold out as good as anticipated. Messrs. Mello & Costa are still taking out good looking rock from their new silver mine near the Gate. But the work is progressing slowly on account of so much water in the mine. They are anxious to get some capitalist interested in the mine so as to help them put up machinery to go ahead faster, they being confident that it is a good investment.

LOYAL LEAD.—Amador Ledger, Sept. 19: The mill has been idle since the 4th of July for lack of water. In running a tunnel east from the North Gover ground, after getting some distance within the Loyal Lead boundaries, a ledge of ore was struck, which had been penetrated eight feet, without getting through it. It shows free gold. In running a crosscut from the stopes of the old works in an easterly direction, at the depth of 50 feet from the surface, another ledge seven feet thick has been encountered, which also looks of a good paying quality.

MOORE.—A contract was let this week to sink the shaft 200 feet deeper, which will give a total depth of 400 feet. The contract was let at \$10 80 per foot to some Italians, but they threw up the job Wednesday night. Mr. Nevills now intends to prosecute the work by day labor.

MISCELLANEOUS.—Mace's mill was started Monday night on rock from the Modoc mine; there is about 20 tons to be crushed. A new and more powerful air-compressor has been ordered for the big tunnel at Middle Bar. The tunnel has made slow headway of late, owing to the fact that only one drill can be run with the present machinery. The tunnel is heading for the point directly under the upper tunnel where the large chimney of pay ore is now being worked. About 400 feet remains to be tunneled before it is expected to reach this ore body.

THE PLYMOUTH CON. CO. are constructing a ditch from the Pacific mill to the gulch southwest of town. It is believed that the work is intended to carry the tailings from the Pacific into Dry Creek, so as to suppress this cause of annoyance to the Amador and Sacramento canal. A large force are at work on the ditch, and it will probably be finished this week.

Alpine.

GRAVEL.—Alpine Argus, Sept. 19: The Chinamen who have been prospecting the Alpine gravel mine lately, left for Carson this week. They got some very good prospects in the gravel near the surface but could not test it on the bedrock on account of the water. We understand that they intend to rig up a pump over the channel so as to make a more thorough prospect of the mine.

Nevada.

ALPHA MINE.—Grass Valley Union, Sept. 16: Ten tons of quartz from the 200 level of the Alpha mine have been hauled to the Rocky Bar mill as a test of the 650 tons now on the dump at the mine, from which a good result is anticipated. Supr. Springer has shown much energy in pushing work since he has taken charge of the mine, and being backed by ample means will place it in good condition for the extracting of ore as fast as the work can be accomplished.

HORSESHOE MINE.—Grass Valley Union, Sept. 20: The new improvements at the Horseshoe mine, are going ahead briskly. The ditch to convey water to the mine has been put in order, the foundations for the frame-work of the new wheel have been laid, and other work is in progress. A wagon road leading down to the mine has also been constructed. It is expected that the new water-wheel and pumping gear will all be in place in four weeks, when the underground work in the mine will be at once resumed.

Placer.

GOLD RUN ITEMS.—Argus, Sept. 17: The Everhart boys have a mine situated near Secret Town, two miles west of Gold Run, which bids fair to become a valuable possession. They first began working it May 10, 1884, and have worked it at intervals since then. It is a quartz lead, the ledge being 16 inches in width at present, the top and bottom are well-defined walls, the western one being of porphyry, the other of black slate. The ledge is reached by an incline extending 34 feet into the side of a hill, which makes the perpendicular depth from the surface to the bottom of the incline 75 feet. The men are now working ten feet below the water line. About a fortnight ago 10 pounds of the rock yielded \$15. Some of the rock is expected to go \$2500 to the ton. They have 15 tons of it ready for crushing. It is the intention to have it crushed, if possible, at the Rising Sun mill, near Colfax, but if it cannot be crushed there they will send the quartz to Grass Valley. The owners of this property are C. M., J. E., Thomas and Mrs. H. B. Everhart, W. K. White and J. Y. Thomas are working a gang of Chinamen on the riverbed in the North Fork of the American, near the mouth of Canyon creek, and they are doing first rate. One week lately they took out \$400. They have been operating there about five weeks.

QUARTZ MINING.—Placer Herald, Sept. 19: We mentioned last week that extensive arrangements were being made for working the Boulder ledge; that the Morning Star was adding five stamps to the capacity of its mill; that work had been started again on the old St. Patrick; that they are getting things in order for resuming work on the Green mine, and that the Gold Blossom was turning out some good ore. In addition to these items, all of which tend to show a material awakening in the quartz mining interests in this part of the county, we learn that Mr. W. J. Lawrence has completed arrangements for the erection of a new mill on his ledge a short distance below Newcastle; that Mr. Dan Kennicott is developing an extension of the

Julian mine in the same neighborhood, and that the Schnabel brothers have recently returned from Arizona and are preparing to start the Julian again. Within the last few months there seems to have been a decided impetus given to the matter of quartz mining in this district. That there should be is not surprising. There is plenty of capital in this country and it is seeking investment, and by economical and judicious management this section offers more favorable inducements than many places more remote that are attracting great interest. If Steve Quinn had taken the money from a mine in Arizona that he recently realized from his ledge near Bellevue Hill, a report of the fact would have caused a regular boom and induced the investment of much capital in that far-off Indian ridden country, while here, close to home, the strike created hardly a ripple of excitement. And if some man in Cœur d'Alene should find a \$250 nugget of pure gold, as was found in Doty's Ravine a week or two ago, the country would have gone wild; while here the occurrence simply suggested the thought, that there are a few more left, if you only knew where to find them.

Plumas.

BUCKEYE MINE.—Plumas National, Sept. 19: Mr. Poe, of Mohawk, informs us that he has struck a body of ore eight feet wide in the Buckeye ledge, at a depth of 55 feet, that prospects very favorably. Messrs. Chamberlain & Flint, of Reno, are partners of Mr. Poe, and they propose to prospect the mine thoroughly with a view of putting up a mill this fall or early next spring.

GRANITE BASIN.—Mr. Johnson, of San Francisco, informs us that he will put machinery on the Siebert and Homestake mine in Granite Basin this fall. The ore in this mine assays well, but has never been successfully worked on account of base metal. Mr. Johnson is confident that he has a process by which it can be made to pay.

Shasta.

QUARTZ.—Shasta Democrat, Sept. 16: Ed. Hume and Silas Stickley last week struck a very promising gold quartz prospect near Buckeye. Much of the surface ore is worth \$40 a ton. Ollie Whitton came down from his Squaw creek mine yesterday and brought with him 22 ounces of gold amalgam, the result of a few days' run with a horse arastra. The prospectors who are rooting around in old abandoned prospect holes that were deserted in early days as worthless, are now uncovering some excellent gold and silver ores. Yesterday morning Willard & Weil bought about \$400 worth of gold dust mined at Copper City. This shows there is money in the ground in that camp outside of the base quartz. It was reported in town Monday that Robinson had disposed of his interest in the Salt creek tellurium mine. His interest consists of a written contract requiring him to erect on the mine machinery to work the ore with, in return for which he is to receive one-fourth of the net proceeds. About 15 quartz claims have been located between the Middle creek and Shasta and Spring creek roads since Porter and Alexander located the Shasta Prince on the 9th inst. We are told that the quartz is of a bluish cast, fine grained, and some of it assays as high as \$500 to the ton. Yesterday we learned that ex-Governor Perkins was interested with Mr. Mathew in the purchase of quartz mines at Lower Springs, and that the Governor is expected up this week. We are also told that it is the intention of this company to erect a mill at Lower Springs this fall. Senator Foster, of Red Bluff, is endeavoring to form a company to build a large custom quartz mill in the Bullychoop district. Developments in that district within the past year have demonstrated that a good-sized custom mill would pay big money on the investment. Last Sunday, in company with Hon. Reuben Clark we visited his mine at Quartz Hill. We found since our last visit that great improvements had been made. All the machinery is in place, consisting of ten Hammond stamps, rock-breaker and self feeders, two Frue concentrators, engine, pump, etc., and a 10,000-gallon water-tank that supplies the whole works with water. Several tons of rock had been crushed just to try the machinery, which was found to work nicely. Last week Dan O'Neal struck another rich chute of ore on the first extension, south of the Florida. We have seen some of the ore and it is about as rich in free gold as any we have seen in the county. All the miners and "old residents" say they have never known water in the mountains to be so low and scarce as it has been this fall. Many mountain springs which always afforded plenty of water are now almost dry; even there is now less water in the Sacramento than was ever known to the "oldest inhabitant."

FROM WHISKYTOWN.—Work on the Mad Mule mine, superintended by F. M. Stocking, is progressing nicely and prospects look favorable for a big find. J. S. Strode has resumed work on the old Pinetop mine and will no doubt develop a fine property. Repairs are being made on the old Phoenix dam, and I understand that a five-stamp mill will be erected here in the course of a few weeks for the purpose of crushing rock from the Phoenix mine.

GOOD ROCK.—Shasta Courier, Sept. 16: McConnell and Morland, of Shasta, have purchased Jack Strode's quartz ledge on Kanaki gulch west of town and are finding rich rock. We understand that W. T. Coleman has recently made additional purchases of mining property in this county.

IRON MT.—The negotiations for the sale of Iron Mountain were said to have been closed this week. Camden, Magee and Salee went down to San Francisco Monday to put the finishing touches on the sale. We know nothing definite as to the price actually paid, but from the time spent in negotiations and amount of figuring by the parties concerned, we should suppose that not less than half a million was at stake.

Sierra.

PROSPECTORS AT WORK.—Sierra Tribune, Sept. 11: Judging by the number of prospectors at work out in the hills, we should not be surprised to hear of some valuable strikes being made before winter storms set in. Tuesday the first clean-up of the Young America mill was made, after a 17 days' run with 10 stamps. The result of that clean-up was \$16,000 in gold bullion, which was brought to town in the afternoon by Manager A. C. Busch. The gold was molded into two handsome bars, the workmanship of which reflected much credit upon Philip Deidesheimer, Jr., who has charge of the assaying department at the mine. The first run has proven

conclusively that the excellence of the mine has not been over estimated even by the most sanguine. Sam Thompson is driving ahead work on the new 10 stamps, and if all goes well they will start up in four or five weeks. There is enough ore on the dump at present to keep the mill going five months without taking a pound more from the mine.

GREENHORN MINE.—The well known Greenhorn mine, on Greenhorn creek, owned by a Grass Valley company has been bonded to T. W. Hughstone, of Oakland, who has associated with himself other Oakland parties and residents of this place to work the mine. The mode of operation will be to extend the tunnel on the ledge and obtain a large extent of backs, which the lay of the ground permits. The vein is quite large, and although of low grade can be mined and milled so cheaply that rock yielding \$7 per ton will give a handsome profit. In due time the new company will put up a mill in order to avoid the cost of hauling the rock to the custom mills of the district. The bond upon the mine is for 18 months, and 10 per cent of the gross proceeds is to be paid by the lessees, which amount will go toward paying for the bonded price of the mine in the event of the property being finally accepted. Work is to be commenced immediately, and Stephen Fowler, a well known miner of this district will be foreman. The mine is well thought of here, and with the proper development it is confidently believed that it will become a good paying property.

BALD MT. EXTENSION.—Mountain Messenger, Sept. 19: Owing to the wearing out of the pumps now in the extension shaft, a new and larger pump has been purchased. The pump and rigging are now at Columbia Hill, Nevada county, where it was used in sinking a deep shaft on a gravel channel. Next Monday teams will start from San Juan for Columbia Hill to load the material, which will be landed at the shaft by the last of the week at least. The pump is a 10-inch cylinder, single-acting plunger, Cornish pump, with a stroke of six feet, which when run at a piston speed of 72 feet per minute will raise 26 inches of water. Probably a speed of 54 feet per minute will be all that will be required to raise sufficient water for the use of the mine. An experienced pump man has been employed to put the pump in place in the shaft. Bald Mountain Extension Co., Forrest City, cleaned up last Sunday 165 ounces. The gravel is somewhat hard now, and has to be blasted. An eight-ounce nugget was found sticking out of the gravel on the dump.

ABOUT THE YOUNG AMERICA MINE.—Sierra Tribune, Sept. 19: Last Friday the vein was struck in the lower tunnel at the Young America mine. At the point where it was tapped (in the crosscut 15 feet from the main adit) the ledge measures 3½ feet strong and is just as rich in free gold as any place in the upper workings. The lower tunnel is in the hill between 600 and 700 feet and the distance from there to the upper tunnel, in a perpendicular line, is about 200 feet. We firmly believe that the Young America stands to-day as one of the greatest gold mines ever uncovered in the State. We also believe that ere another season rolls around Sierra City will take its place as being the center of the best quartz mining region on the coast.

Siskiyou.

ORO FINO.—Cor. Yreka Union, Sept. 17: The quartz mines are beginning to look up again. Carson & Co. are beginning to stope out the ore from the Italian Pete ledge and will take out 200 or 300 tons by the time water comes. The ledge is from one to three feet thick and prospects well all through. Connor & Co. have got their ledge well opened and are getting big prospects, as high as \$50 to the ton. The ledge ranges from six to fifteen inches thick and bids fair to be one of the best in the camp. There are several more ledges being prospected that show equally as good prospects as those above mentioned but are of smaller dimensions. The Weeks & Williams claim, on Indian creek, was sold to a company of Chinese about the 25th ult. for \$26,000—\$8000 down and remainder taken as it comes out, over and above the natural expenses of the claim. Mr. Williams runs the top of the claim and receives the money, while the Chinese run the bottom until the debt is paid.

San Bernardino.

CALICO MINES.—Print, Sept. 20: At the Blackfoot a few men have been discharged, as the supply of ore has somewhat decreased, but prospecting is being pushed forward with sufficient evidence that another rich body of ore may be opened. The company believes in progressing cautiously and avoiding any unnecessary expense. The company operating the Blackfoot recently purchased the "Lion" mine from John McBride & Co., and under the foremanship of Dennis Flynn, employ some eight or ten men in developing the mine. There appears to be an abundance of good milling ore in sight and easy of extraction. Childs & Co., owners of the Mary Bell, east of the Blackfoot, are working the same with encouraging results. John Benefield is working on the west end of this mine with the same results. Owing to the absence of John McBride, work on the Plutarch was for awhile suspended, but now work on the same is resumed with the usual energy of the owners. At the Odessa everything is moving along in first-class order. Probably no other mine on the coast is to-day producing as much bullion with the same number of stamps. The Odessa mill is under the management of E. J. Murray, who is likewise paymaster of the company as well as general financial agent and bookkeeper. At the Garfield, under the management of J. L. Patterson, superintendent of J. S. Doe & Co.'s mining operations, work is carried on in a systematic order. The King is preparing to erect hoisting works. No diminution of the ore bodies is reported. On an average of 40 to 50 tons of ore are daily taken to the company's mill from this mine. The Josephine, about a half mile north of the King, owned by Lawrence & Co., a tunnel is being driven in by Al. White, with good prospects. This tunnel has cut through several seams of ore, but the principal object is to reach the main ledge or ore chimney.

PROVIDENCE MINES.—Calico Print, Sept. 20: Since the burning of the mill in August of the Bonanza King Con. M. & M. Co., almost a complete shut-down has taken place. The insurance on the property has been adjusted and paid, and the president, Wilson Waddingham, has gone East to New York to see what his company is going to do. A new mill without doubt will be erected during the winter, perhaps of greater capacity than the last. The debris of the old mill is being cleared up, when everything will be shut down to await the action of

the company. The mine has never had more ore in sight than at present and especially at the lower levels, 7th and 8th. It is not necessary for the company to prospect as they could keep a mill running providing they had a mill erected, but the ways of companies invariably take their own time and way of doing things.

The Mozart group of mines are being prospected by 8 or 10 men. A main shaft is now down 75 feet; they are crosscutting to cut the ledge which with the dip of the mountain would give them 180 feet of a stope; the ore body on top is large and well defined. Another of the group Mineral Point is having a tunnel run on the left which shows a body of high grade ore.

The Belle McGillroy mine is being steadily worked by the owners. They now have on the dumps, some 30 tons of first-class ore and about 200 tons of lower grade. This mine now shows a continuous body of ore for 125 feet in depth, at least 1000 ton of medium grade ore in sight and in any other camp it would be called a good high grade.

The Kerr and Patton property has been bonded to some Los Angeles parties with a forfeit of \$1000 a month. They have expended some money in development for the past few months, showing that the mine improves with work, but as is the case in so many bonds, the bonder wants his pile at once, and matters now stand in statu quo for the present.

Tuolumne.

LOCAL NOTES.—Union Democrat, Sept. 19: We hear that some very rich rock is being taken from the Seminole mine at Summersville. A vein eight feet thick of fine milling ore is being drifted on the 600-foot level of the Buchanan mine. Work in the Dead Horse mine is at present confined to sinking. The shaft is now down below the 400-foot level, but it will be sunk to a still greater depth before a station is opened. Adam McKenzie, William Martin & Co. are working a bar at the old Central Ferry on the Stanislaus river, seven miles below Reynolds' Ferry. They have just finished their dams and got their derricks and pumps rigged ready for washing. We understand that there is a movement on foot in this county to reduce the rate of miners' wages. Miners now receive \$3 per day, but it is proposed to cut this down to \$2 50. So far none of the mining companies have made any move toward the reduction. Nervi's mine, about seven miles above Columbia, has developed into a fine property. An extensive chute of high grade ore has been exposed in the mine, and each new development makes the prospect brighter. A five-stamp mill is kept busy crushing the ore, which pays handsomely worked free. The new pump has cleared the main shaft of the Lampher of water, and work has been resumed in the south drift on the 500-foot level. There has lately been considerable improvement in the quality of the ore stoped from the South shaft. The rock being hoisted at present mills from \$20 to \$25 per ton. We learn that there has been an important strike made in the Pennsylvania mine at Soulsville, in which Mr. Leechman has a force of four men prospecting. In the South drift a fine vein of heavy sulphureted ore, about 18 inches wide, has been encountered. The ore goes high in free gold, and the chute promises to develop into a large ore body.

Yuba.

QUARTZ MINING.—Grass Valley Union: Quartz mining is looking up in the foothills of Yuba county. The Rising Sun mine of Brown's Valley, is yielding at the rate of \$45 per ton, and at Rose's Bar, between Timbuctoo and Sucker Flat, prospecting is being done with encouraging results, and a number of new locations have been made.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Sept. 19: The main south level drift from the deep winze has been extended to the distance of 72 feet from the winze, and is being pushed ahead energetically, skirting along the east side of the ore vein. It cuts through occasional projections and offshoots from the vein, which give high assays, indicating what may be expected when crosscutting shall be done westward into the vein. The main west drift or crosscut from the winze, same level is now out 42 feet, and is all in quartz of a very strongly mineralized nature, streaks and bunches of which give high assays, and good promise of something more concentratedly better ahead. No water is encountered in this direction as yet, and none is particularly feared, as the work is carefully conducted, and at the first sign of tapping water the work will be suspended until connection with the big pump of the Combination shaft is effected.

CHOLLAR.—The main west drift from the 3100 level of the Combination shaft during the past week, after reaching a point about 145 feet from the shaft, got into the main ore ledge and a few good assays were obtained from the face. Further advance in that direction was abandoned, and a branch or turn was made to the northward which is now out from the drift 42 feet, following the east side of the ledge toward a connection with the lateral drift coming from the Hale and Norcross. This main west drift from the 3100 level of the Combination shaft terminates in Chollar ground 60 feet south of the Hale and Norcross south line; therefore, after the connection aforesaid has been made, supplying plenty of good air, the drift is to be continued through to the west wall two or three hundred feet distant. A south lateral drift will also be made to develop the merits of the Chollar at that depth. The pressure pipe for the new half section of the big hydraulic pump in the Combination shaft is now on its way from San Francisco, and will probably arrive to-day. This will be put into practical operating position forthwith, taking about a week, after which the capacity of the famous pump will be doubled and crosscuts can be pushed west or in any other direction without fear of striking more water than the pump can handle.

BULLION.—The parties who are prospecting the upper portion of this mine, running a drift west from the 160 level of the old Fairview shaft, have suspended operations for the present. They did a large amount of faithful work under their lease from the company, but were disappointed in not finding any ore which would pay to extract and mill. After seven long months of hard work they are taking a rest.

CON. CALIFORNIA AND VIRGINIA.—The 1750 level continues yielding about 125 tons per day of

low grade ore, assaying \$14 per ton, extracted on company account. Only a few tons of ore from select points in the old workings above the 1550 level, under the Jones lease, are now being daily extracted, giving about \$18 average assay. On the 1400 and 1200 levels considerable exploration and opening up work is being done in preparation for the time when milling can be resumed, and ore extracted on a stronger scale than ever. The Eureka mill, which has been running on ore from the Jones ground, is now shut down for repairs.

CROWN POINT.—Some little prospecting work is being done in this mine and in the Belcher, but lack of milling facilities will not allow of extensive ore extraction just yet. The machinery has all been put in the most complete working order, ready for a long run. The Mexican mill is now in a full and complete state of repairs, ready for practical work with a good supply of water as a motive power. It can run only one-third of its stamps at present.

SIERRA NEVADA.—On the 520 level the crosscut west from the north lateral drift, 1000 feet from the shaft, has been extended 52 feet during the past week. The material in the face is softer porphyry and vein matter, containing some little quartz, being the first yet encountered worthy of mention.

BEST AND BRICHER.—On the 1900 level west crosscut No. 2 has been extended 22 feet during the week, making a total length of 207 feet. The material in the face shows no change, being still hard, dry porphyry, with a few seams of clay and quartz.

OPHIR.—Drifting westward for the 350 level of the old Mexican shaft is making good progress, and is about cutting into the old Ophir ledge and workings of several years ago. Good ore is expected to be met with at that point, which would not pay under former cost of extraction and milling.

GOULD AND CURRY.—On the 1000 level west crosscut No. 1 has been extended 48 feet during the week, making a total length of 380 feet. The material in the face is softer than heretofore met with and of a generally more favorable nature.

YELLOW JACKET.—Between 160 and 170 tons of ore is the daily yield from the old workings on and above the 7300 level. The Brunswick mill is running up to its full capacity and is given all the bullion material it can get away with.

ANDES.—Work still progresses westward on the 175 and 275 levels, the first being a good looking vein matter, and the second in quartz of a very promising character giving low assays.

MEXICAN.—The middle crosscut on the 500 level is now out about 170 feet, running at present in heavy, wet ground, which, however, is found more dry as the drift advances.

JUSTICE.—The north end of the mine continues its regular daily yield of about 25 tons taken out through the old Woodville shaft.

KENTUCK.—The regular daily yield of 30 tons continues to be hauled to the Rock Point mill on Carson river for reduction.

UNION CONSOLIDATED.—The north drift is being continued into the Sierra Nevada ground, and it is now proposed to crosscut west.

Como District.

NORTH RAPIDAN.—Virginia *Enterprise*, Sept. 12: The 30 tons heretofore mentioned in the *Enterprise* as being hauled from the North Rapidan mine, near Como, last week to the Rocky Point mill, on the Carson river, below Dayton, has been milled with very gratifying result, yielding \$34.35 per ton. Foreman Shirley, of the mill, thinks that he might have done better than that if he had been more familiar with the rock. The North Rapidan is owned by Senator Westerfield, District Attorney Keith and other solid men of Dayton. Work will be prosecuted at the mine more vigorously than ever now that it is ascertained to be a paying institution. Three hundred feet of 12-inch air pipe was sent up yesterday. The mine is opened by an incline, which extends to the 150 level, at which point the ledge is 40 or 50 feet wide, more or less; in fact, its real width has not been ascertained. It runs nearly north and south, with a dip to the east of about 45 degrees. The hoisting is done by means of horse-power, the rope passing over a gallows frame and under a wheel at the ground, this apparatus being known in the old country as a "whisper derry." The North Rapidan was formerly known as Orizaba, No. 2, and is situated on the Palmyra side of the Como ridge or divide. Surveyor Gignoux went up yesterday to define the boundary of the claim, which is 1500 feet in length; also, to survey some other claims adjoining.

VIENNA.—Wood River *Times*, Sept. 9: The Vienna mine is working a large force of men—about 60—and the mill will start up, it is expected, tomorrow. The ore-house is full to overflowing, with plenty more ore in sight, and once the mill starts up it will continue to run all winter. This is no idle rumor, as the information was furnished the *Times* correspondent from the office of the company. The Vienna company, by the way, has struck a rich and extensive body of ore at the bottom of the shaft—the lowest depth attained. This is what Mr. Johanson, the superintendent, has been working for the past few years, and now he feels satisfied that his is a mine in reality, and the lower it is exploited the better it will prove, as the ore increases in richness as well as in quantity. The Lion mine is being worked by a small force of men, who are taking out considerable ore. The camp seems dull to the old resident, but in reality it is better to-day than any other camp in the country. In all, there are probably about eighty men at work for wages, while a great many are doing the assessment work on their prospects.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, Sept. 19: The small mines of the district have yielded well the past week. Among the ore shipments to the reduction works in town reported to us are the following: To the Richmond—Hamburg mine, 43 tons; King Lear, 48; Continental, 1½; El Dorado, 4½; Home Ticket, 10; Lord Byron, 27; Lone Pine, 7; Prospect Mountain Tunnel, 5; California, 4; Silver Lick, 25; Williams, 8; Silver Connor, 17; and White Pine, 2. To the Eureka Con. works the Phoenix shipped 35 tons, and 15 tons of high grade ore was brought in from the Reville district.

MINERAL HILL.—From parties just in from Mineral Hill the *Sentinel* learns that a prosperous season is being enjoyed there. Barker, Spencer & Co.'s mill has ceased working tailings and is now busily

employed on ore of a good grade; that the company's mines are producing. Notwithstanding the tailings washed away by the recent flood there enough remains to keep the mill employed for two years to come. Altogether the situation at Mineral Hill is good, to say nothing of the promising outlook in the way of further ore productions that it has.

ORE SHIPMENTS.—Eureka *Sentinel*, September 19: Ore shipments to the two reduction works in town during the past week have been unusually good. To the Richmond works the Silver Connor shipped 33 tons, California, 16; Hamburg, 92; Eureka Tunnel, 2; White Pine, 3; and Bowman 23. The following named mines made shipments to the Eureka Con. furnace: The Union mine of Silverado, the Paul of White Pine Mountain, the Delphi, Jefferson, Enterprise and Bald Eagle. To the same works there was also shipped Alexandria, 8½ tons; Hawkeye, 7; and Lizzie L., 8.

Mineral Park District.

PROSPECTING.—Virginia *Enterprise*, Sept. 20: Several prospectors came in from Mineral Park district yesterday to procure supplies for winter, and see old friends, after an absence of some months, during which time they have developed their claims to such an extent that they feel warranted in working all winter. They show some good rock, and, of course, tell some good stories about their prospects. The veins in that district are large, carrying much pure gold in small stringers that promise to lead to something valuable. Twenty years ago Mineral Park was the objective point of a large number of prospectors, and considerable money was spent there by Constockers, who at that time were ready and willing to spend their cash in almost any locality that showed even a fair prospect.

Pennsylvania District.

PROSPECTING FOR WATER.—Pioche *Record*, Sept. 14: On Thursday G. R. Barton left with a 10-horse team loaded with supplies for Pennsylvania district. The district will be thoroughly prospected for water, and a 10-stamp mill will be erected at that point where sufficient water can be found nearest the mine. The quality and quantity of the ore have been satisfactorily demonstrated. A. McDougall has disposed of his interest in the district to Mr. Barton.

Reese River District.

WHAT IS GOING ON.—The following latest report from Superintendent Curtis, of the Manhattan Mining Company, at Austin, gives an idea of the mining operations of that locality: At the Lander shaft the breasts below the 700 continue to produce excellent ore, though in limited quantities. The 700 east drift carries a very small ledge, and a crosscut has been started into the hanging wall to prospect the hanging wall ledge. The winze being sunk below the 740 carries a large ledge of average ore. At the Paxton incline the tributaries in the several drifts continue to extract the usual amount of ore, though not of high grade as formerly. The 1440 and 1500 west drift are being advanced by tributaries and show no change worthy of note. At the Isabella incline the drift running west on the Currie ledge has been stopped for the present and stoping commenced on the ore already run through. Connection has been made between the 870 west drift of the Paxton and 500 north crosscut of Isabella, which affords a better outlet to the waste. At the Union shaft the two drifts east and west of the Union ledge are continued, but show little ore. The north crosscut is continued, but has not as yet cut any other ledge.

COLORADO.

PLACERS.—Denver *Tribune-Republican*, Sept. 19: Confidence in the gold resources of Colorado is daily increasing, and in a few years our product of gold will equal that of silver. This will come from placers fully as much as from lode properties. The magnificent success achieved by the Sovereign Company in Park county will strengthen the faith and nerve the hands of capital to engage in like undertakings. The sneers of old-timers can no longer deter men from vigorously working placer ground which those old fossils declared they had carefully tested and found too poor to pay. The marvelously rich banks extending on both sides of the Platte river from Alma to Montgomery stand as monuments to the shiftless methods and unskillful work of Colorado's pioneer placer mines. Ground of such even richness cannot be duplicated in any State outside of this, and hence it is remarkable that some old pan pretender did not stumble upon a knowledge of its great value. The ground is "lousy" with gold, as any one can verify, and it follows as a matter of course that these fellows who asserted that it would not pay to work were either bungling panners or else lied about panning it. It's not stretching the truth to say that the head of the Platte river will, in a few years, have a reputation for the production of placer gold unsurpassed by any of the famed gulches of past years. Placer mining, instead of being played out, is simply beginning in Colorado, and hence the statement that our gold product promises to equal or surpass that of silver. We have hundreds of thousands of acres of rich placer land that has been allowed to remain untouched for years simply because old-timers said it was not good, and people believed that they knew what they were talking about. California has produced more gold from her placer deposits than from her gold lodes, and Colorado can for a time repeat this history.

NOTES.—Boulder *News and Courier*, Sept. 19: The December mine, near Jamestown, is turning out some very rich ore just at the present time. Dr. Earhart and Col. Teters have a very fair prospect in a new gold find near the Emancipation, at Sunshine. The surface rock shows rusty gold very freely. Shaeffer & Co. made a shipment of 4,304 pounds of ore from the Smuggler lode last week, the different grades running all the way from five ounces to 508 ounces gold per ton. The shipment was the labor of three men 20 days, and brought \$816.11 at the smelter. The following shipments of ore from the Smuggler mine were made recently by Ingram and Duffie: 1645 pounds, \$163.44; 2470 pounds, \$246.99; 3388 pounds, \$270.14; 2067 pounds, \$271.89; 2502 pounds, \$1182.09. This is the labor of a small force of men for just one month, and aggregates 13,132 pounds of ore, yielding \$2137.53. A mill run of ore from the Romance lode in Central gulch, near Jamestown, gives the following favorable results: First-class, \$340.69 per ton; second class, \$75, and the surface mineral run \$101.05. The Romance is worked under lease by Messrs. Tomlinson and Burhams, who have spent the greater part

of the season in developing and getting the mine in proper shape.

IDAHO.

BLACKBURN DISTRICT.—Cor. Wood River *Times*. In your issue of the 27th ultimo it appears that you considered that the Blackburn Mining District had been changed to the "Oriental Mining District." I beg to state that there has been no change, but the facts are as follows: We have two mining districts in this portion of Alturas county—the Blackburn district, between Little Lost river and Birch creek, and the Ontario district, between Birch creek and Medicine Lodge creek. The Oriental district is situated in the extreme eastern portion of Alturas county. The first mines found in each district were discovered by Charles F. Blackburn. Mr. Blackburn and his friends were the organizers of these districts. There are some very promising mines in each district.

MULDON IMPROVING.—Colonel Bullentine came in from Muldoon yesterday, and went on up to Ketchum to-day. He reports about 50 men at work in and around Muldoon, and times there improving slowly. Sam Wilson has struck a six-inch vein of ore in the Black Spruce claim, from which he gets assays ranging from 2800 to 3100 ounces. Colonel Havens, who landed some claims near Muldoon for \$20,000 a short time ago, has quite a force at work upon them, and the claims are opening out satisfactorily. Several shipments of ore and bullion have already been sent out from Muldoon this summer via Tikura, which is the shipping point for that region, and more will follow from this time on until snow flies.

FROM ANTELOPE.—J. F. Kunkle and A. J. Becker came in to-day from the Dry Fork of Antelope, a district situated about eight miles west of the Horn Silver mine. Although the district was only discovered last May, there are several paying claims already, such as the Ajax, Gerie, Vance, Noonday, Mono, Belle of Camden, New York Boy, Henrietta, etc. Several shipments from these and other claims are on the way here to Houston. All ore assaying 100 ounces or over is shipped to Halley, and all ore assaying less is shipped to Houston. The ore is free milling and all high grade; assays go from \$2000 to \$25,000 per ton. Three tons of Ajax ore on the way here is expected to yield \$5000 per ton. Mr. Kunkle says that this is a poor man's district, as the mines pay from the grass roots.

THE GOLD BELT.—Superintendent Doniphan, of the Camas No. 2 Mining and Milling Company, came to town yesterday to bring in the bullion resulting from the last clean-up of his mill. He reports the supply of water somewhat increased lately, and expects no further trouble from lack of water until next summer; and even then thinks that the flow from the mine will be ample to run not only 10 stamps, but the 10 additional ones now being manufactured for him in the East. The mill began running about June 1st, and run about six weeks. During that brief run it turned out about \$5000 worth of fine bullion. This comparatively satisfactory result, coupled with the developments in the mine in the meantime, demonstrated that with 20 stamps and an adequate supply of water, the mill would prove a paying investment. An additional number of stamps was therefore ordered, and as soon as they reach here they will be put in place and the mill started up for an all-winter run. The cost of running and milling this summer has averaged \$4 per ton; but Mr. Doniphan is confident that with 20 stamps, he can reduce this to \$2.50 per ton. The mine is opening up splendidly and the lode shows three distinct and separate strata or veins. Close to the footwall a strip from 10 to 16 feet thick yields the richest gold and silver ore. A horse comes next; then the middle vein, which is 30 to 35 feet thick, the ore being somewhat lower grade, carrying pyrites and some bunches of high grade galena. On the footwall is a smaller vein of red and white quartz, carrying ore not quite as rich as that found on the hanging wall. This formation continues in depth, and is shown by a tunnel driven 75 feet below the surface outcroppings, and about 50 feet below the former lowest workings of the mine.

MONTANA.

TEN MILE MINES.—Helena *Independent*, Sept. 17: Not many weeks ago John Caplice left for New York for the purpose of organizing a company to develop the leads on Ten Mile, particularly those embraced in what is known as the Lee Mountain group of mines, and in a short time succeeded in organizing a company of capitalists to commence a systematic development of a large number of mines on Ten Mile. These mines embrace what is known as the Lee Mountain and Latham groups, the former containing seven leads and the latter six, making 13 in all. Besides these the company has secured the mill sites and water rights recently belonging to the Capital Milling Company. The company was incorporated under the laws of New York, and is known as the Consolidated Ten Mile Mining and Reduction Company. Mr. Caplice, besides being president, is manager in charge, and is authorized by the directors to commence developments at once by sinking shafts and running tunnels, the object being to develop a sufficient quantity of ore to justify the erection of machinery for its reduction. Men have already been set at cleaning out the old tunnels and shafts and work is fairly started on the Lee Mountain, Micawber, Stanton and one or two other mines. The design of the company is, first, to have plenty of ore in sight; second, railroad facilities; third, machinery. This is certainly an improvement on the happy-go-lucky plan that has heretofore characterized mining enterprises on Ten Mile.

THE DRUM LUMMON.—*Inter-Mountain*, Sept. 14: Henry Bratrobe, the popular assistant manager of the Drum Lummom arrived in the city Sunday night, and will remain several days. He says the company is making extensive improvements at the mine, and among other things has expended some \$30,000 in the past few weeks in covering their water supply to protect it from the winter's freezing. The bullion output now runs from \$75,000 to \$95,000 per month.

WORK.—Butte *Miner*, September 17: There is considerable work being done in the mines of this district outside of the large mining companies. The small mine owners, the lessees and tributaries are accomplishing a great deal in the work of opening up the wonderful mineral resources of this country. We are glad to see that there is a disposition on the part of the large mine owners and managers of this district to assist and encourage those who wish to take

hold and prosecute work on the small mining claims, and those places in large mines that have been abandoned by the management on account of the ore being so scarce, or of such a low grade that it will not pay for the company to extract. In many cases, miners are given a reasonable percentage to work those places, and very often, as a result of their hard work, (be it remembered that miners will do better work when on a lease, than they will when working on day's pay) ore bodies of considerable dimensions have been encountered, important developments have been made, and in many a mine is working to-day and adding to the mineral output of the country and to the wealth of its owners which would, but for the lessee, be lying idle and accounted of no value. There are a large number of these men at work in the mines of Butte city and surrounding country, and it is of almost daily occurrence that we hear of some small mill owner or lessee striking it rich in his claim or in the ground allotted to him. We have yet to hear of a case in this camp where a party of men have opened up a good mine under the above conditions, that it has been taken away from them by the owners, until they have been given a chance to make a stake out of the property so developed. This is as it should be, and will tend to encourage our miners to go out and open up mining ground that may be thought comparatively worthless.

OREGON.

NOTES.—Jacksonville *Times*, Sept. 19: Miners are again getting ready for winter. Prospecting continues at a lively rate in the Evans creek district. M. W. Knapp has returned from a prospecting tour into Siskiyou county. W. Eldridge, a San Francisco mining expert, went down to Gilice creek a few days since. The Sterling Mining Co.'s reservoir is well along and will be completed before many weeks. J. S. Brown left this place yesterday for Josephine county, where he will take charge of one of Wm. Bybee's mines. A company, of which Tim Dugan and Jas. Herley are members, have found excellent quartz prospects on Jackson creek. Neitz Bros., who are prospecting in the Gilice creek district, returned a few days ago and bring favorable reports from that camp. A great deal of prospecting is still being done in Jackson and Josephine counties and several promising ledges have been discovered. Marshal Curtis and others have purchased the Excelsior quartz ledge on Jackson creek, which was worked to good advantage in early days. It is reasonably certain that a quartz mill will be in operation in this vicinity before the end of the year. Such an enterprise would not only be remunerative, but of incalculable benefit to our county. Bragdon & Walsh of Ashland, who are prospecting quartz ledges on Wagner creek, are well pleased with the present developments. They have received returns from ore sent to Portland for assay, which leave no doubt in their minds but what their mines can be made remunerative with the proper apparatus. There is considerable ore of a good quality already in sight.

MORE DISCOVERIES.—Eedrock *Democrat*, Sept. 17: Mr. Strickland, who has thoroughly investigated the new camp, gives us the following cheering items: Several rich and well defined ledges have been discovered on the Red Mountain about three miles due north of Cornucopia, and 1½ miles from the Red Boy and Mountain Chief. They are on the north side of the west fork of Pine creek, close to the head waters of the Innaha. There are three distinct ledges, and from 15 to 20 locations have been made on them within the past ten days. They are plainly discernible for hundreds of feet on the surface, and the ledges vary from 18 inches to 3 feet in thickness. Mr. Strickland in his explorations ascended still further where he discovered and located an 18-inch ledge of beautiful quartz—similar to that of the Georgetown, Colorado, mines. Other new discoveries have been made still higher, but the season for prospecting in that altitude is about at an end, as the region of almost perpetual snow is close at hand. At the highest point gained by our informant he found a glacier of solid ice about 100 acres in extent, and could see six separate and distinct lakes in different basins of the mountains. His description of the scenery as beheld from his lofty perch would rival the glowing accounts of the Yosemite and other world-famed natural curiosities. His confidence in the country is unlimited and he bespeaks for it the grandest future of any camp on the coast. Osborn, Tartar, Leep and Denny have also made another valuable discovery of quartz on Snake river, near the mouth of Pine creek. These gentlemen own the Mountain Chief, Independence and Red Boy, four parallel veins within a belt of 400 feet, and the Greenhorn, 200 feet below the Mountain Chief, all a short distance above Cornucopia. The extension of the Red Boy, the Welcome, Golden Chariot, Queen of the West, Red Cross and Updyke ledges of which but little has heretofore been said are mines which give promise of great results. Mining men who have recently visited the camp are of the opinion that the bonding of mines by Neimer will be prolific of no good to the camp. He went in there and bonded the mines before they were in any degree developed, gave contracts for sinking at good figures and then left the men to complete the work. This established a bad precedent and was no incentive to induce other mine owners to develop their claims. Eastern men do such things, but western men have seen too many failures in mining enterprises to invest unless there is something in sight.

THE MAMMOTH BONDED.—Eedrock *Democrat*, Sept. 18: The Mammoth mine, about 30 miles southeast of Baker City, has been bonded to Eastern capitalists for \$50,000 for a period of six months, and already a force of men with a new outfit of tools are at work on the ledge. There is now a 5-stamp mill on the mine, and it has been used for several years, with fair results, although the process by which the ore was worked, saved only the free gold, while from the sulphurets, which are extremely rich and plentiful, no returns were obtained. A. B. Elmer, aware of this fact, succeeded in interesting Eastern parties in the enterprise, who claim their ability to work the sulphurets so as to obtain 95 per cent of the gold they contain. The mine has already been worked to a depth of 50 feet, and the ledge at that point measures 27 feet and 8 inches, and is much richer than on the surface. It will take some time to get the ledge in condition to work to an advantage as the parties last working it took out all the rock that could be easily obtained, but when it is thoroughly opened this vast ledge will be one of the cheapest to work and best paying mines in Eastern Oregon.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.
No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - - San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,
 218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ng Powder, and is used by all the Railroads and Oravel Claims, as it breaks more ground, pulverizes better and aves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,
 653 & 655 Mission St., San Francisco, Cal.
 E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL, The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

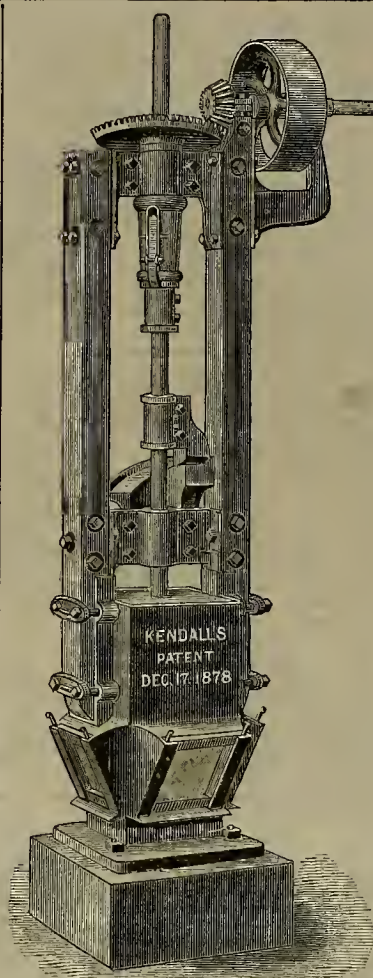
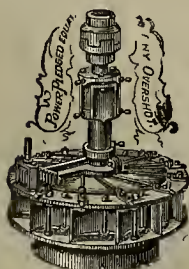
Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,
 Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



L. C. MARSHUTZ.

T. G. CATNRELL

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
 San Francisco,

...MANUFACTURERS OF...

Stationary and Compound Engines,

FLOUR, SUGAR, SAW and QUARTZ MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL

Send for Circulars and Price List.

DEWEY & CO.'S

Scientific Press



Patent Agency.

[ESTABLISHED 1860.]

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

GEO. H. STRONG.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by
 DUNHAM, CARRIGAN & CO., San Francisco, Cal.

JENKINS BROS., 71 John St., New York.



The California
 Perforating Screen
 Company.

All kinds of Quartz Screens,
 slot or round holes; zinc,
 copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.



RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives uniform satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, San Francisco.

HEALD'S

BUSINESS COLLEGE,
 24 Post St. S. F.
 Send for Circular.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.

PACIFIC Business College,
 320 POST ST.
 SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN & ROBINSON, Prop'rs.

Land Business at Washington.

Having associated with us able counsel at Washington, we are now prepared to obtain Patents upon Pre-emptions, Homesteads, Mines, Mexican Grants, and all classes of Land Entries; and to manage contests before the Commissioner of the General Land Office and the Secretary of the Interior. Advice will be furnished upon favorable terms. All business will be attended to promptly and on reasonable terms.

DEWEY & CO., Patent Solicitors.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.



SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue, 17 and 19 Fremont St., San Francisco.

"ACME" DRAWING PAPERS

QUEEN & CO'S

PROFILING AND CROSS SECTION PAPERS



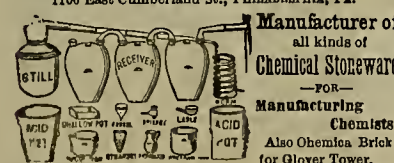
QUEEN & CO'S Improved TRANSITS and LEVELS, TAPES, CHAINS, RODS, RULES, and Drawing Materials of every description. List and description of our Ten Catalogues sent on application.

JAMES W. QUEEN & CO.,
924 Chestnut St., Philadelphia.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 600 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorsey, 529 Commercial St., S. F.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

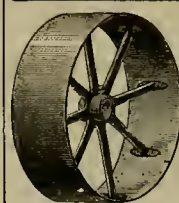
SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'fg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.
Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.
CLOT & MEISE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

DEWEY & CO. { No. 252 MARKET ST. } PATENT AGENTS.
Elevator, 12 Front.

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY

And Assay Office.

Highest Prices Paid for

GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO,

CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leidecorff Street,

Between California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures correct returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.

ORES SAMPLED, TESTED, ASSAYED.

J. KUSTEL.

H. KUSTEL.



METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidecorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analyses of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whals Line, etc., etc.

Extra sizes and lengths made to order on short notices.

TUBBS & CO.

611 and 613 Front St., San Francisco.

Mining and Scientific Press.

THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

Established in 1860, this paper has been eminently successful as a popular and useful mining and mechanical journal. Relative to precious metals especially, it is the leading mining paper of the world.

It is largely patronized by the leading Miners, Mine Owners, Superintendents, Engineers, Metallurgists, Chemists, Manufacturers, Mechanics, Scientific, Professional and Industrial "Men of Progress" on the Pacific Coast, and many leading Mining Men throughout the mining fields of the world.

It is by far the best advertising medium in the Pacific States and Territories for Mining, Mechanical, Engineering, Building and Manufacturing Tools and Implements Goods, Supplies, etc.

Being thoroughly able and reliable in its editorial and business management, and long established in the most progressive industrial portion of the Union, at present, its power as an advertising medium is unsurpassed.

Subscription, \$3 a year. Advertising rates, moderate. Send for samples and further information.

DEWEY & CO., Publishers,
252 Market Street, San Francisco.

Mining Share Market.

Mining stocks continue rather dull. The chief point of interest in the Comstock mining situation continues to be the deep workings and developments of the Hale & Norcross and Chollar on the 300-foot level from the Combination shaft. The situation, briefly stated by the *Enterprise*, is as follows: The main drift west from the Combination shaft, owned jointly by the Chollar, Hale & Norcross and Savage companies, has penetrated westward about 140 feet to the main ore ledge, being at that point 60 feet south of the Hale & Norcross south line, in Chollar ground. A drift was branched off due north, skirting along the east wall of the ore vein, in order to meet the drift coming south along the east wall from the Hale & Norcross deep winze. This south drift from the winze is making excellent progress, considering the disadvantage in handling the waste or debris excavated, and the connection between the drifts is expected to be made in about ten days. Good bunches of ore are met with as the drift skirts along the east wall of the ore vein, occasionally cutting through the projections and offshoots, and when crosscutting is commenced, which will not be before the desired connection is made, giving plenty of good air circulation, a large body of excellent pay ore is confidently expected to be opened. Meanwhile the drift or crosscut west from the deep winze, on the same level, is making good westward progress, running through a heavy body of strongly mineralized quartz, which gives good assays and a substantial indication of the great ore body lying southward, which, judging from what is shown in the face of the Combination west drift, must be 200 or 300 feet wide.

As to the price or fluctuations in stocks, the middle mine managers care precious little. What they are after is to develop their mine and its bullion resources, and they are doing so very effectively. No other companies on the lode are helping them in the least, but all are waiting to see how their more enterprising neighbors are coming out. Therefore it is that Hale & Norcross rules the whole situation, and the future fate of the lower levels hinges upon it alone. It is the king pin, and the prices of all other mines are regulated by it alone. As Hale & Norcross goes up or down, so do all other stocks along the lode.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, department 10, San Francisco.

PARADISE AND LOS ANGELES GOLD AND SILVER MINING LAND AND WATER CO.—Sept. 20th. Capital stock, \$1,000,000. Directors, J. M. Bowers, P. B. Nagle, W. W. Jenkins, T. R. Horton and A. H. Hogg.

ALBION RIVER R. R. CO.—Sept. 22d. Object to build a steam railroad in Mendocino county. The road will run along the north bank of the Albion river into what is known as Tide Water gulch. The route will be two and a half miles long and will have a branch road running up what is known as Railroad gulch. Capital stock, \$25,000. Directors, Wm. G. Byxbee, A. W. Starbird, J. B. Goldstone, C. W. Farnum and Henry Wetherbee.

Bullion Shipments.

Silver Bow, September 16, \$15,728; Clark & Larnie, 16, \$2880; Barber's mill, 20, \$7000; King, 20, \$7818; Calico mill, 20, \$1667; Hanauer, 15, \$5000; Stormont, 15, \$2290; Queen of the Hills, 15, \$1400; Ontario, 16, \$30,791; 17, \$37,041; Hanauer, 17, \$5500; Crescent, 17, \$1400; Queen of the Hills, 17, \$1200; Germania, 17, \$5053; Hanauer, 16, \$2900; Lost River, 19, \$2930; Queen of the Hills, 19, \$1400; Germania, 19, \$9578; Alice, 12, \$18,543; Lexington, 18, \$34,692; Silver Bow, 9, \$15,728; Moulton, 10, \$15,360; Alice, 15, \$19,088.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.							
COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	27.	25, Sept.	3, Oct.	8, Oct.	238, E Burris.	309 Montgomery St.
Benton Con M Co.	Nevada.	14.	10, Aug.	25, Sept.	30, Oct.	21, W H Watson.	302 Montgomery St.
Blue Bluff G M Co.	California.	9.	24, Aug.	21, Sept.	26, Oct.	21, L S Adair.	419 California St.
Benton Con M Co.	Nevada.	14.	10, Aug.	25, Sept.	30, Oct.	21, W H Watson.	302 Montgomery St.
Buchanan M Co.	California.	13.	15, Aug.	24, Sept.	28, Oct.	16, P J Sullivan.	121 Post St.
Con Pacific M Co.	California.	7.	15, Aug.	27, Sept.	30, Oct.	24, S Gardner.	330 Pine St.
Cheva Santa M Co.	Mexico.	6.	25, Aug.	5, Sept.	16, Sept.	30, W L Oliver.	328 Montgomery St.
Equitable Tunnel M Co.	Utah.	32.	10, Aug.	3, Sept.	16, Oct.	27, C J Collos.	512 Montgomery St.
Eintracht Gravel M Co.	California.	19.	05, Aug.	11, Sept.	16, Oct.	5, H Kniz.	239 Sansome St.
Eschequer M Co.	Nevada.	22.	20, Aug.	31, Oct.	7, Oct.	29, C E Elliott.	309 Montgomery St.
Giant M Co.	New Mexico.	1.	02, Aug.	11, Sept.	18, Oct.	19, S P Middleton.	116 Montgomery St.
Golden Fleece M Co.	California.	2.	30, Aug.	31, Oct.	5, Oct.	27, F Schmeier.	Phelan Block
Holmes M Co.	Nevada.	9.	1,00, Aug.	3, Oct.	5, Oct.	27, C T Bridge.	224 California St.
Hale & Norcross M Co.	Nevada.	58.	50, Aug.	4, Sept.	8, Sept.	23, J F Lightner.	309 Montgomery St.
Independence M Co.	Nevada.	15.	20, Aug.	20, Sept.	23, Oct.	14, J W Pew.	310 Pine St.
Johnson Gravel M Co.	California.	2.	05, Sept.	3, Oct.	15, Nov.	20, G White.	318 Front St.
Mexican G & S M Co.	Nevada.	39.	25, Sept.	21, Oct.	27, Nov.	18, C E Elliott.	302 Montgomery St.
Martin White M Co.	Nevada.	20.	25, Aug.	22, Oct.	7, Nov.	4, J J Scoville.	309 Montgomery St.
Navajo M Co.	Nevada.	12.	30, Aug.	31, Oct.	5, Oct.	27, J W Pew.	310 Pine St.
North Belle Isle M Co.	Nevada.	34.	10, Aug.	20, Sept.	24, Oct.	15, J W Pew.	310 Pine St.
Orinab M Co.	Alaska.	3.	10, Aug.	22, Sept.	23, Oct.	24, O Robinson.	339 Kearny St.
Peer M Co.	Arizona.	30.	30, July 31.	Sept.	2, Sept.	29, A Waterman.	309 Montgomery St.
Sulphur Bank M Co.	California.	4.	50, Aug.	29, Sept.	3, Dec.	3, T Winteringham.	336 California St.
Tulhume Co.	California.	1.	05, Sept.	15, Nov.	13, Dec.	15, H J Hyland.	309 Montgomery St.
Union Con M Co.	Nevada.	34.	10, Aug.	24, Oct.	19, Nov.	9, J M Burlington.	309 California St.
Virginia Creek M Co.	California.	2.	10, Sept.	11, Oct.	16, Nov.	6, J M Quay.	406 Montgomery St.
Willow Creek M Co.	Nevada.	1.	1,00, July 22.	Sept.	1, Oct.	12, R Elton.	310 Pine St.
Young America M Co.	Nevada.	2.	10, Aug.	6, Sept.	8, Sept.	30, E M Hall.	327 Pine St.
MEETINGS TO BE HELD.							

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Eureka Con M Co.	Nevada.	E. H. Wilson.	328 Montgomery St.	Annual.	Oct. 19
Presidio M Co.	California.	W. Willis.	309 Montgomery St.	Annual.	Oct. 5
Paradise Valley M Co.	California.	W. L. Oliver.	328 Montgomery St.	Annual.	Sept. 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Kosuth M Co.	Nevada.	O. K. Shurtz.	328 Montgomery St.	66.	Mar. 16
Mahabattani S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept. 1
Mc Diablo M Co.	Nevada.	R. W. Heath.	312 Pine St.	20.	July 30
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	25.	Feb. 13
Plymouth Con G M Co.	Nevada.	W. Van Norden.	Pres. 23 Nassau St. N. Y.	50.	Apr. 6
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Sept. 15
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Sept. 3

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GORUM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Sept 17-23																								
Thursday .....	.00	67	NW	Cl.	.00	88	E	Cl.	.00	84	NW	Cl.	.00	64	W	Cl.	.00	85	W	Cl.	.00	75	NW	Cl.
Friday .....	.00	72	SE	Fr.	.00	87	S	Cl.	.00	82	S	Cl.	.00	60	W	Fr.	.00	87	W	Cl.	.00	76	NW	Cl.
Saturday .....	.00	70	SE	Fr.	.00	84	SE	Cl.	.00	75	SW	Hy.	.00	62	W	Cl.	.00	88	W	Cl.	.00	73	NW	Cl.
Sunday .....	.00	76	S	Fr.	.00	92	NW	Cl.	.00	85	NK	Cl.	.00	72	NE	Cl.	.00	90	W	Cl.	.00	76	NW	Cl.
Monday .....	.00	70	NW	Fr.	.00	96	S	Cl.	.00	88	NW	Cl.	.00	79	NE	Cl.	.00	108	W	Cl.	.00	8	NW	Cl.
Tuesday .....	.00	77	SE	Cl.	.00	92	S	Cl.	.00	88	NW	Cl.	.00	72	W	Cl.	.00	92	SW	Cl.	.00	80	SW	Cl.
Wednesday .....	.00	70	S	LR.	.00	83	S	Hy.	.00	82	S	Cl.	.00	62	SW	Cl.	.00	86	W	Cl.	.00	78	W	Cl.
Totals	—			.00				.00				—				.00				.00				

EXPLANATION.—Cl for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

It is stated that a mill will be put up in the spring, and be run by the water-power derived from the water flowing from the Sutor tunnel. It will be used for working the vast body of low grade quartz cut through in excavating the tunnel. This vein is said to be 300 feet in width, and to give an average assay of \$4 per ton. The water will be flumed to the mill on a trestle, and the trestle will be built wide enough to allow of the construction of tracks on either side on which to run out the quartz from the tunnel to the mill. It is estimated that by this method the poorest quartz can be mined and crushed for \$2 a ton.

MINERVA DISTRICT, a new mining camp in Nevada, located on the western slope of the Soake Range, 15 miles south of Osceola and about 35 miles from Taylor, bids fair in the near future to become an important bullion producing district. The ledges are numerous and large, some of them being 15 to 25 feet wide, and traceable on the surface for the full length of the claims (1500 feet), and the ore is generally of a high grade. Wood and water are abundant.

APPRECIATIVE.—One of our old subscribers writes as follows: "I am a constant reader of the MINING AND SCIENTIFIC PRESS, and am pleased to notice a steady, unceasing improvement in the literary excellence of the journal. You are specially favored with an able and trustworthy staff of assistants, as attested by their good works."

To Young Men and Young Women.

All competent boys and girls should prepare themselves for usefulness in business if they wish to "step up higher." We have for sale to such, on easy and favorable terms, a scholarship in one of the best business colleges in the U. S. Address this office.

A NEW mill is to be placed on North Star mine, near the north fork of Trinity river. The mine is owned by Goodyear & Co.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 3.	WEEK ENDING Sept. 10.	WEEK ENDING Sept. 17.	WEEK ENDING Sept. 24.
Alpha.	.75	.70	.55	.70
Alta.	.30	.25	.35	.25
Andes.	.10	.15	.10	.05
Argenta.	.10	.15	.10	.05
Becher.	1.10	1.50	1.90	1.00
Belling.	2.75	2.30	2.10	1.85
Best & Belcher.	.40	.40	.50	.40
Bonanza King.	.10	.10	.10	.10
Belle Isle.	.10	.10	.10	.10
Bodie Con.	1.80	1.90	1.60	1.70
Benton.	.05	.05	.05	.05
Bodie Tunnel.	.10	.10	.10	.10
Bulwer.	.40	.40	.40	.40
California.	1.70	2.00	1.75	1.55
Challenge.	.25	.25	.25	.25
Champion.	1.80	2.00	1.75	1.50
Chollar.	1.40	1.40	1.40	1.40
Confidence.	1.70	2.00	1.75	1.55
Con. Imperial.	.10	.10	.10	.10
Con. Virginia.	1.70	2.00	1.75	1.55
Con. Pacific.	.10	.10	.10	.10
Crown Point.	.10	.10	.10	.10
Day.	.10	.10	.10	.10
Eureka Con.	.50	.50	.50	.50
Eureka Tunnel.	.15	.15	.15	.15
Eschequer.	.15	.15	.15	.15
Grand Prize.	.15	.15	.15	.15
Gould & Curry.	1.35	1.40	1.20	1.10
Goodshaw.	5.62	6.12	5.12	6.37
Hale & Norcross.	6.12	5.12	6.37	5.12
Holmes.	.10	.10	.10	.10
Independence.	.15	.15	.15	.15
Julia.	.15	.15	.15	.15
Justice.	.20	.20	.20	.20
Martin White.	1.10	1.80	1.50	1.65
McDon.	.25	1.15	.85	.80
Mexican.	.25	1.15	.85	.80
Mt. Diablo.	.25	2.75	.90	2.50
Northern Belle.	.70	.95	.65	.80
Navajo.	.70	.95	.65	.80
North Belle.	.10	.10	.10	.10
Occidental.	1.25	1.35	1.20	1.35
Ophir.	.35	.35	.35	.35
Overman.	.35	.35	.35	.35
Potosi.	.35	.35	.35	.35
Final Con.	2.30	3.0	2.50	2.60
Sage.	1.45	1.60	1.35	1.10
Seg. Delcher.	1.45	1.60	1.35	1.10
Sierra Nevada.	1.45	1.60	1.35	1.10
Silver King.	.60	.60	.60	.60
Scorpion.	.10	.10	.10	.10
Syndicate.	.40	.40	.40	.40
Tyoga.	.35	.35	.35	.35
Union Con.	.35	.35	.35	.35
Utah.	.75	.75	.75	.75
Yellow Jacket.	2.10	2.25	2.10	1.95

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Sept. 24.	200 Navajo.	70c
	100 Andes.	35c
	100 B. & Belcher.	1.55
	200 Bodie Con.	1.60
	200 Con. Va. & Cal.	1.55
	400 Chollar.	1.50
	400 Gould & Curry.	1.00
	550 Hale & Nor.	5.00
	100 Yellow Jacket.	2.00

A RICH strike is reported in the Patterson Company's gold mine, near Clinton, Mono county. It has renewed the confidence in the claims in Patterson.

THE little five-stamp mill at Osceola district is working eight tons of ore in 24 hours.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Rough—Cargo prices are at present as follows: Rough, merchantable, 10 M ft., \$14.00; Rough, clear and surfaced, \$24.00; 1x10 Rustic, No. 1, \$25.00; 1x10 Rustic, No. 2, \$20.00; 1x8 Rustic, No. 1, \$13.00; 1x8, tongued and grooved, \$23.00; 1x4, tongued and grooved, beaded, \$23.00; 2-in. x3, Battens (board measure), \$20.00; Shingles, 10 M, \$2.00.

Pine—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T & G Flooring, 1x6, \$26.00; do 1x8, \$23.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain T & G Flooring, 1x6, \$30.00; do do 1x8, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., 4c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows: Pine, rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T & G Flooring, 1 x 6, \$26.00; do 1x8, \$23.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain T & G Flooring, 1x6, \$30.00; do do 1x8, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., 4c.

Stepping, 1x2, per lineal foot	03
Furring, 1x2, per lineal foot	03
Redwood, Rough	17 00
" " No. 2	13 00
" " Surfaced	30 00
" " 1x8	28 00
" " 1x6	28 00
" T & O. 0 in. 12 ft. and over	28 00
" " " 7 to 12 ft.	28 00
" " " under 7 ft.	20 00
" Rustic	30 00
" " No. 2	25 00
" T & G. Beaded 12 ft. and over	30 00
" " " 7 to 11 ft.	25 00
" " " under 7 ft.	20 00
" Siding, 3 in.	25 00
Pickets, Fancy	15 00
" Rough Pointed	15 00
" " Square	14 00
Battens, 1x3 per lineal ft.	03
Shingles, 14	2 00
Laths, 14	3 25
" 12	3 75
Dunnage Boards less 5c. delivered	16 00

Price subject to change without notice.

Nails.

NAILS.		SLATING.	
10d to 60d	\$	5d	\$1.00
8d to 9d	25	4d	1.00
6d to 7d	50	2d	1.75
4d to 5d	75	2d	3.00
3d	1.50		
2d	2.50		
BARRELS.		FINISHING.	
1 1/2 inch	\$0.75	2d, 1 inch.	\$0.00
1 1/2 inch	1.00	3d, 1 1/2	4.00
1 1/2 inch	1.50	4d, 1 1/2 to 1 3/4 inch.	4.00
1 1/2 inch	1.75	5d, 2 inch.	1.50
1 inch	2.50	5d, 2 1/2	1.25
1 inch	4.50	10d, 3 inch and over.	1.00
1 inch	6.00		
ROAT NAILS.		CASING AND BOX.	
1 inch	\$8.00	10d to 30d.	\$0.75
1 1/2 inch	6.00	8d	1.00
2 inch	5.00	6d	1.25
2 1/2 inch	4.00	4d	1.50
3 inch and above.	3.00	3d	2.50
Galvanized extra.		COOPERS'.	
PINE PLUED.		CUT SPIKES.	
3d	\$3.00	All sizes.	\$0.25
CINCH.		ROAT SPIKES.	
6d to 30d.	\$1.75	All sizes.	\$0.75

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 15, 1885.

326,198.—HYDROMOTOR FOR STREET R. R.—R. F. Bredwell, S. F.

326,201.—PUMP—John P. Cobb, College City, Cal.

326,209.—SINGLE ACTING PUMP—W. H. De Valin, San Rafael, Cal.

326,208.—CULTIVATOR—Geo. W. Forbes, Guberville, Cal.

326,210.—CABLE RAILWAY—J. D. Isaacs, Oakland, Cal.

326,122.—HEMIAL TRUSS—Nathl Jones, Berkeley, Cal.

326,434.—PUMP—L. A. Kelly, Dayton, W. T.

326,231.—BULLET—Frank Manning, Marysville, Cal.

326,314.—PRUNING SHEARS—L. M. McKay, Pomona, Cal.

326,144.—PROPELLING RAILWAY CARS—Geo. Parry, S. F.

326,145.—PROPELLING RAILWAY CARS—Geo. Parry, S. F.

326,516.—SHEET METAL PIPE MACHINE—M. K. Pierce, Perryville, Cal.

326,243.—SAW GUMMER—S. J. Randall, Moodyville, B. C.

326,253.—CRUSHING AND GRINDING MILL—W. C. Stiles, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PUMP.—John P. Cobb, College City, Colusa county. No. 326,201. Dated Sept. 15, 1885.

This pumping apparatus is specially designed for irrigation and other purposes where it is necessary to throw a considerable body of water. It consists of a series of pump cylinders, extending radially and horizontally from a central casing, the oppositely placed cylinders having pistons and rods extending from them into the central casing, where they are actuated by reciprocating racks driven by gearing upon a central shaft, and in connection with these the driving mechanism and discharge pipes.

BULLET.—Franklin Manning, Marysville. No. 326,231. Dated Sept. 15, 1885. This invention relates to an improved bullet or projectile for firearms or rifled guns, and it consists of a head or front portion having a diameter smaller than that of the interior of the gun; a series of cannelures with intervening projecting rings or ridges, which have a diameter sufficient to fit the grooves or rifling of the gun, the channels or cannelures between said ridges gradually deepening from the rear of the bullet toward the front, while the deepest channel or groove is made in front of the last ring, and between it and the head of the bullet.

CULTIVATOR.—Geo. W. Forbes, Guberville, Santa Clara county, No. 324,208. Dated Sept. 15, 1885. This improvement in wheeled cultivators consists in the novel mechanism by which the tooth frame is connected with and raised and lowered by the crank axle, in the location of the seat in the independent, removable and adjustable tooth sockets, and in various details of construction. The object of the invention is to provide a cultivator which can be easily and readily adjusted to throw its teeth into or out of the ground, and which is adapted to receive substitute teeth or blades either of the same or of a different pattern.

FRUIT-DRYER.—Ambrose Blachley & A. T. Hatch, S. F. No. 325,782. Dated Sept. 8, 1885. This drying apparatus consists of chambers having vertical diaphragms or partitions at intervals, with leaves or shutters formed in them, by which the current of air which passes through the chamber from the furnace, situated at one end, to the suction-fan or draft apparatus at the opposite end, may be regulated, and the current thrown downward or upward as may be desired. Cars carrying trays to receive the fruit are caused to run in and out of these chambers, which are provided with suitable doors. The number of chambers in the series can be increased as long as the current of air can be profitably drawn through them.

HYDROMOTOR FOR STREET RAILWAYS.—Richard F. Bredwell. No. 326,198. Dated Sept. 15, 1885. This is a novel apparatus, which the inventor calls a "hydromotor," for car propulsion, and it consists of an underground slotted tube, into which a shank from the car extends, and upon the slot irons of which a single line of wheels run and support the car; a central longitudinal water pipe within the tube with a flattened top, upon which a channeled casing and shoe at the lower end of the shank fits and travels, a plate or abutment at the front of the shoe, and vertically moving gates on the pipe, acted upon by the passing shoe, so as to admit water into a temporarily-enclosed space, where, by its pressure, it acts to drive the shoe and car along.

MULLER'S pebble spectacles are the best. 135 Montgomery St., near Bush, opp. Occidental. x

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscriptions up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz.:

- 1.—World's Cyclopedia, 791 pages, with 1,200 illustrations, worth \$1.75. Postpaid for 50 cts.
- 2.—Patent Binder (cloth cover) with name of this paper in gilt. Postpaid for 50 cts. \$1.00
- 3.—To New Subscribers, 12 select back Nos. of the MINING AND SCIENTIFIC PRESS. Free .75
- 4.—Any of Harper's first class periodicals, 15 per cent less than regular rates.
- 5.—Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates.
- 6.—Pacific Coast and Eastern Bibles, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates.
- 7.—Picturesque Arizona, 350 pages, in cloth and gilt. Postpaid for 25 cts. 1.25
- 8.—California, 160 pages, Magazine, best to 1882 (3 Vols.) single Nos. Postpaid for 3 cts. .35
- 9.—Per volume, unbound, 5 Vols., Postpaid for 20 cts. 2.00
- 10.—Per volume, bound, cloth back and stiff paper sides. Postpaid for 40 cts. 2.50
- 11.—Picturesque California Homes (40 building plans and estimates). Postpaid for \$1 3.50
- 12.—Dewey's Patent Newspaper File Holder (18 to 36 inch). 25 cts. .50

NOTE.—The cash must accompany all orders. If too much is sent for any article or publication, the balance will be returned immediately. Address this office, No. 252 Market St., S. F.

P. S.—No. 11 is really a valuable premium to new-comers and others who appreciate the better class of stories and a good standard of California literature.

- Webster's Dictionary, 634 pages, with 1,600 illustrations. 50 cts. 1.50
- Grant Lithograph, size 24x19. 50 cts. .50
- Cleveland Fine Steel Plate, size 12x16. 10 cts. .50
- Grant Steel Plate, cabinet size. 5 cts.
- De Groot's History of Mining in California. 5 cts. .25
- Beautiful Book-Review, a handsome, entertaining and instructive souvenir of real merit. 25 cts. .50

Send for any further information desired. Readers will please inform their new neighbors and others concerning our paper and these offerings. On application, sample copies of this paper will be mailed free to the address of any persons thought likely to subscribe.

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes thereof from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "unsuccessfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less consistent writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth. Price, \$1.00. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc. Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parting; Processes; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F.

These are much needed books for miners and other practical men, by an intelligent and careful assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for sale to the experts. They are thoroughly practical books.

A Handsome Premium.

The publishers of this paper have had printed on fine paper and handsomely bound, a neat little volume, entitled "A Beautiful Poetic Review and Friendly Offering." It was written by Dr. J. R. Bradway, orator of Oakland Council, American Legion of Honor, and read in short sections by the author at different meetings, eliciting much praise from his listeners. The work is embellished with fine lithographic portraits of several noted poets whose writings are mentioned in the work. We believe the book will prove a pleasant and attractive keepsake in every family—it can be so readily taken up and read as leisure moments may occur. It will be mailed for 25 cents to subscribers (old or new), upon paying 12 months in advance for this paper. Or to those who pay one year and three months in advance we will send this beautiful souvenir free, postpaid.

At Harney's Peak, Dakota, where tin was discovered in June, 1883, there are now 1000 claims located, many of which are tin-bearing and in process of development.

Very Acceptable Present.

Stereoscopic and Cabinet Views.

We are Sole Agents for the Pacific Coast for the views of the Continent Stereoscopic Company, consisting of a most complete series of photographic views of all popular localities west of the Rocky Mountains. They represent all the principal locations of the Pacific Coast, including views in

California. Yosemite. Colorado. Oregon. Alaska. Arizona. New Mexico.

Columbia River. City of San Francisco. Washington Territory. Union Pacific Railroad. Nevada and the Northwest.

And Types of Indians of all Races.

Send for a sample hundred of our views, which will give you an idea of the quality of our goods. New subjects from all sections are constantly being added.

Price \$8 per hundred. Liberal discount to the Trade.

We want to particularly inform those heretofore using these goods that the line has just been revised, with new Subjects, both Cabinet and Stereoscopic. We respectfully solicit your patronage.

CUBERY & CO.,

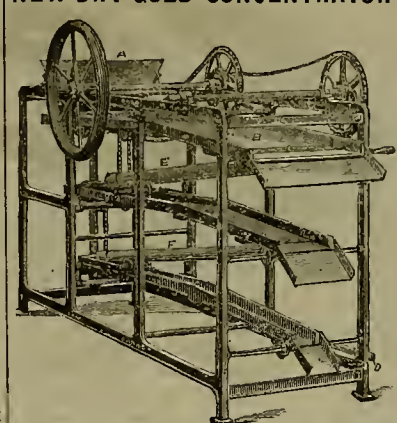
Printers and Dealers in Cards for all Societies.

415 MARKET ST., below First, SAN FRANCISCO.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY

NEW DRY GOLD CONCENTRATOR



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.

Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

METALLURGICAL AND MINING ENGINEER, H. SALAZAR, ASSAYER AND CHEMIST.

PACIFIC Reduction & Metallurgical Works.

SALAZAR & KUSTEL, Managers.

Location of Works: Melrose, Alameda Co., Cal.

Office: 318 Pine Street (Basement), San Francisco.

SAN FRANCISCO CREMATION CO.

[INCORPORATED SEPT. 5, 1885.]

CAPITAL STOCK, \$25,000, divided into 500 shares of the par value of \$50 each.

217 Shares Have Been Taken.

The remaining shares are now offered for sale and may be subscribed for at the office of GENERAL H. A. CORB, 321 Montgomery St., where further particulars may be obtained; also at the office of the Secretary, 100 Battery St. By order of the Board of Directors. MAX LEVY, Secretary.

L. PETERSON, INVENTORS. MODEL MAKER,

258 Market St., N. E. cor Front, up-stairs, S. F. Experimental machinery and all kinds of models, tin, copper and brass.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent-business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from the seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

Our long experience in obtaining patents for inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

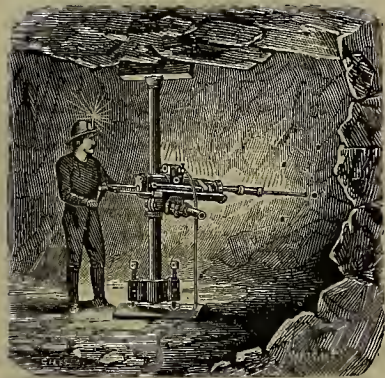
Remittances of money, made by individual inventors to the Government, sometimes mis-overy, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street, Elevator, 12 Front St., S. F.



INGERSOLL ROCK DRILLSAND.... AIR COMPRESSORS.

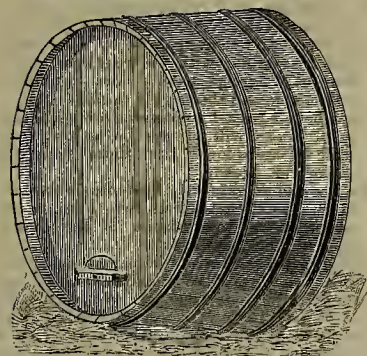
The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,
PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

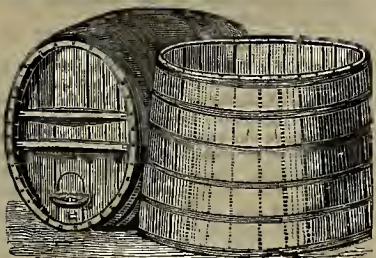
MECHANICS' MILLS.



Water Tanks. Wine Tanks.

Our well-known TANKS are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

WELLS, RUSSELL & CO.,
Proprietors Mechanics' Mills
Cor. Mission & Fremont Sts., San Francisco
WATER TANKS! WINE TANKS!
CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,
30 to 40 Spear St., San Francisco.
ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
—1883—
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,
Machine and
Engine Works
22 Fremont Street,
SAN FRANCISCO.



DEWEY & CO.'S SCIENTIFIC PRESS PATENT
AGENCY is the oldest established and most successful on the Pacific Coast. No. 252 Market St., Elevator 12 Front St., S. F.

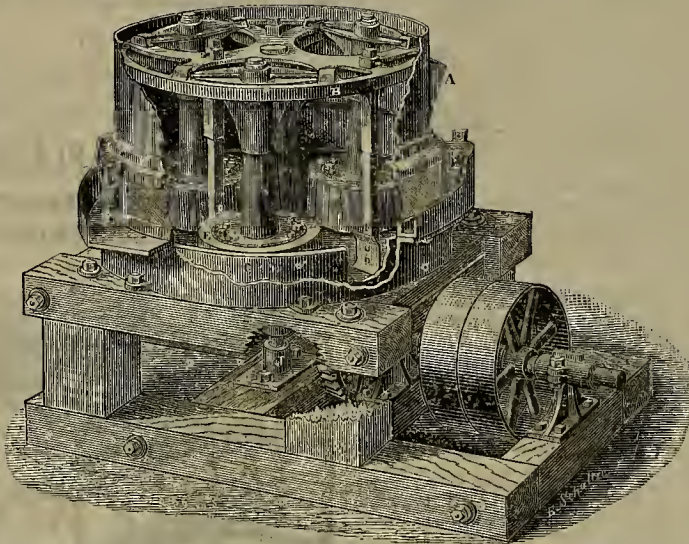
HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND..... Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

F. A. HUNTINGTON,
45 Fremont Street, San Francisco, Cal.
FRASER & CHALMERS,
Cor. Fulton and Union Sts., Chicago, Ills.



ALL KINDS OF HOSE.

SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



Chicago Prices Beaten!
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).

Orders Promptly Executed.

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

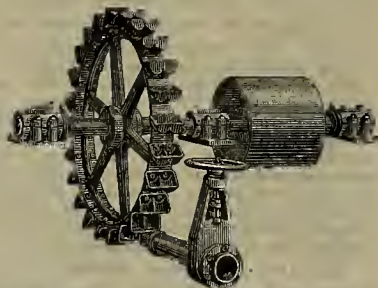
STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Rolling Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

.....MANUFACTURER OF.....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

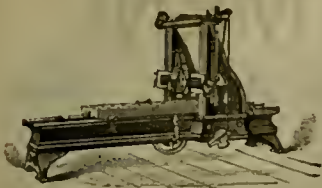
SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



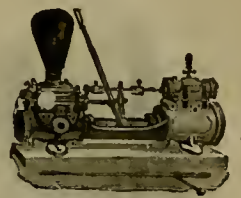
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.



Knowles Steam Pump
The Standard.

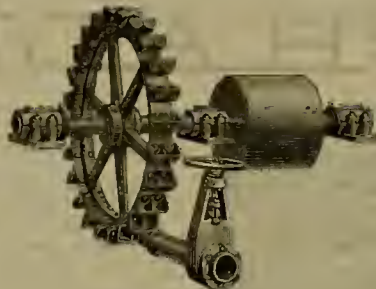
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

SOLE AGENTS FOR

SEND FOR CIRCULARS.

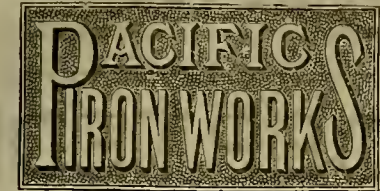
SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Leffel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

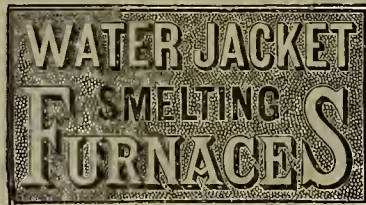
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
embracing machinery of LATEST DESIGN and
MOST IMPROVED construction. We offer our cus-
tomers the BEST RESULTS of 35 YEARS' EX-
PERIENCE in this SPECIAL LINE of work, and
are PREPARED to furnish from SAN FRAN-
CISCO or CHICAGO, the MOST APPROVED
character of MINING and REDUCTION MA-
CHINERY, adapted to all grades of ores and SU-
PERIOR to that of any other make, at the LOWEST
POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-
LIVER in COMPLETE RUNNING ORDER,
in any locality, MILLS, CONCENTRATOR
WORKS, WATER JACKET SMELTING
FURNACES, HOISTING WORKS, PUMP-
ING MACHINERY, ETC., ETC., of any DE-
SIRE CAPACITY.

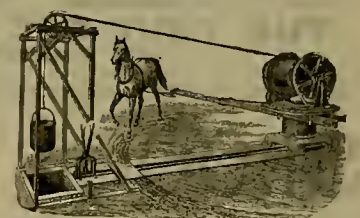
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
ores of NEW and ORIGINAL DESIGNS, covered
by LETTERS PATENT. No other Furnace CAN
COMPARE with these for DURABILITY, and in
CAPACITY for uninterrupted work. MORE
THAN 150 of them are now RUNNING in various
parts of THIS COUNTRY, as well as many in
FOREIGN COUNTRIES, giving results NEVER
BEFORE ATTAINED as regards CONTINUOUS
running, ECONOMY of fuel, AMOUNT and QUAL-
ITY of BULLION produced. These CLAIMS have
been PROVEN BY RESULTS in ANY NUM-
BER of INSTANCES, and the GREAT SUP-
REMACY of this SYSTEM of smelting ores DI-
MONSTRATED BEYOND QUESTION. COM-
PLETE PLANTS furnished to order of any CA-
PACITY, with ALL IMPROVEMENTS that ex-
perience has DEMONSTRATED as VALUABLE
in this class of work.



Beyond question the cheapest and
most effective machine of the kind
now in use adapted to all grades and
classes of ores.

This machine has been THOROUGHLY TESTED
for the past TWO YEARS, under a GREAT VA-
RIETY of CONDITIONS, giving most EXTRA-
ORDINARY results FAR IN ADVANCE of
anything EVER BEFORE REALIZED. A re-
cent COMPETITIVE TEST at the Carlisle Mine in
Mexico, showed an ADVANTAGE OF OVER 30
PER CENT in favor of THE DUNCAN. The
amount SAVED OVER THE FUEL being suffi-
cient to PAY THE ENTIRE COST of the ma-
chines EVERY MONTH OF THE YEAR. One
of its MOST VALUABLE features is as an AMAL-
GAMATOR. It saves all THE AMALGAM GOLD
AND SILVER that ESCAPES the BATTERIES,
PANS or SETTLERS, making the machine worth
MORE than ITS COST for THIS PURPOSE
ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist,
and affording means for the continuous operation of a
Pump or Blower, without interfering with a hoisting ap-
paratus. It is made entirely of iron, no piece weighs
over 300 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes
Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths.
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!

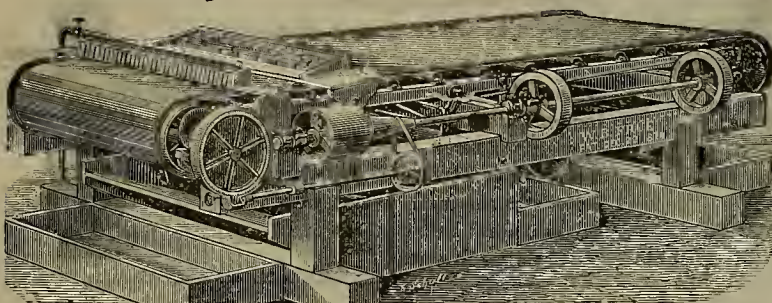
We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

CHICAGO PLATING COMPANY, 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St., San Francisco, Cal.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

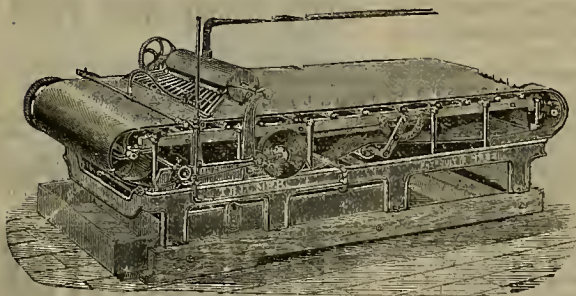
ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street, — — — SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.

THE "TRIUMPH" TRIUMPHANT!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$190.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St., San Francisco, Cal.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Barbed Wire.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 3, 1885.

VOLUME LI
Number 14.

Electric Transmission of Power.

Keith's Dynamo Machine.

We illustrate herewith Keith's dynamo, a recent invention of one who has been long and favorably known in electrical science. Its manufacture has been established in San Francisco, at the Union Iron Works, by the Pacific Coast Electrical Construction Company, and because it possesses many novel features which insure efficiency and endurance beyond many older and well-known machines, we will describe it, after briefly stating the general principles which govern such apparatus.

Fifty years ago the learned Faraday discovered that currents of electricity were induced in wires moved in the neighborhood of magnets, and that if the ends of the wires were connected so as to form electric circuits, the currents so induced would flow in the wires; and that such currents were identical with the currents from galvanic batteries. He also showed that power was required to move the wires so to produce electricity, and that if electricity was caused to flow through the same wires from some other source, the wires would move to produce mechanical power.

The dynamo, or machine for the mechanical production of electricity, was very tardy in its appearance, and it was not until 1856 that the machine of Siemens was produced, which was the first to attract any considerable attention. Thereafter followed its modifications made by Wilde and Ladd; and then, in 1869, by another of Siemens' invention; and about this time by that of the consequently famous Gramme. Upon this introduction and success of this latter, the modern science of dynamic electricity may be said to have its foundation.

Faraday discovered the principle, and others made the apparatus in which the principle was embodied. Briefly then, a dynamo-electric machine—or, dynamo for short—is a machine run by power for moving wires in the neighborhood of magnets for the purpose of producing electricity. It is also reversible—that is, it may be a machine through the wires of which currents of electricity may be passed to move the wires in the neighborhood of magnets to produce power.

It is theoretically propounded that lines of force proceed from the poles of magnets and curve from pole to pole, and that the currents of electricity are produced in the moving wires from crossing these lines of force. It has also been found that where these lines of force are the most dense, and that is at the shortest possible distance from the poles of the magnets, the greatest inducing effect in the production of electricity is produced, and that like effects are produced by concentrating these lines of force so as to act as a whole upon the moving wires, instead of being lost in part in space unoccupied by wires.

The magnets of dynamos are generally electro-magnets, i. e., magnets formed of cores of soft iron surrounded by coils of wire conducting currents of electricity, in preference to permanent magnets, which are of hard steel magnetized. Electro-magnets are only strong when electricity flows in their coils of wire.

These magnets of a dynamo are generally made the frame of the machine, and are called the "field magnets," and the moving masses of iron covered by wires are called "armatures." In the operation of a dynamo one of these masses, called an armature, is rotated between certain parts of the frame of the machine, which parts are called the poles of the field magnets.

These magnets and armatures have been made of many forms and of many varieties of shapes and sizes relative to each other, in this effort, when intelligently made, to produce the greatest concentration of the lines of force proceeding from the field magnets upon the wires of the rotating armature. Upon this success attained in this line depends the value of the dynamo. Many haphazard, rule-of-thumb designs have been made by inexperienced men as dynamos, but with little to recommend them in either the electrical or mechanical point of

somewhat after the manner of winding of the well-known Gramme dynamo armature, but differing in the manner of laying the wires relative to one another. The currents of electricity generated in these wires are conducted through the wires surrounding the cores of the field magnets, as in other dynamos.

This feature which is specially noticed by the electrician and others who have had experience with other dynamos, is the simplicity of construction and the small amount of wire upon the machine. Our illustration is made from a photograph of the 30 arc-light machine, lately exhibited at the Mechanics' Fair. It weighs 1600 pounds in all, and there is but 118 pounds of wire in the four field-magnet coils, and but 28 pounds of wire on the armature. The armature is 11 inches in diameter, and is rotated 1100 turns per minute to supply 30 arc-lamps with a current of thirteen hundred volts and twelve

ing electric energy equal to 90 per cent of that power, or 90-horse-power utilizable in the electric circuit of the dynamo. Suppose then a second dynamo with a capacity of converting 90 per cent of this electrical energy to mechanical power, and located any distance away from the first, like 1000 feet or ten miles: we would have at our command at the second dynamo 90 per cent of 90 per cent, or 81-horse-power from the primary 100-horse-power, and at a very little cost. But there must be deducted from this the power absorbed by the wires connecting the two dynamos, say from one to ten, or more per cent, according to the distance and the size of the conducting wires.

But it is not imperative that only one motor be placed upon such an electric circuit. Two or more may be placed on it and the energy may be divided among them, though placed far apart and doing a variety of kinds of work.

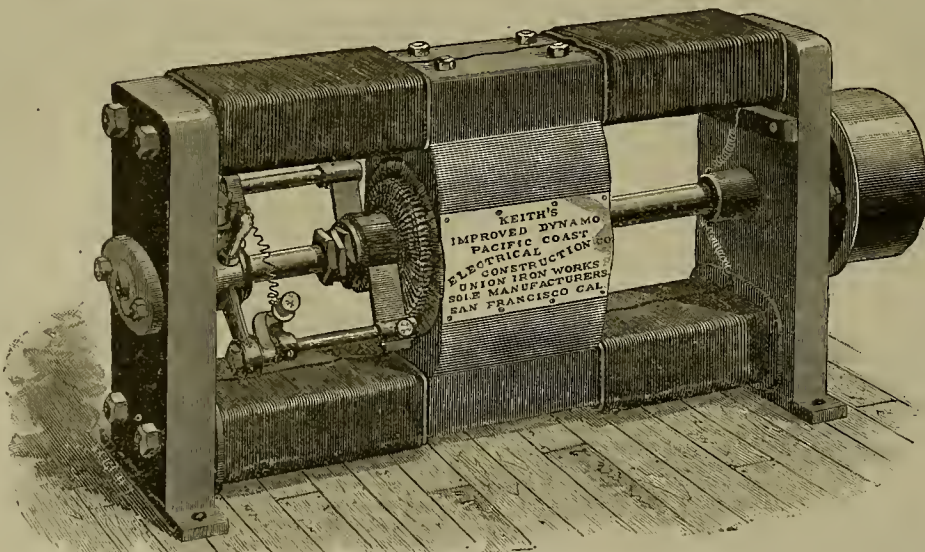
Take, for instance, a mine which may have its drilling, hauling, hoisting, pumping, milling, lighting, etc., done by electricity generated at a distance from the works at which utilized.

At the Mechanics' Fair a Keith small dynamo was run in the exhibit of the San Francisco Tool Company, and the electricity so generated was conducted by wire to the exhibit of the Pacific Electric Motor Company, where it was utilized in running several small electric motors attached to sewing machines. On the same circuit was another Keith dynamo in the exhibit of the Pacific Coast Electrical Construction Company, and this utilized some of the same electrical energy by operating a pump which raised 18,000 gallons of water per hour 17 feet high so that it might return as a waterfall. This waterfall was illuminated by electric lights placed in the falling water. Each sewing machine was under complete control of its operator, so that it was started, run, or stopped instantly at

will. Dynamos can be made of any desirable size, ranging from a fraction of a horse-power to that of many hundreds. We expect to see them in very extensive use through the mining and manufacturing regions, not only for lighting purposes, but for the very important one for purposes of power. They are coming into use in various parts of Europe and the United States in running railroads, elevators and their hoisting rigs, and for various other purposes.

Imagine a machine shop in which there are no shafting and belting: but each lathe, drill-press, planer, boring machine, etc., is run by its special dynamo directly attached, and receiving its electrical energy by a wire running from a large dynamo in the engine room, or at a waterfall perhaps miles away! Yet this can be done; and is but the elaboration of the modern practice, fast coming into extensive use, of attaching a steam engine to each considerable user of power in large works, because found more economical than deriving the needed power through belts, gears and shafting.

We are pleased at the establishment of this industry in San Francisco, and shall take pleasure in recording its practical applications in all its branches. We refer our readers to the advertisement of the Pacific Coast Electrical Construction Company in our advertising columns.



KEITH'S IMPROVED DYNAMO-ELECTRIC MACHINE.

view. Some of these dynamos have achieved commercial success because they were put on the market in a business-like way before better ones had been invented or constructed.

It follows, then, from these considerations, that the principles being known, the inventor has but to make the due mechanical combinations to achieve success in their manufacture, and this has been done by the inventor of the dynamo under consideration; and in evidence of this, the grand silver medal of the Mechanics' Institute has been awarded for its superiority over those exhibited at the recent fair, from the factory of the most widely celebrated dynamo makers of the world.

The north pole of the dynamo (see illustration) is the curved iron piece above the name-plate; and the south pole is the like piece below the name-plate. These poles are the joint ones of two horse-shoe electro-magnets, the cores of which constitute the frame of the machine. The pole pieces and the frame are of the best wrought iron, because that material is much better for the purpose than is cast-iron. They constitute the field magnets.

The armature is the cylinder in the cylindrical space between the poles. This is made up of disks of thin soft sheet iron, mounted on a spider, and covered with convolutions of wire wound parallel with, and radial to, the shaft,

amperes. There are but four layers of wire in each of the four field magnet coils, and but two layers of wire on the armature. To the electrician these facts carry an important meaning, which is, there is less power wasted in the coils of the machine than in others, and in proportion to the less length of wire used.

Electricians have determined the dynamic equivalent of electrical energy, and have invented instruments by which measurements of this energy may be readily made. The ratio of conversion of mechanical energy or power into electricity, or electrical energy, by this dynamo, and utilizable in the electric circuit external to the dynamo, exceeds 90 per cent. Conversely it will convert a like percentage of electrical energy to utilizable power.

As all mechanical operations are simply the conversion or translation of motion, and are effected more or less cheaply in proportion to the percentage of conversion or translation, it would seem that we have in these machines highly economical means of converting mechanical power to light, and of translating power from places where it is undesirable to use it, but where it can be cheaply procured, to places where wanted for use, and where it would be, if at all otherwise attainable, too costly.

Take, for instance, a dynamo located at a waterfall and using 100 horse-power, and giv-

Discovery of Californian Gold.

Address Delivered Before the Society of California Pioneers, Sept. 9, 1885, by John S. Hittell.

(Continued from last week.)

The opening of the mines proved disastrous to Sutter and Marshall, and was a subject of lamentation to both of them. The former did not know how to use his magnificent opportunity to make multitudinous millions. His land grant at Sacramento, through which all the travel and trade of the mines passed, and his possession of the only store there, his extensive acquaintance and his credit, gave him immense advantages over all competitors in the race for wealth; but he was not the man to make the best of them. He was careless, extravagant and confiding. He never thoroughly studied or diligently watched the details of any branch of his business. He gave his orders in vague language, and did not inquire whether they were clearly understood or promptly obeyed. His servants were employed without discrimination, and were not discharged when found remiss. Instead of employing one agent to sell his land at Sacramento, he had many, and some of them had instructions so injudicious that they were enabled to defraud him out of large sums. He trusted strangers readily and gave away much foolishly in the name of charity. So late as the fall of 1850, when employment could readily be obtained at high wages, a man representing himself to be a newly arrived and penniless immigrant could buy provisions, tools, and clothing from Sutter without security, and in many, perhaps most cases, the promissory note of the unknown purchaser was the only payment ever made.

The reports of the immense sums obtained by the miners induced Sutter to leave his store and go with a party of Indians to Weaver Creek, and thence to Sutter Creek, but this venture was doubly unprofitable, for he spent much, he got little gold, and his important interests at home were neglected. His flour-mill at Brighton was never completed, and all the money invested in it was totally lost to him. His injudicious sales, the frauds of his agents, the expenses incurred in resisting squatters, and the litigation to defend his title left little profit to him from his land; and a few years after the gold discovery he retired from business to a farm in Sutter county, a disappointed man, never ceasing to lament the gold discovery, which had deprived him of his dependents, his business, his land, his wealth, and his position as prince of the Sacramento valley. In consideration of his poverty and of his liberal aid to the American immigrants from 1843 to 1850, the Californian Legislatures of 1864, 1870 and 1874 gave him a pension of \$3000 a year for nine years, and would, perhaps, have continued it till the end of his life if he had not left the State in the vain hope of obtaining compensation from Congress for the wrongs done to him under the Congressional laws relative to Mexican land grants.

For a time Marshall seemed to be on the high road to fortune. His mill began to run in April, and although its operations were irregular at first, after a few months there was a steady demand for its lumber at \$500 a thousand feet, or twenty fold more than he had expected to receive. Many of the people in the mines and all the traders at New Helvetia, in the summer and fall of 1848 came to his mill, as the only one in the Sacramento basin, for sawn material of their houses, barns and fences. He continued to prosper until the spring of 1849, when a party of Oregonians killed—Marshall said—murdered—three aborigines near Coloma, and in retaliation five of their number were slain by the red men. The surviving Oregonians collected a mob and massacred all the Indians they could catch, including those employed at the saw-mill, though they had nothing to do with the previous trouble, and having come from the valley, were not of the same tribe with the mountain Indians. Marshall tried to save his red dependents, but the mob, not content with exterminating them, threatened him, and he was thankful to a friend who provided a horse for his escape.

On another occasion Marshall was driven from Coloma by a mob, and he said that his only offense was that he refused to tell them where they could find good diggings. When he went out prospecting he was watched as if he knew some wonderfully rich places, and on one occasion a multitude followed him, and when he stopped they threatened him with hanging if he held his knowledge from them. They were so furious that he fled on horseback, and remained away six months. When he returned he found his tools, his horses and his oxen had been stolen, his mill had gone to ruin, his title to his land about the mill was denied, a town had been laid out, and the lumbering business was at an end there for him. Sutter and he had paid the Coloma Indians for their land, and Marshall believed that under the American preemption law he was entitled to 160 acres of land, including all the valley in which the mill was situated, with its gold. The first miners did not dispute Marshall's title, and some of them paid for the privilege of washing gold on his land; but it was not long before lawyers came and explained that the pre-emption laws had not yet been extended to California and would probably never be applied to rich mining ground. Marshall was too obstinate to listen considerably to the other side, and he was too ignorant to fully understand that there was no

legal basis to his claim; and he firmly believed to the end of his life that great injustice had been done to him by the refusal of the authorities to drive off the trespassers. He could have obtained profitable employment as a carpenter, but he hoped for a sudden fortune at mining; and when he had a claim in which he could make an ounce a day he soon left it in the hope of finding one much richer, and thus wasted much of his time in prospecting. Though moderate in his wants and economical in his habits he never accumulated much money. His friends were few and poor like himself, so he could not engage in the large enterprises of fluming rivers or washing down deep gravel deposits in the hills. If he stuck long to a claim, it proved at last to be poor, while others above and below struck it rich. And he complained that if his labor promised to be remunerative he was driven away by ruffians and that this happened more than fifty times, but perhaps this was because presuming upon his imaginary pre-emption claim, he undertook to hold more ground than he was entitled to under the local customs.

Having made several statements discreditable to the miners at Coloma in 1849, on the authority of Marshall, it is only fair that I should add that, within the limits of my own observation on the overland route and in the mines, the pioneers of that year were the most orderly and peaceful men I ever saw, and I have lived in quiet towns in Pennsylvania and Ohio. The 25,000 adventurers who crossed the continent by way of the Platte and Humboldt valleys in 1849 nearly all started as soon as the grass furnished food for cattle, and all followed one narrow road. A thousand might sometimes be collected at a good camping place, and on the march we were continually making acquaintances. Some companies that were at first in front fell behind because they did not know how to manage their oxen; others with strong teams advanced from the rear to the front. The train to which I belonged kept a position near the middle all the way across, so that I had a good opportunity to see and speak with the emigrants. Their superior character was a subject of common remark and congratulation. All were agreed that no country had ever received a more desirable class of settlers. Many were well educated, and, though young, most of them had made a successful start in business. They were orderly, peaceful and well behaved. No case of drunkenness, gambling or fighting was reported in our vicinity between the Missouri and the Sacramento rivers, and I heard of only one homicide which occurred many miles away. I must admit that there was much profanity, but that in an ox teamster is an allotropic form of piety, and we all had to take our turns in driving. We were somewhat unenraptured, however, when the Indians, repeating the first words which they heard, and supposing them to be the ordinary salutations, would come up, hold out their hands and shout, "How d'ye do, Wo han, d— you!" sometimes adding a few words of similar import to show greater proficiency in politeness.

The men at Clear Creek, now Horsetown, near Shasta, where I spent the winter of 1849-50, had nearly all crossed the continent in the previous summer; and in the mines as on the road, their conduct was admirable. There was no homicide, no fighting, no quarrelling about claims, no gambling, no idling, very little intoxication, and no place within ten miles where strong liquor could be bought. Though gold dust was abundant, and was often seen lying about unguarded within sight of passing strangers, no thefts were reported until after midwinter, and then but few.

Marshall's assertion that he was driven from his claims more than 50 times by men whose only motive was robbery, suggests a suspicion of exaggeration, or of some fault on his part. The miners were always ready to defend a neighbor in the possession of his claim, held under the local customs and regularly worked; and this was so well understood that no trespasser would venture upon a claim unless he could make out a plausible case of abandonment or violation of custom.

It is not my desire to throw doubt on Marshall's honesty. That was never questioned among his intimate acquaintances, so far as I have heard. He had no desire to injure his neighbors, and was good and kind in all his impulses.

As to the character of the men of 1849, I speak not from hearsay, or from the hasty presumptions of a day or two, but from a year's direct and intimate observation of men thrown into new circumstances, exposed to many dangers, privations and temptations, and at the same time left without the wholesome checks of family, old associations, and well established legal machinery. Hundreds if not thousands of the overland pioneers of 1849, still surviving, can corroborate my statements as to the character of that migration. Of the miners at Clear Creek of the winter of 1849-50, the only one whose address is known to me is the Hon. Alexander Anderson, of Shasta, who was a member of the Second Constitutional Convention, and has filled other public offices with credit to himself and benefit to his constituents.

Marshall, to whom I must now return, took up some land near Coloma for agricultural purposes, about 1856, and planted kitchen vegetables, fruit trees and vines, which promised, at one time, to yield him a comfortable support, but the increasing supply of such things and the decrease of population in the mines deprived him of this hope, and mining again became his

reliance. He moved to Kelsey, four miles from Coloma, and there he made his home till the end of his days. In 1870 George F. Parsons, an able journalist of Sacramento, wrote Marshall's biography, and the work, though bearing the marks of hasty composition, is very readable. It had much influence in inducing the Legislatures of 1874 and 1876 to give an annual pension of \$1200 to Marshall for four years, making a total of \$4800, the only reward which he ever received from the public for his discovery. He died as he had lived, in poverty. Of the men who were at Coloma in January, 1848, not one became noted for wealth.

The Californian gold discovery is one of the most prominent events of recent times. To it can be traced many of the most beneficent features of recent progress. The migration of a million people from the eastern to the western side of the continent; the rise of large and highly civilized communities at the occidental base of the Sierra Nevada and Cascade mountains; the development of the wealth of California, with her cities, vineyards, orchards, factories and roads; the opening of the auriferous and argentiferous deposits of Australia, New Zealand, Nevada, Utah, Colorado, Montana, Arizona, Oregon, Idaho, and British Columbia; the construction of half a dozen railways connecting the two great oceans; the establishment of several steamer lines across the Pacific, and Japan's welcome to European intercourse, are only a few of its results. Industry and commerce first felt its powerful stimulus, and these reacted on popular education, political freedom, literature, science and art, all of which have made more rapid advances within the last 35 years than ever before, and largely because of the impetus started upon the bank of the American river.

The chief credit for the Californian gold discovery has been awarded by some writers to Sutter, through the influence of mistakes or prejudice. They had heard the Coloma mill spoken of as though it were Sutter's exclusive property. They supposed that Marshall was a hired servant, who furnished only his manual labor, while Sutter supplied the brains for the management, as well as the money. Besides, Sutter was a man whose munificent charities had placed the whole State under obligations to him; a man of family, of extensive friendship, of genial companionship, and of polished manner.

Marshall, on the other hand, had no family and few friends. He was rough in his mode of life, careless in his dress, often surly in his manners, and frequently querulous or extravagant in his conversation. Such comparisons of the two persons most prominently connected with the discovery, though they were not entitled to the least influence upon this question of the gold discovery, led many persons to assert that the chief credit belonged to Sutter.

The mill should have been called by Marshall's name. He selected the site for it, he built it, he was its sole manager, owning half the building, and having a superior claim to all the land. His industry and mechanical skill had a larger share in the enterprise than Sutter's money, and Sutter contributed nothing but money. He did not have energy enough to examine the place and form his own judgment about its fitness until the structure was nearly completed.

Marshall not only selected the mill site well, laid out the line of the race and superintended all the work, but he was the first to see the gold, to pick it up, to subject it to a test, and to recognize its value. The chief, if not the exclusive credit of the discovery belongs to him. To him more than to any other man, our State is indebted for the opening of those auriferous deposits which attracted to her a large population and suddenly gave her a secure and respectable position among the most highly civilized communities of our time.

An assertion printed in the *Alta Californian* of the 18th ult., that Wilfred Hudson found gold in the race, several days before Marshall saw it, is disproved by many evidences, the most conclusive of which is the fact that we have a list of all the persons at the mill at the time of the discovery, and Hudson's name is not there.

The credit belonging to Marshall is not of a high character. Though the results were marvellously great, the strike was purely accidental. When selecting the site for the mill and route for the race, he did not take into account the possibility of finding gold. When the metal was exposed to view he did not require much capacity to suspect its nature and to try whether it was malleable. He did not know enough to make a conclusive test of its value to find the extent of the deposit by prospecting, or to separate the gold from the gravel by washing. In the vastness and beneficence of its immediate consequences, his find may be compared with the discovery of America, and the inventions of the steam engine and the telegraphic alphabet, but his name will never be entitled to such honor in history as those of Columbus, Watt and Morse, who began their labors with grand purposes, and achieved success by means of learning, combined with rare foresight, steadfastness of purpose, long toil, and severe sacrifices, patiently borne in confident anticipation of a commensurate reward. Their triumphs were achieved by calculation, and Marshall's came by chance.

Did his luck place the community under great obligation to him? I think not. The sense of gratitude for favors conferred unintentionally is not strong in the average human mind. I do not recall a case in which a govern-

ment has given a large pension or fortune for accidental service. The noted liberality of California, however, would not have been withheld from Marshall upon any technicality about luck, if he had shown a disposition to receive favors gracefully. But he habitually spoke and acted as if he considered the world hostile to him. In his biography we are told that "the history of his life" after January 1848 is "a record of a series of outrages" including "persecution, robbery, abuse, slander, and injustice of the basest kind." Such a complaint must have had most of its basis in a diseased imagination. The people of Coloma and of El Dorado county generally entertained very kind feelings toward him, and regretted that he made himself so unhappy. His bitter feeling was shown in a letter refusing the request of Hutchings' Magazine in 1857 to allow his likeness to be used in illustrating an article on the gold discovery. He used these words: "I feel it a duty I owe to myself to retain my likeness, as it is, in fact, all I have that I can call my own, and I feel like any other poor wretch; I want something for myself. The sale of it may yet keep me from starving, or it may buy me a dose of medicine in sickness, or pay for the funeral of a dog, and such is all that I expect, judging by former kindness." This is from a man 45 years of age, strong, healthy and without a family, in a country where he could easily earn \$5 a day by his labor. There is some truth in Thackeray's statement, that "the world is a looking-glass, and gives back to every man the reflection of his own face." In October, 1848, he asserted that he had information of the existence of a large organized band of robbers at Coloma, that he understood their signals and knew several of the leaders, but when urged to give his information to the public, so that the offenders could be punished, he refused, on the ground that the criminals were too formidable, and the only result of his exposure would be that he would lose his life.

Soon afterwards, while in San Francisco, he discovered the plan of an organized band of robbers to burn and sack the city, and learned "their grips, passwords and counter-signs." He spoke to a friend of the proposed crime, but refused to go before the constituted authorities for fear they were in league with the criminals. We could believe one story of this kind, but two so near alike and so close together strain our credulity. Parsons admits the existence of a rumor that Marshall was insane, and in 1848 Major Reading thought his mind was unsound, an opinion evidently shared by Kemble. According to an opinion common among his neighbors, he was a crank. Notwithstanding his ill temper and his mental weaknesses, the Californians would probably have provided for him well if any comprehensive and judicious statement of his claims had ever been presented to the Legislature, but no such presentation was made. The citizens of the county where he resided never instructed their representatives to demand relief for him, nor did any Governor of the State plead his cause in an official document. While his treatment of the Government seems excusable, if not just, the people of the State will presumably regret to remote time that it was not more magnanimous. Expressions of such regret can avail nothing now to him, but they might be followed by giving some appropriate resting place and monument to his remains.

Many mistakes greater than the neglect of Marshall may be found in the history of California; and in this country, as in every other, the partial or malignant artist who depicts only the foul and overlooks the fair can paint a very black picture and truthfully assert that every separate feature in it is true to the life. The spoliation of the holders of Mexican land grants, the refusal to give permanent homes to the early settlers in the Sierra Nevada, the delay and chicanery in the administration of civil and criminal justice, the demagogism of the officials, and the embezzlements and frauds in the executive department, have been in some respects unequaled in any other highly civilized community. But the canvas on which these dark spots appear is bright in general color.

If we add together the number of inhabitants in California in 1850, 1860, 1870 and 1880, as ascertained by the census, and divide by four, we obtain 475,000 as the average population of the State for the last 35 years. No other people, within the same period after obtaining possession of a new and strange country, have done more in proportion to number to discover and develop its resources, or accomplish greater marvels in changing the face of nature. Within half a lifetime they have done more road-grading within the narrow limits of their territory than the Romans did in their entire empire in ten centuries, and Gibbon regarded the Romans as the most remarkable road-builders the world had ever seen. They have carried rivers over the hills and have dumped mountains into the valleys. They made their country as the *Westminster Review* truthfully remarked, first the treasury and then the garden of this world.

"But," says a Briton, reproachfully, "California has no traditions." A creditable tradition is not an appurtenance of real estate; it is personal property. It attaches itself to the man and not to the land. The Californians have inherited the history as well as the blood of their ancestors. Every great deed, every intellectual triumph of Europe or the United States belongs in part to them. A drop of Anglo-Saxon blood in California has just as much title in Rannymede as has any drop of

(Concluded on page 236.)

MECHANICAL PROGRESS.

Sparks by the Carload—Unconsumed Fuel.

Mr. John Bingley, master mechanic of the Hanover and Gettysburg railroad, writes to the *American Machinist* in favor of extended fire boxes as against extension smoke boxes, and also in favor of very large exhaust nozzles. He says:

"While on a trip over some of the trunk lines recently, and in speaking to a master mechanic about the working of extension smoke boxes, he said they were an expensive thing on freight engines, but the suburbs of our large cities ran out so far that they had to use them. But he remarked: 'We haul away 18 carloads a week of sparks, and that is most all fuel.' Eighteen carloads, at 20,000 pounds each, can easily be figured. I saw, recently, some one speaking of a certain extension smoke box, who said they emptied out, I think, 20 bushels in 15 miles. I have no desire to own an invention like that. No wonder railroads go into receivers' hands—rather costly, as the old lady said."

"Mr. Frank Smith spoke about railroads running less than 3" nozzles invariably coming to grief. He also spoke about back pressure in cylinders, etc. Very good logic, ell."

"But I conceive that the best extension is to be made on the fire box end, and it is only a matter of time when the master mechanics and purchasing agents will see it. This will give more thorough combustion, less smoke, no sparks. I say the proper place for sparks is in the fire box, where they belong. I know some parties use hoppers and steam jets to drive them back into the fire box, like the boy dragging his sled up the hill to skid down again."

The correspondent says that the road with which he is connected has given the idea a thorough trial. The fire box on one of their locomotives, with a heating surface of 1415 feet, was enlarged, and the single exhaust nozzle was enlarged from 5½ to 6½. In regard to the recent performance of that engine, Mr. Bingley says:

"I wonder if there is another locomotive in the United States with one larger than that? We haul freight, and sometimes large excursion trains, over pretty heavy grades to Gettysburg. This engine hauled President Cleveland and his company in grand style and time. The report from coal yard is that this engine heels the same trains with just half the coal the other engines do. We expect to save enough coal in one year to pay the royalty on the fire box. We are not bothered with sparks, black smoke scarcely any, steam always plenty. The fire men say it is a picnic to fire her, and they get sick sometimes when they have to change."

"Now I just state these facts to induce thought. Any man, who is not prejudiced, will do well to turn his thoughts of improvement to the other end of the engine. Engineers of an adjoining road look down the smokestack, some times, at the nozzle of the engine I refer to, then you should hear them—'bucket,' 'barrel,' 'hoghead,' etc."

CHROME IRON AND STEEL.—A boring tool of chrome steel, if properly proportioned, will stand to bore and turn cast-iron that is too obdurate to yield to the persuasions of the best tempered and "highest" crucible steel cemented from bars of the best iron. A large fly wheel for a special purpose, with a narrow rim, and thirty-two feet in diameter, was found to be so hard on the face of the rim that it could not be turned. Much fuss was made to induce the obdurate rim to yield, but to no purpose. Grinding was attempted, and chipping, but the outer surface was like glass. Tools of chrome steel finally induced the iron to yield, and a costly casting was saved. The chromate of iron, commonly called "chrome iron ore," is found in Maryland and in Pennsylvania. The chromate of potash is made by heating chrome iron ore with one-fourth its weight of nitrate of potash (niter) and then digesting it with water. Chromisen (chrome iron) is a compound of about three parts by weight of chromium and one of iron. It is hard enough to cut glass readily. Chrome steel has a large proportion of iron. Both are used in the construction of burglar-proof safes. Chrome steel may be made quite ductile and soft by using chromisen instead of spiegleisen in the Siemens steel process, when the resultant can be tempered to several grades of hardness within well defined limits. Chrome steel is useful for many jobs in the machine shop, and should be more generally employed.

THE PERFECTION OF MODERN TOOLS.—Smiles, in his "Iron Workers and Tool Makers," after referring to the fact that fifty years ago it was a matter of great difficulty to set a new steam engine to work, and to keep it going after it was started up, the foreman of the factory at which it was made having "almost to live beside the engine for a month or more," proceeds to speak as follows of the machinery of our day: "Now the case is altogether different. The perfection of modern machine tools is such that the utmost possible precision is secured, and the mechanical engineer can calculate to a degree of exactitude that does not admit of a deviation beyond a thousandth part of an inch. When the powerful oscillating engines of the Warrior were put on board that ship, the parts, consisting of some 5000 separate pieces,

were brought from the different workshops of the Messrs. Penn & Sons, where they had been made by workmen who knew not the places they were to occupy, and fitted together with such precision that so soon as the steam was raised and let into the cylinders the immense machine began as if to breathe and move like a living creature, stretching its huge arms like a new born giant; and then, after practising its strength a little, and proving its soundness in body and limb, it started off with the power of above a thousand horses to try its strength in breasting the billows of the North sea."

Second Hand Machinery.

There is no particular risk in buying second hand machinery and shop appliances, if such ordinary caution is used as would be deemed necessary in buying second hand furniture. If the seller is a man of known integrity, and is practical mechanic enough to understand not merely the market price, but the actual value of the machines, it is enough to trust to his representations. But it is not often that the practical or judging mechanic and the honest dealer are combined. Auction sales of machinery may be traps, unless the would-be purchaser has had previous opportunity to examine the goods. Second hand machinery is frequently offered for sale, not only cleaned of gurry and rust, but painted, varnished and polished. "Paint and putty cover a multitude of mechanical sins."

The times have put upon the market a large amount of machinery that has been used, much of it used up and fit only for the scrap heap. But the business necessities of some proprietors of small establishments have impelled the selling of shop tools and appliances at very low prices. There are plenty of good second hand tools in the market, as well as plenty of junk material.

If the purchaser is not himself a practical judge of the value of a machine, or a shop or factory appliance, it is not difficult to obtain, for a moderate consideration, the examination and opinion of a good mechanic. This will pay, even if the examiner makes a fair charge for time and trouble.

A small manufacturer wanted an additional boiler, and he bought a second hand one that had been coal tarred inside and out; it looked clean and shone beautifully. He bought it "dirt cheap," and had it put in place. It leaked like a sieve as soon as 60 pounds pressure was on; he had it calked on the seams, poured in a lot of rye flour; had the coal tar foaming over into his engine cylinder, and after three weeks of torment blew it off and had a reasonable boiler-maker examine it.

The result was patches and repairs to almost the first price paid; the combined expense would have bought a good boiler, and a small outlay for experience would have saved him a vexatious outlay of money and experience.

ALWAYS HAVE TOOLS HANDY AND READY FOR INSTANT USE.—It is impossible for a workman to keep every sort of a tool he may need, or have use for, among his kit of tools, if he has anything to do with repairing machinery or keeping it in order. If a machine is worth cleaning up it is worth having a few special tools fitted and kept where they will be handy for no other purpose than for adjusting and changing the parts of the machine. In the simple matter of helting the workman is obliged whenever one of these ripping connections becomes loose, or is torn apart from the lacing and gets wound about the shaft, to hunt over every department in his chest of tools for a piece of lacing he once saw, or among a hex of nails and screws, for a few belt hooks he may be in need of. It is very easy for any one to arrange a spare corner for a few lengths of lacing, belt punch, beltawl, with hooks or any other form of connection, and keep them where they will be ready at a moment's notice, instead of waiting until these simple tools are wanted for immediate use. One of the great advantages of helting never gearing is that a belt is very easily replaced, while a gear wheel would require the shutting down of the whole concern for the greater part of the day, and although a belt can be replaced or taken off and repaired in one-tenth of the time, nearly this amount of time is wasted by every one concerned in searching for one of these little articles for making belt holes, or for a side of leather to strip off a length of lace. It is very true that an accident by which a belt gives out, if it can be called an accident, does not occur every day, but it is all the more reason that the necessary tools and material to work with should be protected with as much care as the work they are to assist, for it is during these idle moments that they are likely to get misplaced. In looking after the welfare of any machine, or the amount of production expected from any tool, as much depends on the means of adjusting as in any part of its operation.—*Am. Artisan.*

THE DAYS OF MACHINERY, remarks a contemporary, have been for the poor man days of home-making and home-making comforts, as no other days ever were. If machinery has given the rich man luxury, it has given the poor man the necessities and comforts of habitation, and clothing, and travel, such as he never had before. The printing press, especially, is the poor man's servant and benefactor, soothing abroad our intellectual wealth, raising all to an intellectual level and binding all into one whole.

SCIENTIFIC PROGRESS.

Formation of Artificial Petroleum.

Possible Origin of Natural Petroleum.

For the past quarter of a century, ever in fact, since the attention of the commercial and scientific world was attracted to petroleum by reason of its immense production in Western Pennsylvania, its primary origin has been a question of much study and speculation.

The question was asked over and over again: What is petroleum, and how were the immense deposits formed, and from what substance or combination of substances?

Some scientists ascribe its formation to the result of vegetable decomposition, but other scientists soon proved the vegetable theory fallacious. Then the theory was advanced that it was formed by the decomposition of animal matter, but this theory was also shown to be wrong.

For a long time the apparent impossibility of solving the problem seemed to discourage scientists, the discussions on the subject ceased and the public lost sight of the matter and but little appeared in print about it.

Later on, and quite recently, the question of the origin of petroleum again began to be discussed, more particularly among strictly scientific scholars, and among them M. Berthelot, of Paris, who carefully studied the chemical composition of petroleum, and when he had satisfied himself on this point he began experimenting, endeavoring to make petroleum or a substance that had the same chemical constituents as petroleum. This he finally accomplished and a result has arrived at what may be the correct theory of the cause and source of the origin of petroleum.

By the action of superheated steam on cast-iron, that was exceedingly rich in carbon, in a fluid state at a very high temperature, a product was produced which after a careful investigation was found to be identical with the hydrocarbons forming crude petroleum. This discovery not only offered a hypothetical theory of the formation of petroleum but very possibly explains the nature and origin of its formation at great depths in the interior of the earth.

The way in which nature, in her great laboratory may form petroleum is easily comprehended and understood when a few well-known philosophical and chemical facts are considered.

It is a demonstrable fact that the specific gravity of constituents in the interior of the earth greatly increases as the center is approached and that at a great depth there is a vast accumulation of the heavier metals; and it is also generally acknowledged that the heat of the interior of the earth so increases as the center is approached that at great depths it is hot beyond any artificial heat that man can create on the earth's surface. It is also proven by experience that iron, at a very high temperature and under great pressure, is able to absorb much larger percentages of carbon than the cast-iron in blast furnaces.

It is also known that through fissures in the ocean bed water filters to very great depths, where the heat is excessive and where iron would be in a melted condition and under a great pressure. Here, then, are the necessary conditions to produce the same results as were produced in the laboratory of M. Berthelot.

The chemical action which produces the petroleum is as follows:

The sea water coming into these very hot depths is converted into superheated steam, which, coming in contact with the melted iron, rich in carbon, is decomposed into free hydrogen and oxygen. The oxygen combines with the iron to form iron oxide and the hydrogen unites with the carbon, which was set free through the oxidation process—thus forming the hydrocarbons. These hydrocarbons consist of gas, vapor and oils, which, in the intensely hot regions where they are formed, are in a vaporous state. These vapors, ascending through fissures to a higher and cooler region, will, by condensation, deposit all their condensable products upon reaching a strata of porous rock able to absorb the liquefied oil, and over which there is an impervious strata to prevent their further ascending. The result of these condensed liquefied products is petroleum, or rock oil, as found in the so-called oil-bearing rock.

It may be asked why, if the above be true, that petroleum is not found in all parts of the world, and why, when found in a strata of rock at one place it is not sometimes only a short distance away. The shortest answer would be that the combination of the several necessary conditions for not only its formation but condensation and deposit did not exist in those places where it is not found. It must be remembered that not only must the hydrocarbon vapors be found in the interior, but there must be fissures in the various sub-strata through which the vapors come up toward the surface, and that these fissures do not exist in all places. Further, even, when the vapors do ascend, condense and form petroleum in deposit, the vapors must find their way to a strata of rock sufficiently porous to absorb and hold the condensed products, and that to condense the vapors these strata of rock must be sufficiently near the surface to be cool enough to cause the necessary condensation. And, again, that such strata of rock must be overlaid with a shell or crust or strata that is impervious to the ascending vapors, otherwise they will continue to ascend to the surface, and instead of condensing escape and pass off into the air in a gaseous or

vaporous state, as is frequently the case in many parts of the world where there exist gas springs, so called.—*Exchange.*

Causes of Earthquakes.

Colonel W. W. Hollister, of Santa Barbara, has been for thirty years an interested observer of the results and phenomena of earthquakes. His conclusions as to their causes are so diverse from the usually accepted theories of their causes that they will be of interest to many readers. His theory is that electricity is the force to which is attributable the disturbance of all seismic areas; that great reservoirs of this fluid are formed, the overflow of which acts with such tremendous power and quickness as to suspend the principle of gravity. He has remarked that the mid-action is generally a straight line, which is occasioned by the negative and positive poles meeting in one uniform center. In support of his theory and in opposition to the old one, which is based on the sudden generation of steam from the influx of superficial water to internal fires, he adduces the testimony of many who have been in wells or mines at the time of an earthquake and observed no motion, while the immediate surface has been greatly agitated. He divides them into two kinds as to motion; the one traveling as a wave at sea, and the other in a right line. The amount of liberated electricity would control the intensity of the shock. In support of his theory, he also alleges that if the earth's crust were rendered from below, springs which have been released would flow downward into the ruptures opened, instead of remaining living springs upon the surface. Earthquakes, he says, are exterior, not interior; otherwise, there would be a continuous great chasm to the very center. That gravity is, then, overcome or suspended, he contends to be proven by the fact that stone walls, chimneys and persons have been removed from locations as though undisturbed by levitation. He has seen water two inches deep in a tub rise and overflow its sides when the motion of the earth was not sufficient to account for such an eccentricity. The greater frequency of earthquakes in the vicinity of volcanoes he ascribes to the necessarily thinner crust of the earth's surface near them, therefore rendering it more susceptible to fracture, which occasions the rushing fourth of the lava, "because of the suspension of the force of gravity." Colonel Hollister offers his theory suggestively, and hopes it may promote a discussion which will ultimate in scientific observations and discoveries.

The Art of Printing.

We may trace the footprints of creation in the enduring rocks that underline the earth's surface. The physical world bears the imprints of the Almighty Hand by which it was created, and reading this wondrous page in the light of modern science, curious inquiry is ever encouraged by new discovery to fresh research. Even the birth of man, and the manner of his coming into this world of ours as an animal, is now a problem of which many claim to hold the key. They can even speculate shrewdly as to when this animal became the proud possessor of that intelligence which distinguishes him from his humbler fellow creature—when man began to think.

But there is a point in the world's history from which we may reason with a proximate certitude. Beyond and back of that all is confusion, doubt and superstition. Tradition, which transmits its facts by impression upon the shifting tablets of memory; the spoken word that fades into silence or is lost in the confused babel of tongues, that loses its import on being repeated, is not a trustworthy guide by which to trace the growth of thought.

When men began to write, though for the first time began to assume an enduring form. Then books were made, and the mental achievements of one age were handed down as a legacy to the next.

And even the written page, whose words were traced "in the unvoiced silence of the student's cell," to be read only by the unquestioning disciple whose highest aspirations were to understand the dicta of the sage, whose prodigious wisdom was taken for granted, proved but a halting advance in the world's mental progress. Not until the art of multiplying books by impressions from movable types was discovered, was human thought emancipated for all time. Its first charter of inalienable liberty was the printed page. Books, open to criticism, capable of countless reproduction, render the mental labors of one century as legible to future generations as they were to the age in which they were first given to the world. They live with their truths side by side with their errors. They endure as records of past achievement, and the prophecies are subjected to the test of the world's riper experience. To destroy the results of this wondrous invention, it would not suffice to burn all the great libraries of the world. Nothing less than a flame that would wrap the earth could undo the work of movable types or blot out the records of human progress.—*The Printer.*

The manufacture of solid carbonic acid gas has been carried on for some time in Berlin. It comes in small cylinders, and if kept under pressure will last some time. A cylinder 1½ inches in diameter and 2 inches long will take five hours to melt away into gas.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 15 Front St.

B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... .2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 3, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Electrical Transmission of Power, 225. Passing Events; Mining Debris; Avoidance of Brittle Gold; More Gold Fields; Ore Assays; Sediment and Fissures; Expanding Drill-bit for Boring, 228. Mechanics' Fair at Awards, 229.

ILLUSTRATIONS.—Keith's Dynamo-Electric Machine, 225.

MECHANICAL PROGRESS.—Sparks by the Coal—Unconsumed Fuel; Chrome Iron and Steel; The Perfection of Modern Tools; Second-Hand Machinery; Always Have Tools Handy and Ready for Instant Use; The Days of Machinery, 227.

SCIENTIFIC PROGRESS.—Formation of Artificial Petroleum; Causes of Earthquakes; The Art of Printing, 227.

ENGINEERING NOTES.—Some Big Schemes; Artificial Water Ways; Electricity on Railroads, 231.

USEFUL INFORMATION.—Repairing with Brass; About Screws; Right and Left-Handed; Heat Waste in Stoves; Care of an Oil Cloth; To Collect the Odors of Flowers; Swaying of Locomotives; How to Make Florida Water; To Keep Mice and Rabbits from Trees; A German Test for Watered Milk, 231.

GOOD HEALTH.—The Faith Cure; Hammocks vs. Beds; Reducing Obesity; Light and Health; The Teeth, 231.

MISCELLANEOUS.—Discovery of California Gold, 228. Practical Hydraulics, 230.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 232-33.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board. Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 236.

Business Announcements.

Pacific Coast Electrical Construction Co.—S. F. Engines and Boilers—Stearns Mfg. Co., S. F. Assessment Notice—Orleans Mining Co., S. F. Real Estate—Joseph H. Dorcy, S. F.

See Advertising Columns.

Passing Events.

We devote considerable space in this number of the PRESS to the list of awards to exhibitors at the Mechanics' Fair in this city, which has just closed. The list is instructive, as showing the variety of our local industries, and is useful as well in indicating as it does, the question of superiority in various branches.

The discovery of gold in the French possessions in Madagascar is announced. Thus far there are no details at hand to indicate the extent or value of the fields.

It is said that the famous State Line mines, on the borders of California and Nevada, about which there was so much talk some years since, will soon be started up again.

The low stage of water in many of our California rivers is being taken advantage of by river-bed miners, who are doing well in this branch of mining. With the first rise in the water, however, their work will come to a stop.

The Manufacturers' Association held an important meeting at the Mechanics' Institute on Wednesday evening. Owing to the fact that the list of awards of the fair takes up so much space in this number, our report of the Manufacturers' Association meeting is necessarily deferred to the next issue of the PRESS.

The Bald Mountain Extension Co., Forest City, Sierra county, cleaned up last week 153 ounces of gold, valued at \$2,845.80, the gravel averaging over \$3 per carload from sides of channel. The width of pay lead is 168 feet, and no left rim has yet been found.

MINING companies having offices in this city disbursed in September \$244,200 in dividends.

Ore Assays.

The Mint Bureau has issued a circular discontinuing the assaying and chemical analysis of ores and of furnaces by-products at the mints and assay offices of the United States. It is ordered that the mechanical preparation of pulverizing of ores or other mineral, mattes and slags, shall be done upon the premises of the mints and assay offices only when a part of the technical processes of these institutions, or when in the course of their regular business. The Director also adopts a rule to the effect that assaying or chemical work in a private professional capacity at the hands of offices of the United States mints and assay officers, should not be performed upon the premises of these institutions. Professional signs are prohibited upon the premises of mints and assay offices; and it is ordered that professional cards and certificates of assay or analysis must be without official captions or signatures.

There has been complaint from private assayers that the Government has been doing work in competition with them. It is not long since the Government reduced the prices of assays from \$3 to \$2 for gold and silver, and from \$5 to \$1.50 for copper. But now these officials cannot do it at any price.

The order will be mainly felt by prospectors and miners in Idaho and Montana. At Boise and Helena the Government assay offices have been doing considerable business for some time. The Idaho men will have to send to Portland, Salt Lake, or this city, if they wish certificates from large establishments. There are now, however, many private assaying establishments all over the country, where good work can be done. Ore assays are so simple and so quickly performed that the order can work little hardship generally, though in some few cases it may put men to more trouble than they have been accustomed. Any reliable assayer can make just as good ore assays as Government officials.

Sediment and Fissures.

In some mining districts transported material or sediment is often an accompaniment of fissures and ore bodies. In Eureka district it consists of loose boulders of gravel more or less connected together, of large and small brecciated fragments of limestone or of loose sand. The nature, the position it occupies and its structure, show that it could only have been brought into its present place by the aid of water. It is to be looked upon, therefore, in the opinion of Mr. J. S. Curtis, as simply a wash from higher points which has filled the cavities and interstices of the rock formed by dynamic and chemical causes. This wash frequently accompanies large ore bodies and is usually found adjoining or overlying the ore, and although it is not an infallible indication of its presence, it is one which is not to be overlooked. The two-million-dollar ore chamber on the eighth level of the Eureka mine, Eureka district, Nev., was discovered by following such a wash. This body extended up above the seventh level, and down nearly to the ninth, and covered a great deal of ground with its ramifications and pipes. On the other hand, there is a very large mass of material of similar origin, in the form of fine sand, on the fifth level of the Phoenix, which, although pretty well prospected, has not led to any discoveries. These washes are more frequent at or near the surface, but have been found down almost to the water-level.

Avoidance of Brittle Gold.

Most gold and silver refineries in which the method of parting by sulphuric acid is adopted, produce brittle gold—that is, gold that cannot be rolled safely, and which requires careful annealing before passing the breaking-down rolls, and perhaps may not be sufficiently ductile even after annealing. Much trouble has been experienced at the San Francisco mint from this cause. The presence of the most minute quantity of lead impairs the ductility of gold, but does not affect silver in nearly the same degree. Lead is with difficulty removed when the parting of gold from silver is done by sulphuric acid. To entirely eliminate the lead which may be present, a very simple and efficacious expedient has been devised, which consists in taking advantage of the difference in specific gravity between gold and lead and the minute subdivision of the particles of the latter. The

filtering vessel in which the parted gold is washed with hot water, is slightly inclined by the operator, and the lead particles are floated off with the washings into another tub. This plan of simple decantation succeeds so well that at the Carson mint, according to Williams, the gold ingots do not require to be annealed before going to the breaking-down rolls.

More Gold Fields.

The Chinese, having recently found gold in their territory bordering on the Amoor river, have put several thousand men at work on the new diggings. Now comes the news that the French have discovered gold in paying quantities in Madagascar. No special sensation has been caused by the latter announcement, though some \$7000 or \$8000 has been received as the first results of the discovery. The gold is in the mountains which lie in the territory of the Hovas, with whom the French are carrying on a sort of a skirmishing war, which, however, will no doubt be soon put an end to if the gold discoveries are as extensive as supposed.

The Island of Madagascar is the third largest in the world, being 980 miles long from north to south, and 350 miles across its widest part. It is in the Indian ocean, and about 300 miles from the southeast coast of the African continent, from which it is separated by Mozambique channel. The country is still but imperfectly explored. The country is pretty well watered, even in the highest ranges of the interior, the abundant rainfall giving a perennial supply to the innumerable springs and streams.

The geology of Madagascar has been imperfectly investigated. Still it has been found that iron exists in great abundance in the central parts of the island, and copper and silver are said to have been found in small quantities, but are not worked. Antimony seems to be plentiful in the north, and rock salt, iron pyrites, plumbago, and various others are among the mineral products. There are thin beds of lignite, suitable for steam coal, on its northwest coast.

The Hova, is the dominant tribe, and occupies the central province of Imerina. They are the most advanced, intelligent and civilized of all the Malagassy. The new gold fields are in their territory. This is the only place owned by the French people where gold has been found, and its occurrence is likely to excite the French to a wonderful degree. It is yet too soon to speak definitely of the extent or value of the discovery.

Expanding Drill-Bit for Boring.

In artesian well boring the drill-bit is passed down on the inside of the pipe until its cutting points or ends project below the pipe. The drill is then rotated by suitable mechanism, and as it makes its hole the pipe is forced down after it. In ordinary drill-bits it is obvious that as they are no wider than the interior diameter of the pipe, the hole made by them is also of that size, and therefore the pipe, which for the space it occupies is measured by its exterior diameter, has to be forced down a hole too small for it. To obviate this difficulty extensive or expansive drill-bits have been attempted. These are adapted to pass down through the pipe in a contracted condition, and when they get beyond the pipe, they expand or extend in order to cut a hole larger than the pipe itself, but it is obvious that the friction of the descending drill-bit against the interior wall of the pipe as it is being lowered is materially increased by the fact that it is being held in a contracted condition, merely by reason of its confinement within the pipe.

Mr. Charles C. Lane, of this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a new form of expanding or extension drill-bit, specially adapted for boring artesian wells. The invention consists in two or more spring legs firmly secured at their tops to the head of the tire, their lower ends being formed into or provided with cutters, above which, on their outer edges, are formed peculiar frictional or bearing-knees on fixed or stationary fulcrum blocks between the legs, over which they are adapted to bend when their lower ends are forced together, whereby the distance between the cutters is much shorter than the distance between the knees; and in a vertically adjustable automatic strut-brace adapted to operate between the legs to hold them rigidly separated, and to re-

lease them when the tool has to be raised. The invention consists, further, in providing in some cases anti-friction rollers for the knees and a clamping band for the cutters.

Mining Debris.

They are getting up a sort of debris scare in Oregon, the Portland *Oregonian* having published an article, trying to prove that hydraulic mining in Boise county, Idaho, is filling up the Columbia river and will impede navigation. They are looking a long way ahead, when it is remembered that the Boise basin is 750 miles above Portland, and no debris is deposited in the Boise river, 30 miles below, where mining operations have been carried on for 20 years. The Idaho *Statesman* gives two reasons for this: "Moore's creek, where the debris is deposited, is a deep, rocky canyon for 30 miles, and takes it as fast as it is washed down. Of course the water riles the waters of Boise river and partially riles the waters of Snake river for about 100 miles, but there is scarcely any perceptible coloring of the waters of Snake river at Lewiston, although Salmon river, where there is considerable hydraulic mining, empties in 50 miles above Lewiston, but the waters of Payette, Owyhee, Malheur, Weiser and Grand Ronde rivers are all heavy streams of clear water, and help to cleanse the waters of Snake river long before it reaches the Columbia. If these tributaries were like the Platte, the Niobrara, the Yellowstone and numerous other branches that roll down their sands to help perturb the muddy waters of the Missouri, there might be cause of danger. Portland is on the Willamette, 20 miles above the mouth where it empties into the Columbia, and any careful observer will discover that the mud and dirty water that flows down the Willamette in consequence of plowing and cultivating the soil in the valley above, and the great rains and freshets which the country is subject to, is a hundred-fold greater than the muddy water from the mouth of Snake river, which is nearly 300 miles above the mouth of the Willamette. All the danger of debris filling up of the Columbia is in what is known as the Lower Columbia, and that comes from the cultivation of the soil on the streams below the Cascade range during the rainy seasons. If there was any trouble about the debris in Boise county, Boise valley would suffer first. No inconvenience has ever been experienced in this valley. If there were ten times more mining in Boise county the debris could be cribbed or caught in the Moore's creek canyon with very little expense."

While this agitation is commencing in Oregon, the expected results of the famous Sawyer decision are being felt here in this State in the increasing number of injunctions against hydraulic mines. An action has been commenced by the Board of Supervisors of Sacramento county against all the hydraulic mines ascertained to have been lately in operation on the Cosumnes river. The suit is entitled George Cashman vs. the Amador and Sacramento Canal Company. Cashman alleges that he is the owner of a ranch of 700 acres on the north bank of the Cosumnes, twelve miles above its mouth. He complains that, owing to the hydraulic mining carried on by defendants in Amador, Sacramento and El Dorado counties, a large quantity of debris, consisting of sand, red earth, gravel and cobble-stones, equal to about 300,000 cubic yards, is annually being deposited in the Cosumnes and other rivers. He further alleges that, owing to the blocking up of the channel of the river, the water has been forced upon his bottom lands, the crops destroyed and the land left covered with sand, from which worthless willows readily spring and render it perfectly useless. He asks that the defendants be enjoined from operating the mines.

Judge Sawyer, of the Circuit Court, has granted a temporary injunction against all of the mines on the Cosumnes, and they have all ceased operating. Service has been made upon the Amador and Sacramento Canal Company, H. S. Bynan, John D. Hurley, John Haggerty and Martin Welch, connected with the mines at Hill Top, Lambing Bros., Geo. W. Phillips and others at Irish Hill, etc. The case will be heard before Judge Sawyer, November 2d.

The San Francisco mint coined \$1,920,000 during September, of which \$1,120,000 was in ten dollar pieces, and the balance in twenties.

(Concluded on Page 237.)

PRACTICAL HYDRAULICS.³¹

NUMBER 4.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDAL.]
[COPYRIGHTED.]Substituting these values of pc and $(2g)^{\frac{1}{2}}$ in (34).

$$Q = 2.6365 h^{\frac{5}{2}} \text{ per second.} \quad (35)$$

If, in (35), h'' representing inches be substituted for h , which represents feet, and the unit of time be made one minute, we shall have the following formula, which is attributed to Professor James Thompson, of Glasgow University:

$$Q = 0.317 h''^{\frac{5}{2}} \text{ per minute.} \quad (36)$$

If a second be the unit of time, and the head be in inches, we have:

$$Q = .005285 h''^{\frac{5}{2}} \text{ per second.} \quad (37)$$

Professor Thompson having experimented satisfactorily with the quadrantal weir, pronounces it more simple and reliable than the rectangular weir, in that the ratio between the head of water and the horizontal width of notch is constant; in that the flow of water through it is less effected by the "depth from the crest to the bottom of the channel of approach," and finally, in that the coefficient of discharge is constant for different depths. In the experiments of Prof. Thompson, "the volumes of water," says J. T. Fanning, C. E., "varied from .033 to .6 cubic feet per second." From this statement it is deducible that the depths of water varied from two inches to 6.6 inches (see Table 4), though the depths given by Mr. Fanning vary from two to four inches.

The simplicity of this weir, its cheapness, and the assurances of its superiority, as stated, have induced the computation of Table 4 for practical use.

TABLE 4.

Flow of Water per Second over a Quadrant Weir.

Head Inch.	Flow Cub. Feet	Head Inch.	Flow Cub. Feet	Head Inch.	Flow Cub. Feet	Head Inch.	Flow Cub. Feet
1.	.0053	4.	.1691	7.	.6852	10.	1.6713
1.1	.0067	4.1	.1799	7.1	.7100	10.1	1.7134
1.2	.0083	4.2	.1911	7.2	.7352	10.2	1.7562
1.3	.0102	4.3	.2026	7.3	.7610	10.3	1.7995
1.4	.0123	4.4	.2146	7.4	.7873	10.4	1.8435
1.5	.0146	4.5	.2270	7.5	.8142	10.5	1.8882
1.6	.0171	4.6	.2398	7.6	.8416	10.6	1.9334
1.7	.0199	4.7	.2531	7.7	.8696	10.7	1.9794
1.8	.0230	4.8	.2668	7.8	.8981	10.8	2.0260
1.9	.0263	4.9	.2809	7.9	.9271	10.9	2.0732
2.	.0298	5.	.2954	8.	.9567	11.	2.1211
2.1	.0338	5.1	.3105	8.1	.9869	11.1	2.1696
2.2	.0379	5.2	.3259	8.2	1.0177	11.2	2.2187
2.3	.0424	5.3	.3418	8.3	1.0489	11.3	2.2686
2.4	.0472	5.4	.3593	8.4	1.0808	11.4	2.3192
2.5	.0522	5.5	.3750	8.5	1.1133	11.5	2.3703
2.6	.0576	5.6	.3922	8.6	1.1463	11.6	2.4222
2.7	.0633	5.7	.4100	8.7	1.1799	11.7	2.4748
2.8	.0693	5.8	.4282	8.8	1.2142	11.8	2.5280
2.9	.0757	5.9	.4468	8.9	1.2489	11.9	2.5818
3.	.0824	6.	.4661	9.	1.2843	12.	2.6365
3.1	.0894	6.1	.4857	9.1	1.3203	13.	3.2205
3.2	.0968	6.2	.5059	9.2	1.3568	17.	6.2979
3.3	.1046	6.3	.5266	9.3	1.3941	19.	8.3167
3.4	.1126	6.4	.5477	9.4	1.4318	23.	13.4089
3.5	.1211	6.5	.5693	9.5	1.4702	29.	23.9369
3.6	.1300	6.6	.5915	9.6	1.5092	31.	28.2800
3.7	.1391	6.7	.6141	9.7	1.5490	37.	44.0128
3.8	.1485	6.8	.6373	9.8	1.5890	41.	56.8896
3.9	.1588	6.9	.6610	9.9	1.6299	43.	64.0830
				47.		80.0420	

Table 4 has been computed from formula (37), in which the head is in inches, and the quantity discharged per second is in cubic feet. The tabulated discharges for depths of water over six inches requires the confirmation of experiment; until that shall be had, however, there seems good reason from the data to regard them approximately correct.

APPLICATION OF TABLE 4.

Ex. 20.—The depth of water in a quadrantal weir being 2.1 inches, what is the discharge over it in cubic feet per second?

Cal.—In "head" column, Table 4, find the given head 2.1 inches, opposite which, in "flow" column, will be found .0338 cubic feet: the quantity sought.

To determine the flow of water on a quadrantal weir, the head given being equal to the product of two factors, each designating a head of water in Table 4.

Rule 14.—Multiply the product of the discharges due the factor heads by 189.2.

Ex. 21.—The head in a quadrantal weir being 15 inches, what is the discharge per second?

Cal.—Observe that the factors of the given head are three and five: $3 \times 5 = 15$.

By Table 4, flow due 5" head = .2954.

By Table 4, flow due 3" head = .0824.

Hence, $.2954 \times .0824 \times 189.2 = 4.6054$ cubic feet.—*Ans.*

Ex. 22.—The head in a quadrantal weir being 42 inches, what is the discharge per second?

Cal.—Observe that the factors of the given head are six and seven: $6 \times 7 = 42$ inches.

By Table 4, flow due 6" head = .4661.

By Table 4, flow due 7" head = .6852.

Hence, $.4661 \times .6852 \times 189.2 = 60.4258$ cubic feet.—*Ans.*

The application of Rule 14 to depths below 13 inches will be unnecessary; the rule is given to avoid an extended table.

EQUILATERAL WEIR.

To determine the flow of water over an equilateral weir, ECF, in Figure 3, make $p = \frac{2}{\sqrt{3}}$. That is when

h is the height of an equilateral triangle, its side on width as in ECF, is $EF = ph = \frac{2h}{\sqrt{3}}$. Substituting this value of p in Eq. (33), there results:

$$Q = 1.52217 h^{\frac{5}{2}} \text{ per second.} \quad (38)$$

Were the head given in inches, and the quantity of flow required in cubic feet per minute, then would

$$Q = 1.77 h''^{\frac{5}{2}} \text{ per minute.} \quad (39)$$

The heads being equal in the two forms of triangular weirs, thus far considered, then will the discharge in the equilateral form be to the discharge in the quadrantal form as .57735 is to 1. Hence, to find by Table 4, the discharge over an equilateral weir, the head being given:

Rule 15.—Find in Table 4 the discharge due the given head over a quadrantal weir. Multiply the quantity so found by .57735.

Ex. 23.—The head of water in an equilateral weir is eight inches. What is the discharge in cubic feet per second?

Cal.—By Table 4, it is seen that the "flow" due the given head, eight inches, is .9567 cubic feet per second. Hence, $.9567 \times .57735 = .5524$ cubic feet.—*Ans.*

In Eq. (34) any value may be given p , as 1, 2, 3, 4, 5, etc., so as to indicate the relations existing between the height and width of triangular weirs. But since c , the coefficient of discharge, varies with every different condition imposed, the labor of determining the theoretical flow due any considerable number of such forms would necessarily be barren of practical results.

In general let (34) be reduced to its simplest form:

$$Q = 2.14 pc h^{\frac{5}{2}} \quad (40)$$

In which h denotes feet, and Q cubic feet.

If in (40) we make $p = 2$ and $c = .616$, the formula becomes that of the quadrantal weir, as shown by Eq. (35).

If we make $p = \frac{2}{\sqrt{3}} = 1.1547$, and $c = .616$, the formula becomes that of the equilateral weir, as shown by eq. 38.

If we make $p = 2\sqrt{3} = 3.4641$, and $c = .616$, the formula becomes that of a weir, whose apex or angle $C = 120^\circ$; Fig. 3.

$$Q = 4.5665 h^{\frac{5}{2}} \quad (41)$$

And in this manner may special formulas be deducted from (40), to meet the various requirements of triangular weirs. In theory the results obtained are as they should be; but in fact, experiment best determines in what cases c is constant, and in what variable.

TRAPEZOIDAL WEIRS.

To determine the flow of water over a trapezoidal weir. Let, in Fig. 3, ACD represent a triangular weir, in which GI is a line indicating a division with respect to flow of water over the weir.

The flow of the triangular portion, GCI, taken from the entire flow due ACD, there remains that portion of the flow due the trapezoid DAGI. The mean velocity of the water in ACD is evidently greater than the mean velocity is in DAGI, else the flow in the trapezoid could readily be determined from that of ACD by the simple ratio of three arms.

Let, in the present solution, h , p , c , Q , g and v have the same values or functions which they had in the discussion hitherto of triangular weirs. In addition put $CL = nh$;

$$\text{Then } BL = (1-n) h, \quad (42)$$

the depth of the trapezoid DAGI.

Integrating equation (33) between the limits of $x = 0$ and $x = nh$, and there results the flow per second due the triangular portion of the weir GCI.

$$Q_i = pc (2g)^{\frac{1}{2}} \left(-\frac{2}{3} (1-n)^{\frac{3}{2}} + \frac{2}{3} (1-n)^{\frac{5}{2}} + \frac{4}{15} \right) h^{\frac{5}{2}} \quad (43)$$

Deducting (43) from (34), there remains:

$$Q = \frac{2}{3} pc (2g)^{\frac{1}{2}} (2+3n) (1-n)^{\frac{3}{2}} h^{\frac{5}{2}}. \quad (44)$$

Formula (44) represents the discharge due the trapezoid DAGI.

$$Q = 1.07 pc (2+3n) (1-n)^{\frac{3}{2}} h^{\frac{5}{2}}. \quad (44)$$

Ex. 24.—The width of a trapezoidal weir being two feet, the depth one-fourth ($\frac{1}{4}$) of a foot, the sides inclining 45° to the horizon, and the coefficient of discharge being .62, required the cubic feet flow over it per second?

Cal.—Since the width is two feet, and the inclination of the sides 45° , were the sides produced downward till they meet, the depth of the triangle so formed would be equal to one-half the given width—that is, $h = 1$ foot, and $p = 2$.

The given depth of weir being $\frac{1}{4}$, hence $n = \frac{1}{4} (1 - \frac{1}{4}) = \frac{3}{4}$.

Making substitution of these values in (44),

$$2 + 3 \times \frac{3}{4} = 4.25;$$

$$(1 - \frac{3}{4})^{\frac{3}{2}} = \frac{1}{8};$$

$$(1)^{\frac{5}{2}} = 1. \text{ We have}$$

$$Q = 1.07 \times 2 \times .62 \times 4.25 \times \frac{1}{8} = 7.05 \text{ cubic feet.} \text{—Ans.}$$

Ex. 25.—The width of a trapezoidal weir being 4.5 feet, the depth one foot, the sides inclining 45° to the horizon, and the coefficient of discharge being .62, required the cubic feet flow over it per second.

Cal. 1st.—The width being 4.5 feet, and the inclination of the sides 45° , if the sides be produced till they meet, the depth of the triangle so formed will be $2.25 = \frac{3}{4}$ feet.

$$2.25 - 1 = 1.25; n = \frac{1}{2} \times \frac{2.25}{2.25} = \frac{1}{2}; 1 - n = 1 - \frac{1}{2} = \frac{1}{2}; p = 2.$$

Substituting these values in Formula (44),

$$Q = 1.07 \times 2 \times .62 \left(2 + \frac{1}{2} \right) \left(\frac{1}{2} \right)^{\frac{3}{2}} \left(\frac{1}{2} \right)^{\frac{5}{2}} = 10.946 \text{ cubic feet.} \text{—Ans.}$$

Cal. 2d.—The bottom width $1.25 \times 2 = 2.5$ feet.

Regard the trapezoid weir made up of a rectangular weir, whose length is 2.5 feet and depth one foot, and of a quadrantal weir, whose width is two feet and depth one foot. Then

The quantities of "flow" are found to be by Table 2, for each linear foot of crest, 3.339 cubic feet; hence, for 2.5 feet; $3.339 \times 2.5 = 8.3475$ cubic feet, and by Table 4, for "flow" over a quadrantal weir one foot deep = 2.6365 cubic feet.

$$\text{Hence, } 8.3475 + 2.6365 = 10.984 \text{ cubic feet.} \text{—Ans.}$$

The discrepancy between the results obtained by the 1st and 2d calculations arises from the different values assigned the coefficient of discharge.

By *Cal. 1st* the coefficient was taken, as proposed in the given problem, at .62.

By *Cal. 2d*, the coefficient employed in computing Table 2, was taken from Table 1, which will be seen to be 3.339. So that the coefficient of discharge employed in Table 2, was, in fact, $3.39 \div \frac{2}{3} (8.025) = .6241$, instead of .62, as provided in the given proposition. The coefficient of discharge employed in computing Table 4, was .616, which was deduced from the formula given by Prof. Thompson. Weisbach's Mechanics and Engineering state that the coefficient employed by Prof. Thompson, was .619, while J. W. Stone, C. E., author of Hydraulic Formula, states that it was .617.

Cal. 3d.—The top width is given 4.5 feet. The bottom width = $(2.25 - 1) \times 2 = 2.5$ feet. Mean width $(4.5 + 2.5) \div 2 = 3.5$ feet.

By Franeis' formula $(3.5 - 1 \times 2 \times 1) = 3.3$, corrected length.

By Table 2, flow over each linear foot, 3.339 cubic feet. Hence, $3.339 \times 3.3 = 11.008$ cubic feet.—*Ans.*

This result differs but little from those obtained from more rigorous solutions.

FLOW OF WATER OVER TRAPEZOIDAL WEIRS IN WHICH THE LENGTH OF THE CREST IS GREATER THAN THE TOP WIDTH OF THE NOTCH.

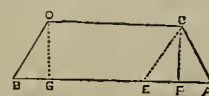


FIG. 4.

Let ABCD, Fig. 4, represent a trapezoidal weir, in which the length of the crest $AB = b$ is greater than the width of the water surface $CD = t$.

ENGINEERING NOTES.

THE WORK OF THE ENGINEER has been defined as the overcoming of the resistances of nature, and the best engineer is he who effectually overcomes these resistances with the least expenditure of time, labor and money. The successful engineer must love his work for its own sake, and not for its emoluments. He must have the same professional pride that a good lawyer or doctor has, and be ready to sacrifice his money, fame, or even life itself, if duty should demand it. The responsibility thrown upon the engineer is sometimes one whose extent cannot be measured by a money standard. His mistakes may be more serious than those which hurt only the pockets of the lawyer's client, or those which the doctor brings six feet under ground. Think of the mistakes of the Ashtabula bridge, the engineer of which committed suicide; of the Tay bridge, the disaster to which is said to have broken the heart of its builder. And as to the financial responsibility, how many millions of dollars have been lost by engineering mistakes. See the abandoned mines and mills in our gold and silver districts, the silent blast furnaces and rolling mills built in the wrong locations, the waste of money and life in the Hudson river tunnel and the Panama canal. No higher trusts are assumed by any other profession than by that of engineering. It behooves that profession, therefore, as much as any other to be sensitive of its honor. Shall a judge be corrupt, or a lawyer defraud his title? No more should an engineer give or take a bribe, or do ought to bring dishonor on himself, or to demoralize his associates. In manners he should be beyond reproach, but in integrity beyond suspicion.—*Wm. Kent, M. E.*

SOME BIG SCHEMES.—In the development of railway schemes the present age is most prolific. Two of these are of colonial inception and of great magnitude—namely, the Canadian Pacific Railway from sea to sea of North America, and the Australian Transcontinental Line, which is intended ultimately to connect Adelaide in the south with Port Darwin in the north. Yet there is nothing startling about these projects, because they are in familiar fields of enterprise and expansion, and because they seem not merely legitimate, but obviously necessary sooner or later. Of vast importance to the British Empire, again, is the intention to expend some £50,000,000 in developing the railway system of India. It is known that a very large portion of the wheat actually produced in India is wasted, because of the insufficiency of existing means of getting it to market. It is also known, by the careful reports of experts, that vast tracts which are peculiarly adapted to wheat cultivation are now lying useless, and that, although the present production of wheat in the Empire is between two hundred million and two hundred and forty million bushels annually, it could be almost immediately doubled were communication established. With an adequate development of the railway system, it is probable that India may vie with America as the granary of the world.—*Chambers' Journal.*

ARTIFICIAL WATER-WAYS.—The Chicago *Times* is of the opinion that the time for building canals has gone by; that they are relics of a past age, and have been, or will be, entirely superseded by railroads. In England the Manchester ship canal bill has just passed through both houses of Parliament. The original estimates for completing the canal were something over £5,000,000; now it is said the total outlay will be nearer £10,000,000 sterling, which will make the undertaking a very costly one. It cost the friends of the measure enormously to "put it through," and a three years' fight. The Panama canal scheme, enormous as the cost will be of that undertaking, is in progress, and the much talked-of Nicaragua canal has by no means been abandoned. The Welland canal will probably be greatly enlarged; also the Erie canal is likely to be widened and deepened. The friends of the Hennepin canal scheme have not yet abandoned all hope of its success. Canals still engage the attention of the most enlightened nations in the world, for the reason that a large extension of inland water carriage affords the only rival to the grasping avarice of railroads. Canals solve the question of cheap transportation; they make cheap transportation possible. The day for improvement of our natural water-ways and the construction of artificial ones will never go by.

ELECTRICITY ON RAILROADS.—While electrical propulsion for street railroad cars is generally pronounced a failure in England, Mr. Field recently declared in London that within a short time electric motors would be as complete a success in New York as horse cars are now on their street railroads. He further declared that the experiments thus far have proven that we have not yet claimed half enough for electricity in this direction. The *London Electrical Review* in noticing these remarks says: "We suppose that after the electric propulsion of electric cars has been successfully established in America for a few years English capitalists will be found who will pick up courage enough to do something of a practical nature in that direction at home."

USEFUL INFORMATION.

Repairing With Brass.

A special method of repairs with cast brass for large and valuable castings which cannot well be spared while new ones are procured, such as cylinder saddles broken through a steam connection or other projecting part, has been devised by Herr Haas, Government Master Mechanic at Berlin, and is illustrated in the *Organ*. The process is as follows: The main casting is cut off inside the crack to a fairly uniform line. A model is then made by means of the portion cut off to fit over the end of the break and make the necessary junctions with the adjoining parts of the machine. The lower half of the mold flask is fitted around the broken end of the casting and well secured to it, and the joint is sealed with clay. The model is then set into the flask over the broken end, on which it, of course, should lap a certain amount, and the molding is proceeded with. The upper half of the flask has, of course, a core fitting into the hollow of the broken end, if such there be. Before casting, the broken end is well warmed by a charcoal fire placed within, and the precaution is generally taken of boring several holes into the broken end around the part on which the patch takes hold, into which the fresh metal runs and forms lugs, making a firmer connection between the new and the old parts, though the chief reliance is on the shrinking of the new casting around the end of the old one. The heating of the old portion is done to avoid having this shrinking excessive and to prevent chilling.

Several repairs of this sort have been made by Herr Haas with entire success, the parts still remaining in active use, though a considerable time has elapsed since the repairs were effected.

ABOUT SCREWS.—In an article on the manufacture of screws in Rhode Island the *Providence Journal* says: "It is interesting to note that, while the manufacture of wood screws probably originated in Westphalia, Germany, and was subsequently carried on in Eastern France and England before its introduction into this country, American inventors have supplied the machinery that is now universally employed. The popular feeling that the gimlet-point screw is a modern invention is erroneous. The American Screw Company have in their possession sample cards of French screws, pointed, though not so perfectly made as at present, which were brought from France early in the present century; and from an old piano now at Northampton, made about the year 1750, screws have been taken showing the same feature. Patents have been issued on gimlet-pointed screws, but they covered only a peculiar form of point." The gimlet is said to have been invented by Daedalus, a Greek.

RIGHT AND LEFT-HANDED.—A right-handed man is a man who takes hold of a hoe, a rake, a spade, or a fork, with the right hand down and the left hand up or nearest the body. A man who habitually puts his left hand down, or, for instance, the man who places his right hand on the top of a spade, and grasps the handle or shake with his left hand is a left-handed man. And so with an axe. A right-handed and a left-handed man can work together in chopping down a tree. If they were both right-handed or both left-handed they could not do this unless one chopped on one side of the tree and the other on the other side. And so it is in loading earth into a wagon. If the men stand face to face one should be left-handed and the other right-handed. In hoeing a row of corn the right-handed man will walk on the left side of the row, while the left-handed man will walk on the right side of it. We think there are more left-handed men (in this sense) than right-handed men.

HEAT WASTE IN STOVES—GAS VS. COAL.—Tests made by Dr. Fischer, the well-known German chemist, show that in the ordinary domestic stoves in use not more than 20 per cent of the fuel consumed is really utilized for warming the rooms, whereas with stoves burning gas 80 per cent and more of the possible effect is obtained. In a certain sugar manufactory at Elsdorf, it is stated, no steam engines have been used for several years. Gas is made at a cost of about 20 cents per thousand feet, and is used for lighting and for driving gas engines. At the great Schultz Iron Works at Essen water gas is made at a cost of about 8 to 16 cents a thousand feet, and serves both for fires and lighting. For the latter purpose a ring is fixed over the burners, having rods or pencils of magnesia attached, these being made glowing hot by the non-luminous gas flame, and emitting an excellent light. The abandonment of burning coal direct for heating will do away with all the disadvantages of smoke.

CARE OF AN OIL CLOTH.—An oil cloth should never be scrubbed with a brush, but, after being swept, should be cleaned by washing with a soft flannel and luke-warm or cold water. On no account use soap or water that is hot, as either would have a bad effect on the paint. When the oil cloth is dry rub it well with a small portion of a mixture of beeswax softened with a minute quantity of turpentine, using for this purpose a soft furniture polishing brush. The following is also used to keep oil cloths looking well: Wash them once a month in

skimmed milk and water, equal quantities of each. Rub them once in three months with boiled linseed oil. Put on a very little, rub it well in with a rag, and polish with a piece of old silk.

TO COLLECT THE ODORS OF FLOWERS.—Roses and all other flowers containing perfumed oils, may be made to yield their aromatic qualities by keeping the leaf petals in a saucer of water and setting it in the sun. The water should be soft or rain water, and a sufficient quantity allowed for evaporation. In a few days a film will cover the water. This is the essential oil of the flower; every particle is impregnated with the odor. It must be taken up carefully and put in tiny vials, which should remain open until all the remaining water is evaporated. A few drops of this will perfume glove-boxes, apparel, etc., and will last a long time.

SWAYING OF LOCOMOTIVES.—Attempts have been made with considerable success on German roads to diminish the swaying of engines, and with it the wear of the rear driver flanges, by making the tender coupling more or less rigid laterally; and, indeed, four wheeled locomotives have been used on some roads for line engines by having heavy shoot bolts on each side entering sockets on the tender, and thereby preventing either vertical or horizontal swaying.

HOW TO MAKE FLORIDA WATER.—Dissolve in $\frac{1}{2}$ gallon 90 per cent alcohol, 1 ounce each oil of lavender, oil of bergamot, and oil of lemons, and of oil of cloves and cinnamon, 1 drachm each; add one gallon water and filter. Or, take of oil of bergamot, 3 ounces; oil of cinnamon, 4 drachms; tincture of benzoin, 2 ounces; 75 per cent alcohol, 1 gallon. Mix and filter.

TO KEEP MICE AND RABBITS FROM TREES.—Dr. Sanborn, of Illinois, states that he protected completely from rabbits and mice his 600 pear trees with a wash of lime and water, with enough coppers added to change the color to a deep green. Some cheap glue was added to make it adhere to the trees. Neither rabbits nor mice would touch the tree thus treated.

A GERMAN TEST FOR WATERED MILK consists in dipping a well-polished knitting needle into a deep vessel of milk, and then immediately withdrawing it in an upright position. If the milk is pure, a drop of the fluid will hang to the needle; but the addition of even a small proportion of water will prevent the adhesion of the drop.

GOOD HEALTH.

The Faith Cure.

The faith cure is interesting a great many persons. In New York City there are several establishments where it is practised. We have one church drawing immense crowds, in which the special object is to pray for the sick. Thousands of the sick visit this church seeking cure. We hear of many wonderful cures. If one ventures to express a doubt he is denounced as a person without faith in God. Every good person must rejoice over the reported sudden cures, without drugs, if he can believe in them. For myself, I believe there are thousands of discouraged people who are cured this way. Organic diseases are never cured in this way, I think, but those maladies which consist in low spirits and nervous prostration are. A lady has recently assured me that when she went to this faith-cure church for prayers, she was so weak that she had to lean upon two friends. An hour later she came home without assistance, and has enjoyed better health ever since. I do not doubt it. Another assured me that she had suffered for some months with rheumatism in her hips, and was scarcely able to attend to her household duties; she visited the prayer-room and was immediately cured. Upon inquiry I found that she had not been quite free from pain or stiffness since, but had been performing the duties of housekeeping, which seemed to her impossible before she was prayed for. Did not excited hope and imagination lift her into the new life?

I believe there are many persons crippled with rheumatism that might be helped in the same way. One is asked, "Do you not believe that God can cure disease, and do you not believe that the prayers of his saints may move him?" I believe He who made man may cure him of disease, and that our Father in Heaven will hear the cries of his children. Whether he will contravene the law which He has Himself established, that a hand thrust into the fire shall burn, that one who steps off a precipice shall fall, that one who outrages his health shall suffer, is another question. The only God-ordained management in these cases consists in keeping the hand out of the fire, keeping away from precipices, and observing the laws of health. Whether a woman who has committed herself into various dislocations and nameless sufferings may look to God for the sudden removal of the results of her folly, is the question.

One gentleman assures me that he took to this faith-cure church a friend with an organic disease of the heart, which hourly threatened his life. The sufferer was prayed for and immediately cured. I do not believe it. Another gentleman assures me that he saw at the faith-cure church a man with an immense goitre. The swelling was so large that it could not be concealed. Several Christians gathered in a circle about him and prayed for him with great

passion. When they opened their eyes and looked upon the man, who had carried the large neck-swelling for 30 years, lo! and behold, it was gone. This I do not believe. We are fond of the marvellous, and delight in nothing so much as telling of wonderful things. Out of this passion come most of the miracles of the faith cure.—*Dio Lewis.*

Hammocks Versus Beds.

"Traveler" writes to the *Lancet*: "Beds are occupied night after night, year after year, by divers persons in sickness and in health, in summer's heat and winter's cold, and as to when bedding is remade and purified each one can judge by his own experience. Compare this with the use of the South American hammock, which only requires a stout blanket inside, and in winter a woolen sleeping dress as well of suitable make—i. e., drawers, socks and a loose jacket, all periodically washable. The sanitary difference becomes at once startling to those who have never considered the subject before. The South American hammock is made of the fibers of the young leaves of the ita palm (*Mauritia flexuosa*), so woven that it yields to every movement and projection of the body in every direction, except lengthwise, in which direction the weight of the body establishes its own support, the same as in chairs with the loose canvas backs. Hammocks are very easy to get into and out of, and one cannot fall out of them when asleep. They should be swung the same distance from the ground as the seat of a chair; they form an excellent seat. Sitting down one draws the back of the hammock up as high as one may desire. The proper way to get into a hammock—for there is a proper way—is first to sit down on it and then throw the legs up and the back down, wrapping yourself up in its soft, elastic and ample folds. The best way to lie is crosswise; the position can be varied in three or four ways. The writer has passed several nights in such a hammock and blanket, exposed to the damps of a South American forest, and risen perhaps more refreshed than if he had slept in a bed. In many cases in hospitals such hammocks would be real sanitary appliances. The hammock I have comes from the Essequibo Indians in British Guiana. I do not know why a similar mode of open weaving (more like knitting without the knots) of some material having the mellow feeling of the rush used in the rush-bottomed chairs could not be managed in this country."

MEDICINAL QUALITIES OF TURTLE OIL.—The oil is of a yellowish color, and at ordinary temperatures in this country forms a thick, finely granular fluid, in consistence something like olive oil partly congealed. A gentle heat renders it clear and transparent. It possesses little odor or taste, and does not quickly turn rancid. Taken in warm milk it is not so objectionable as codliver oil. Turtle oil has been used with the most beneficial results in all cases where codliver was indicated, in persons to whom the nutritive process was defective, in children of strumous disposition, in the sequelae of scarlet fever, in measles and other acute specific diseases. It has proved of the greatest service in scrofulous affections of the eyes, nose and other parts, and has been most beneficial in chronic bronchitis, gout, rheumatism and syphilitic affections; but more particularly useful in phthisis pulmonalis in all its stages. Turtle oil is borne well by the stomach, causing neither nausea, eructations, dyspepsia or diarrhoea.

REDUCING OBESITY.—We see it stated that there are four plans for reducing obesity. First, the eating of nothing containing starch, sugar or fat, which is the Banting system. Second, the eating of fat, but not sugar or starch, called the German Banting. Third, wearing only wool, and sleeping in flannel blankets instead of sheets, the Munich system. Fourth, not eating and drinking at the same time, or rather, within a couple of hours, the Schweininger system. There is another system which I think is better than any of these; it is to simply eat what agrees with you in such moderate quantities that your flesh will reduce, say, a pound a week. This may not tickle the fancy like some of the above, but it is the best of anti-fat means. It will operate perfectly with a man or a horse. You can easily reduce a horse from 1200 to 1000, or a man from 200 to 160.—*Dio Lewis.*

WALKING is the best of exercises, and if spirited and the arms be allowed to swing freely, it brings into play the muscles of the upper part of the body as well as the lower half. Walking, if well managed, is better in one respect than exercise in a gymnasium, where you get little sunlight and where you are likely to breathe dust and impure air.

LIGHT AND HEALTH.—No plant or animal can digest in the dark. Try it. Plant a potato in your cellar. See how slender and pale it grows. Now open a window in another part of the cellar and notice how the poor hungry thing will stretch that way. The process of digestion, the great function of assimilation, cannot go on without sunshine.

THE TEETH.—A clean tooth will not decay. It is the food left between the teeth which causes the trouble. The part of the tooth which you can reach with the tooth-brush does not decay if the brush is used. The decay takes place between the teeth, especially the double teeth, where the tooth-brush cannot reach.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

A BIG MINING SALE.—*Calaveras Chronicle*, Sept. 25: The "Fine Gold mine" located in the new district east of Railroad Flat, this county, we are informed, was sold last Monday to Mr. Wm. Clary, superintendent of the Sheep Ranch mine, and Mr. P. Kervin of San Francisco. The price paid was \$30,000 in gold coin, a nice little fortune for the two French gentlemen, the Messrs. Guilliman, who were so fortunate as to be the owners. This mine, although a recent discovery, has the reputation of being a splendid property and there is no question but what the purchasers have a bargain in its acquisition. We understand that our old friend, Mr. T. J. Sevrans, and a miner of much experience, is in present charge of the property, and that he has already begun active operations preparatory to the thorough development of the mine. He is grading a fine road to Rose's saw-mill, and will at once erect a large boarding-house, office, etc. The owners are preparing to sink a 500-foot double compartment shaft, besides running a tunnel that will tap the ledge at a great depth.

Inyo.

IBEX.—*Inyo Independent*, Sept. 26: The Ibez mine of Death valley has started up again under the superintendency of Mr. Little. Mr. Little has already taken out several miners and millmen and we may expect to see some of the results in bullion soon. A recent run of ore from the Keynot netted \$3000. A run of ore from the Chulula mine averaged \$34 a ton. At the Keynot mine there is a large dump of ore that had been cast aside as too low grade to work. A miner recently screened out two tons of this waste and worked it, it yielding \$25 a ton. Mike Lasky and John Anton will screen out the remainder of the pile and mill the screenings. There is estimated to be a thousand tons of ore on the dump. About 50 tons of ore will be shipped from the Union mine, at Cerro Gordo, in a few days, by John Basto and his partners. At the Minetta mine, White Hill, Billy Hedge is getting out a good deal of nice silver and lead ore. The mine is looking well, with a good vein of ore in sight. A couple of Mexicans have made a rich discovery of gold about 16 miles south of this place at the end of Old Dads mountain. The ore assays about \$150 to \$200 in gold, carrying considerable silver. The find is attracting a number of old prospectors and no doubt more will be heard of it ere long.

Mariposa.

THE CRANBERRY MINE.—*Herald*, Sept. 25: A. H. Ward, one of the owners of the Cranberry mine, was in Mariposa last Monday evening, and to a *Herald* representative said that the report that a rich strike had been made in the mine was true. The ledge is 11 feet thick and the rock immensely rich. Preparations have already been commenced to build a mill, but it is hardly probable that it will be completed before spring. Mr. Ward has spent a large sum of money in this county prospecting, and the news of this strike will please everybody who is interested in the development of the mining resources of the county. The Cranberry mine is located about two miles almost due north from the Hite mine on the north side of the main Merced river. It is at an elevation of about 2700 feet above the sea, and some 1100 feet above the Merced river. The formation in which the mine lies is granite with slate walls, the granite being superimposed on a fundamental slate formation. Messrs. Ward & Craig have two water-power arastras which they have kept in motion for four months or more, grinding about one ton per day of rock, with an average yield of \$34.60 per ton. This rock was taken from the old shaft opened by Mr. Craig. The new strike is by a crosscut about 500 feet southeast from the old shaft, and on the opposite side of a ridge giving a lift of over 100 feet on the vein.

Napa.

RICH ORE.—*Napa Reporter*, Sept. 25: At the office of Sheriff Harris there can be seen a large specimen of silver ore taken from the Grigsby & Johnson mine at Calistoga. The lump weighs 40 or 50 pounds and is certainly rich enough to assay \$500 or \$600 to the ton. In the Grigsby & Johnson mine there are hundreds of tons just as rich as this specimen now in sight. There is no disputing the fact that one of the richest silver mines in the State is situated at Calistoga, and it would not surprise us in the least to see Napa counted among the great silver producing districts in a few years. Mr. Grigsby is not pushing the work on this mine although he has already taken out an immense amount of ore, and will probably erect a stamp-mill in the near future. He is now waiting for the completion of the Selby Smelting Works near Port Costa, and when this large establishment is in full running order he will ship a large quantity of ore there to be worked. When it is taken into consideration that he will only ship ore that will produce over \$100 to the ton, and that he has hundreds of tons of that sort all sorted and ready for shipment, some idea can be formed of the richness of this mine.

Nevada.

WORKS NICELY.—*San Juan Times*, Sept. 20: A few weeks ago we announced the fact that the Malakoff Mining Company had commenced the construction of an elevator upon their mine to determine the feasibility of working it on the elevator plan. Richard Thomas, of Birchville, was sent up there to superintend the construction of the works. Monday last he called at this office to say that so far as tested the works are a success. By means of a 22-inch iron pipe and 1100 inches of water, with 400 feet pressure, debris has been elevated to the height of 50 feet perpendicular or over 60 feet on an incline of about 45 degrees. Mr. Thomas is of the opinion that with a smaller tube and the same quantity of water and pressure the debris can be elevated at least 70 feet. He is of the opinion that with 900 feet pressure the debris can be elevated 100 feet—the height required to work the mine successfully. At present the amount of water used upon the bank is 900 inches, while 1100 inches are required to elevate the debris 50 feet perpendicular.

Shasta.

COPPER CITY.—*Republican Free Press*, Sept. 26: Lute Bahney informed us Thursday that every fur-

nace is in full blast at the Winthrop mine, and that the mill is running night and day, and that the mine is turning out some very high grade ore. Lute brought down a beautiful silver brick worth about \$500—the first one produced. The managers of this enterprise have been feeling their way very carefully, and it is more than probable that this district will at last prove a source of wealth.

Siakiyou.

SUMMERVILLE.—*Cor. Yreka Union*, Sept. 24: Summerville is on the south fork of Salmon river, about 50 miles from Etna. At this point hydraulic mining has been carried on for a number of years by Messrs. Bennett & Miller, and owing to the accidental death of the latter member of that firm, some years ago, Mr. Bennett, the surviving partner, sold this mining property to Messrs. George Smith, R. H. Campbell, and George C. Spooner about two years ago, for the sum of \$15,000. Mr. Spooner, being a practical hydraulic miner, was made superintendent. After one year's run with the then water facilities, being two small ditches from Rusb creek, enough was learned of the value of the mine to induce the owners to extend their water facilities by bringing in the water from the main river and the Little South Fork, which would give an abundant supply ten months of each year, and without any stoppage during the whole year. This involved the heavy outlay of nearly \$40,000 and a year's time. The main ditch is about five miles long and cut in bedrock almost the entire distance. It is five feet six inches in width at the top, and three feet six inches wide on the bottom, and two feet six inches deep; it has a grade of one inch to each foot, giving it a capacity of 3000 inches. The upper half mile of this ditch, owing to the perpendicular cliffs of solid rock, is built of flume, and in the most substantial manner. At a point one mile below the head dam on the main ditch the water from the Little South Fork forms a junction with the main ditch, conveyed through an iron pipe 1000 feet in length from the opposite side of the main river and across a suspension bridge 100 feet above the river. This piece of mining engineering is a masterpiece, and reflects great credit on Mr. Spooner, and is convincing evidence that he is master of the situation. The main ditch, when it reaches the mine, has an elevation of 500 feet above the river bed, while the gravel to be washed lies 100 to 200 feet above the river, giving from 100 to 200 feet for dumping purposes, and from 300 to 400 feet pressure through the great iron pipes and massive giants. In addition to the purchase made by this company from Messrs. Bennett & Miller, they have secured 640 acres additional ground, covering the entire Petersburg flats, making in all near 1000 acres of mining ground, ranging from 10 to 100 feet deep, requiring with all their great advantages, forty to fifty years to exhaust. As to the richness of the ground, everyone that ever lived or mined on the Salmon river and its tributaries, knows that the Salmon, from its source to its mouth, was immensely rich. It is not supposed that such richness exists in these deep deposits on the high benches as did in the river bed and rim rock, but it will be readily seen that they do not have to be as rich by a great deal to pay under the great advantages. It is expected now by this company, as soon as the water raises to an ordinary head, to keep three giants running night and day. Everything is in readiness for this.

San Bernardino.

CALICO DISTRICT.—*Print*, Sept. 27: The Dora Belle, adjoining the Bismarck on the south, is still looking well. A few tons of good ore are on the dump, and the work of sinking one of the shafts is progressing. There are two shafts, one about 50 and the other about 75 feet deep. This claim is being worked by Page & Thomas. Operations on the Bismarck are not so extensive as they were some time ago, as the largest portion of the surface deposits has been thoroughly worked and exhausted, only 10 men now being employed in prospecting and taking out ore. The ore that is being extracted is of a high grade. Only two or three tons of ore are being taken out daily, but it is such a high grade that it yields a good profit. The Exchequer continues to look well, and is regarded by all who have examined it as a good mine. The tunnel is in about 25 feet and a shaft down 65 feet, besides several prospect cuts. A few tons of ore were taken to the mill that returned 120 ounces to the ton. A few chlorides are working on the Kearsage, and if all of them are doing as well as Reeves Unsworth then the mine contains an abundance of rich ore. The Blackfoot still looks rather indifferent, but as other mines have looked equally as bad and afterwards developed into fine bullion producers, there are yet grounds for hope that this mine will result similarly. J. W. Coleman is chloriding on the Bullion adjoining the Exchequer, and his work is showing up well. There is an 80-foot tunnel and a 25-foot shaft on the mine. Only 12 men at work at present on the Occidental mine, mostly engaged in prospecting. A chamber of rich ore has been struck near the south end of the claim. The main tunnel of the Garfield has been extended westward about 1500 feet and is in the Thunder some distance, where a fine body of ore is reported to have been recently struck.

Sierra.

WILL NOT RESUME NOW.—*Sierra Tribune*, Sept. 26: We are informed that the Marguerite mine will not resume operations before next spring. There is discord among the owners, and they cannot work the mine till an amicable settlement is reached. This is to be regretted, as the Marguerite is known to be a rich mine. The Sierra Buttes chlorination works are running in full blast, with Albert Maltman as superintendent.

AMERICAN HILL.—*Mt. Messenger*, Sept. 26: The company that is opening the American Hill quartz property has bought the engine formerly used at the Colombo mine, and it is now being hauled to American Hill. One-half of the balance wheel went through here Wednesday, which weighs 6000 pounds. A wheel that would weigh 12,000 pounds it would seem ought to balance almost anything. The Colombo Company is disposing of its engine because it has found water enough in its tunnel to run its mill when it desires to start it. Richard Fischer, of Sierra City, returned to Downieville last Thursday morning from Secret canyon, and reports the Big Crevice Company's tunnel in 200 feet, with face in hard slate. Pay gravel is expected almost any day. In early days about \$6000 is said to have been taken out of a shaft down 30 feet from a point above by some miners, who came to town for a jollification over their good luck, and on going back found their

diggings all caved, which so discouraged them that they quit work.

GIBSONVILLE.—The Union mine has struck mountain dirt in their shaft. We hope the Gravel Hill mine will be as lucky with their new shaft as its neighbor (the Union) has been.

FOREST CITY.—Judging from the amount of timbers around the South Fork mine, operations at that place will soon begin. The weekly clean-up at the Extension last week was about 147 ounces.

San Luis Obispo.

ASPHALTUM MINING.—*San Luis Obispo Tribune*, Sept. 23d: But few people are aware of the extensive business that is carried on in this county in mining, refining and transporting asphaltum. This substance is found in various parts of San Luis Obispo as well as throughout the entire coast region of California, but that of the Tar Spring rancho, in the southern part of this county is regarded as superior to any found elsewhere, being, under the usual treatment, less liable to crack or crumble. It sells at \$10.50 per ton in San Francisco. Scheerer Bros., of San Francisco, are working these mines. They recently had a large contract in lining the University Hill reservoir, of San Francisco, in which 850 tons of asphaltum was used. With the exception of 50 tons, all this came from San Luis Obispo. Some fifteen teams are employed in hauling, and Mr. Conrad Scheerer, who has just been visiting the mines, says the road to them is badly cut up by the great amount of hauling that has been done. At present there is about 30 tons of refined asphaltum and as much crude on the ground, but the recent excessively hot weather has stopped work during its continuance. The ground is melted and the asphaltum is too soft to pick and too stiff to pump. Under the treatment by the Scheerer Bros., this matter is used very successfully in making sidewalks, pavements, roofs and in making paint, felting, etc.

Trinity.

DEADWOOD ITEMS.—*Trinity Journal*, Sept. 25: A Deadwood correspondent furnishes an interesting letter this week, which we are compelled from lack of space to condense, as follows: "In addition to the older mines which have been in successful operation for several years, Gibson & Blagrove, on the Black Bear extension, have some extremely rich rock in the lower tunnel and about 30 tons of the same kind on the dump. P. Varnum is extracting good ore from the Sargent and McDonald location. Frank Belleau & Co. are opening a large vein of good ore, which has a large per cent of rich galena sulphurets. Westlake and Co-grove have a good vein of high grade ore. Boothby & Hendricks have a small, rich vein. Brown & Co. are making developments on a ledge situated above the St. Auburn, on Thorn Gulch, which gives every indication of permanence and value. McDaniels & Co. are pushing their tunnel ahead in good shape; they will crush their ore in Gibson's cannon-ball mill. Minear & Co.'s new Huntington mill is in full blast and runs like a charm. Quite a number of prospects in the district are undergoing development.

Tuolumne.

NOTES.—*Union Democrat*, Sept. 20: The Santa Maria mine and mill at Crocker's Station has been shut down. We did not learn the cause. The Empire Mill Co. is putting the boilers up for the new saw-mill at Brown's meadows. In a very short time the saws and lighter machinery will be put in place when the mill will be ready for operation. John Collins has leased the Alabama mine and mill, at Jamestown, from Bell & Harris, and will immediately commence operations with a small force. Work on a large scale will not be inaugurated till water can be had to run the mill. The rumor that the Rawhide mine would soon be started up does not appear to have much foundation in fact. A large share of the mine is the property of an estate now in probate, and until some definite settlement of the estate has been effected there is small chance of the mine being operated.

LOW RIVERS.—*Tuolumne Independent*, Sept. 23: The rivers are lower now than ever before known; so say old observers. This gives river miners their golden opportunity, unless heavy rains ensue. The claim of Fitch, McQuade & Co., on the Stanislaus, is now in full operation; but, as the claim is located to one side, in an old bed of the river, considerable rain will have to fall before they will be flooded out. The claim of R. J. Moffit, however, is apt to be greatly injured by a considerable rise in the Tuolumne. The place where he is operating is narrow, the walls of the canyon being almost perpendicular. From the dam above, the water at present in the river is conveyed over the dam below through a large rubber hose. The water which collects between the two dams in the river, is pumped over the lower dam. The river bed is supposed to be very rich at this point, and it is hoped that Mr. M. may reap an abundant harvest from his enterprise, in which he has invested many thousands of dollars.

NEVADA.

Wahoe District.

HALE & NORCROSS.—*Enterprise*, Sept. 26: At the time of the breaking of the crank shaft of the hoisting engine at the Combination shaft on Wednesday, everything was going along finely. The two lateral drifts south and north from the Hale & Norcross deep winze and from the Combination joint west shaft, on the 300 level, were rapidly progressing towards connection, there being only about 50 feet intervening space remaining. This will be done away with before the end of another week, when crosscutting west will be in order. Both these connecting lateral drifts have been cutting through bunches and streaks of ore, evidently offshoots from the ore vein which is about to be crosscutted into, and strongly indicates what may be expected to be found in the vein itself. The cross drift west from the deep winze on this same lowest level was also showing exceedingly well at the time of this little interruption.

CON. CALIFORNIA AND VIRGINIA.—The repairs of the old Con. Virginia shaft are completed, and in a few days the Eureka mill on the Carson river will be in first-class condition ready for ore reduction. Out of 60 stamps at the Eureka mill only one-third could be kept going, but the chances are that the present cooler weather will have a tendency to check evaporation, raise the springs and perhaps induce an increase of Carson's rolling, turbid flood. No ore is being extracted from the Jones lease section at present, but a few men are kept at work timbering, opening up new drifts and sections, etc. The 1780 level,

being worked by the company, continues its good little yield of over 100 tons per day, worked by the Morgan mill, which is a steam mill. This ore during the past week gave average assays of over \$20 per ton.

BULLION.—It is rumored that prospecting work will be resumed shortly in the upper workings of this mine. No paying body of ore has ever been found in the Bullion mine at any depth, from the lowest up, and in fact the only indications of ore worth mentioning have been found in the croppings. With proper encouragement to tributaries, leasers or contractors a good body of ore, after the Belvidere style, might be uncovered in the upper part of that mine which otherwise might remain buried from human enterprise or cupidity forever.

SIERRA NEVADA.—On the 520 level the crosscut west from the north lateral drift, 1000 feet from the shaft, has been extended 52 feet during the week, making a total distance of 372 feet. The face is in vein porphyry, with promising streaks of quartz and clay, and a small seepage of water. It has 152 feet yet to go before reaching the west wall of the ore vein, and very interesting and valuable developments may be looked for at any time.

CROWN POINT.—Nothing but repairing and prospecting work is being done in either this or the Belcher mine at present. Should the present cool and threatening weather induce a rise in the water of Carson river sufficient to allow the mills to run to good advantage, ore extraction and reduction would doubtless be resumed. The repairs to the Crown Point gallews frame and surface of the shaft are making good progress.

OPHIR.—The drift west on the 500 level from the old Mexican shaft is out nearly 100 feet and has cut into the old ore vein and workings of the Ophir Company, which were abandoned years ago by reason of no profit in their extraction at the expense of those days. It is anticipated that much good paying ore will now be extracted at that point.

GOULD & CURRY.—West crosscut No. 1 is now out 442 feet, 48 feet having been added during the week. This crosscut is at the north line of the Savage, and shows good ore indications, being in vein porphyry, quartz and clay, but no water. The old El Dorado tunnel, connecting with the Bonner shaft, has been cleaned out and repaired throughout.

MONTE CRISTO.—The new shaft has nearly attained its projected depth of 150 feet, and is cutting into the ore vein 100 feet deeper than it was ever opened before. Good results are being realized, which will be more definitely developed the next week or two.

BEST & BELCHER.—West crosscut No. 2, on the 1000 level, was extended 43 feet during the past week, making a total length of 239 feet. The chute being constructed on the El Dorado tunnel level, conjointly with the Gould & Curry Company, is completed.

CHOLLAR.—As stated elsewhere, the breakage of the crank shaft of the hoisting engine at the Combination shaft has caused a temporary interruption of work in the lower level (the 300), but that will be all right again the first of next week and work fully resumed.

YELLOW JACKET.—The usual daily yield of between 160 and 170 tons per day continues to be extracted from the old workings on and above the 1300 level. The Brunswick mill runs steadily right straight along, doing excellent work.

UNION CONSOLIDATED.—On the 500 level the main lateral drift north is making good progress and has attained a total length of 697 feet. Considerable retimbering has had to be done during the past week or so.

MEXICAN.—On the 500 level the middle crosscut east is now out 203 feet. The material in the face is vein porphyry, clay and quartz of a damp, heavy nature, looking favorable for an ore body.

ANDRES.—The drifts west on the 175 and 375 levels are progressing well, both in good promising indications, the lower levels especially being in fine looking quartz giving low assays.

KENTUCK.—The regular daily yield of 30 tons continues to be hauled by teams to the Rock Point mill on Carson river for reduction.

ALTA.—The west crossdrift from the main lateral drift is making good progress in hard blasting rock.

Cottonwood District.

NICKEL AND COBALT.—*Reese River Reveille*, Sept. 20: Over at Cottonwood the famous nickel and cobalt mines are attracting considerable attention from outside capitalists. Not longer ago than last Sunday Grant's brother-in-law, Mr. Honore, and a Mr. Palmer of Chicago and Hensch of San Francisco were there looking at these mines. The latter has the mines at Lovelock bonded for \$35,000 and the time expires very soon. There is nickel enough there to supply the world and in a short time will doubtless be heard from.

Eureka District.

THE EUREKA CON.—*Sentinel*, Sept. 26: The work preparatory to the erection of the new furnace at the Eureka Con. reduction works is progressing favorably. The carpenters have about completed the heavy work on the building being erected, and on the second floor of the same the blower has been placed. The furnace and all its castings have arrived from San Francisco, and just as soon as the stone-cutters get through with their job and the different parts of the new furnace are put together the results of the work in progress now for several weeks will be readily seen to advantage. The bins at the smelting works continue to be well supplied with ore, nearly all of which comes from the company's mine. The work of removing the "Jumbo" hoisting engine from the hoisting works over the mine, preparatory to putting in a new steam engine, continues. In short, there are many evidences that the company are laying the foundation for large and extensive operations in the near future.

ORE SHIPMENTS.—*Sentinel*, Sept. 26: During the week ending yesterday ore shipments were made from the mines of the district to the two reduction works in town as follows: To the Eureka Con. works—Jackson, 56 tons; Frazier & Molino, 8½; Home Stake, 2½; Summerall, 1½; Heyer, 2½; Rose, 5½; California, 30; Bald Eagle, 5; and Ernst, 1½. To the Richmond smelters—Silver Lick, 83 tons; Continental, 4; Barton, 9; Lord Byron, 5; Dunderberg, 42; Diagonal, 5; Empire, 5; Excelsior, 1½, and Blue Run 6.

Granite District.

MANY PROSPECTORS.—Reese River *Reveille*, Sept. 20: Granite district is on the other side of the valley from INL district. Here the ledges are smaller in size, but richer, giving from \$300 to \$500 per ton, but they are plenty large enough to pay handsomely. Many prospectors are there now with excellent indications ahead of them.

INL District.

EVIDENCES OF LIFE.—Reese River *Reveille*, Sept. 20: INL district is beginning to show evidences of life after a long rest. The Black Prince ledge is a remarkable one. The croppings are from 100 to 120 feet thick and they have sunk on it and find the regular formation is 100 feet. This ore is about all silver bearing, only a trace of gold being found, but it contains lead and silver enough to make a fine flux suitable for the process they propose to use there. They have been fortunate enough to secure the service of an experienced Swansea smelter who will personally superintend the erection of the smelting works and run them. He is satisfied that the total cost of milling and mining the Black Prince ore (which assays from the croppings from \$40 to \$50) will not exceed a quarter of that amount. The presence of the lead and galena are very valuable in the process to be used. They are now crushing quartz to make their own fire brick and have everything needed to start operation. They propose to go slow and sure and gradually develop their property. That it is an immense mine they know, but they are not going to be too fierce to rush it at first. This company will also take hold of the Spar mine, which is an extension of the Black Prince and develop it too. The Spar is owned by Kellogg & Irvine.

Secret Canyon District.

TRIBUTERS.—Eureka *Sentinel*, Sept. 25: Many of the tributaries in Secret canyon are taking out ore and making money. The Scorpion mine in Page canyon is yielding some ore of exceedingly rich quality. Messrs. Spargo, Serpell & Co., are taking out rich ore from the Water Jacket mine in Page canyon. Richard Berryman is taking out 10 sacks of rich ore per day from the Contention mine, Page canyon. Abe Laird has done some "tail" work in the Rambler series lately, and his prospects are steadily improving. Ben Levy and Jim Allen have a streak of rich ore in the Hannon claim, Secret canyon, at 12 feet from the surface. Messrs. Nelson & Anderson are doing very well in the Geddes mine, and will make another shipment to the furnaces this week. Messrs. Pope and Berryman have another shipment of ore ready at the Blue Kain mine, which will be shipped to the furnaces this week. The ore in the Contention mine is making in the direction of the Medora mine, and there are parties seeking a lease of the latter from H. K. Mitchell, Esq. Capt. J. M. Foley is expecting to ship ore from his mines at Secret canyon shortly. He has a fine lot of mining ground which he is working hard to develop.

ARIZONA.

VARIOUS MINES.—Clifton *Clarion*, Sept. 25: The Guthrie Company have shipped to the Metcalf deposit all the siftings accumulated at the Alaska since it was opened. This ore is exceedingly rich in carbonates and glance. A new drift, starting from the shaft of the Alaska, was driven and a rich body (two feet) of ore was cut. The gold claim, Vanderbilt, owned by the Bonnell Bros., shows the same ledge matter in the shaft, which is now 45 feet deep, that it did when ground was first broken. The formation is lime and porphyry, lime the hanging and porphyry the foot wall. If, after the shaft has been sunk 80 or 100 feet without showing any indications of pinching or breaking off, it is safe to predict that the Vanderbilt will be a great gold producer. The gold in the ledge matter is of a free milling and flaky nature and the ledge matter resembles talc—some call it talcose and others hornblende quartzite or decomposed quartz. In the immediate vicinity of this strike are some of the best mineral leads in Arizona, all of which have to be developed to prove their value. The outlook, however, for early development is not good, because the owners have not the means. Rails have been laid in the incline tunnel at the Longfellow and a whim put in. Ore is brought out from it now and the old adit abandoned. The ore bodies at the Montezuma, Upper and Lower Yankee, Detroit and Arizona Central look fine. In fact everything connected with the Detroit Company's management shows thrift and enterprise.

MEXICAN.—Mohave *Miner*, Sept. 23: They have about seven tons of ore on the dump, sack samples from which run from \$60 to \$120 per ton, and which is the result of about three weeks' work. They expect to complete the carload and ship it early next week, and it will probably be sold to the Kingman Sampling Works. The Reward mine is one of the late new strikes, and is an extension of the old and well-known Mocking Bird mine. The ore is about eight inches wide, and a recent sample taken from the bottom of the shaft assayed 387 ounces in silver. They have quite a pile of this character of ore on the dump, which they will soon ship and from which they expect handsome returns. The Oro Plata mine is one of the oldest and best locations in the Todd Basin, and is credited with having produced in the neighborhood of \$100,000 since its discovery. It is now owned by L. A. Sanderfoot, of San Francisco, but is being worked by Messrs. Maxson and Murphy under a lease. They have been working some three weeks, and are running in the lower tunnel, which is now in about 150 feet. On the Primerosa mine Messrs. Jackman and Jamieson have just finished taking out 123 sacks of ore which has been packed down to the road ready for the teams. They are working this mine on a lease. The Night Hawk is a mine which has become celebrated by reason of rich developments unearthed in the past ten days by its owner, George Bowers, and the two men in his employ. The strike in this mine was made in the face of the tunnel, which is in about 160 feet, and in which we were shown a streak of horn-silver ore from 4 to 18 inches wide. Mr. Bowers told us that an average sample taken across the ore streak in its widest part, 18 inches, assayed 700 ounces in silver to the ton. Mr. Bowers has about five tons of this class of ore sacked for shipment. The Rip Van Winkle is another good claim adjoining the Night Hawk, and on which we found Messrs. Sample and Jamieson putting in both time and muscle with good results, if seven inches of ore showing horn silver all through it, is worth anything,

The present developments consist of a tunnel about 50 feet long which tips the ledge, and from the end of which two drifts have been run on the ledge, one of which is in 20 feet and the other 16. It is at the end of the 50-foot drift that the good ore is now coming in. The Alpha is well-known as one of the best ore producers in the Wallapai district. Messrs. Cole and Caffrey have just finished cleaning out the 50-foot level preparatory to stopping, and large shipments may be expected from now on. The work of stopping commenced last Thursday. A carload of ore has been shipped from this mine in the past ten days.

RICH STRIKE ON THE PROSPERITY.—Mohave Co. *Miner*, Sept. 20: Of all the rich strikes ever made in this county, and there have been many such in the past 15 years, none can approach in magnitude or wealth that made about a month ago by Capt. Layne on the Prosperity mine in Todd Basin, about three miles from Mineral Park. This claim was located about six or seven years ago. The assessment work has been done regularly on the claim since that time but nothing more, until the past year, during which Capt. Layne has prospected it pretty thoroughly, and taken out several lots of ore which have paid him well. The last work done on the claim previous to the rich strike just made was done by Mr. James Jackman under a lease. He sunk a shaft about 20 feet deep and run in a short cut from it into the hill, but not obtaining any immediate results he gave it up and surrendered his lease. About six weeks ago Capt. Layne concluded to sink that shaft a few feet deeper, and after going down just two feet from where Jackman left off, struck the vein of ore which has widened to such an extent that it is, beyond doubt, the finest body of ore ever opened out in the county. At the point where Capt. Layne first struck the ore the ledge took a turn and the character of the country rock changed, showing that the real ledge had been covered up by surface deposits. When the ore was first uncovered the streak was only a few inches wide, but it soon widened out to two feet, and then to three. About that time Capt. Layne began to think he had struck something good, and sent in for his partner, Caldwell Wright, Esq., who went out and took a number of samples for assay. These samples assayed so high as to cause some doubt as to their correctness, and more were taken and assayed with the same result. Mr. Wright then determined that he would ship what ore he had on the dump, which amounted to seven tons, and it was accordingly sacked up and sent to Pueblo. In a few days Mr. Wright received a dispatch stating that his ore had sampled 221 ounces in silver and one ounce in gold. Then, and not till then, did Mr. Wright believe in his good fortune. After paying all expenses of packing, teaming, freight and smelting charges Mr. Wright received a little over fourteen hundred dollars for the first seven tons of ore shipped from the new discovery. In the meantime Capt. Layne and one other man continued sinking the shaft, and after going down some ten feet more the ore body widened out to the full width of the shaft, having gained a foot and a half in width in ten feet. About ten days ago another shipment of about 20 tons of the ore was sent over to the Kingman Sampling Works, and while it was not expected that it would go as well as the first shipment, the returns are extremely satisfactory to the owners. While we are not permitted to give the exact value of this shipment, and of another one made last Monday, still we have no hesitation in stating that the last shipments have averaged very close to \$150 per ton.

COLORADO.

A. P. TUNNEL.—Georgetown *Courier*, Sept. 24: The tunnel is being pushed ahead with a determination that looks like the owners mean business.

SHIVELY.—The lessees on the Shively, after having done a great deal of dead work, are now working upon good ore.

INCREASING OUTPUT.—The mines on Red Elephant mountain are said to be out-putting more ore at the present time than for several months past.

MINT.—Two lots of ore from Harris & Co.'s lease on the Mint were marketed last Saturday, the first class returning 248 ounces and the second class 188 ounces silver per ton.

SNOWDRIFT.—Dawson & Crimmon milled some ore last week from the snowdrift, which ran at the rate of \$824.41 per ton for first-class and \$101.70 for second class, over and above mill charges.

BALTIMORE.—Jacobson & Co. made a good strike a few days ago, opening up ore that returns about \$600 per ton. Another party also made a strike one day last week, over which they are highly elated.

SEVEN-THIRTY.—The mine has been shipping about 40 tons of ore to the Stanton concentrators for a trial run the past week. About the same amount has been treated from the Centennial with satisfactory results.

CAPITAL.—A company of experienced mining men is placing the Capital mine in condition for operation. The hoisting machinery has been repaired, and the workings are now being cleaned out. Good ore is exposed in the mine.

RICH STRIKE.—A strike is reported in a property adjoining the Winning Card worked by a Mr. McCrary. It is said that he has opened up a six-inch streak of ore that will mill run on an average 1000 ounces silver per ton. Chicago capitalists are back of the enterprise.

ALASKA.—Judge Henry Seifried and Mr. J. A. Fish, owners of the Alaska lode on Griffith mountain, have commenced work upon it after over 15 years of inactivity, during which time the workings have become filled with debris caused by cavings. J. H. Woodard and John Taylor are employed cleaning out the upper adit, preparatory to sinking. A large streak of low-grade pyritiferous ore is exposed.

TERRIBLE.—About 50 men are employed on this mine. The work of retimbering and putting the mine in good working condition, which has been pushed for a number of months passed, will not be completed for several months. In the meantime new ground is being opened and a number of lessees are receiving good returns for their work.

ROMBAUER PLACER.—Judge Rombauer of St. Louis, has commenced to clean up his hydraulic placer above Empire, which has been operated steadily all summer. The results last year were very large, but he believes this year's clean-up will excel all previous ones.

RED ELEPHANT.—H. A. Mears, the superintendent of the Red Elephant Co.'s mines, informs us that the main work is being done through the Schwartz shaft on the White. The most important lease is that of Van Syckle & Co. on the eighth and ninth levels, at the Junction of the Boulder Nest. They are stopping above the eighth level on from six to ten inches of good grade ore, and drifting under the same block of ground on two streaks of ore, one on either wall. A carload of this ore was shipped last week, which milled 150 and 100 ounces in two classes.

IDAHO.

ANOTHER BONANZA IN SMOKY.—Wood River *Times*, Sept. 26: Sam, Allen, who returned yesterday from Smoky, reports a recent strike of 2½ feet of rich ore on the surface in O. C. ground, which William Watt, J. O. Swift, Geo. Montgomery and himself recently purchased. The find is opening out splendidly, and proving so large that a shipment of one carload has already been made. This lot will be in next Sunday. If it samples as well as it looks, the owners have a bonanza. They are only working four men there at present, but if the ore pays they will employ quite a force all winter.

OVER THE RANGE.—The Vienna mine employs at present about 60 men, the ore output is good, the mine showing well all through. The mill is expected to start up this week and lively times are anticipated. Talking about the Vienna Company, they deserve great credit for the enterprise they display in developing this valuable property. Mr. Johnson, the superintendent, George Francey and the various foremen connected with the mine are live men, up day and night if necessity requires, and kind and generous to their men. The Lion claims to have struck a body of fine ore lately, and the only thing we regret is that a lawsuit exists between the Lion and Vienna, which, we hope, will be settled amicably. The Solace M. Co. is working but a few men and will probably quit working altogether this winter. The Emma is working several men and will probably work six or eight men all winter. Both of the latter mines show well for the country. The Morning Star, a fine-looking prospect over on South Boise and east of the Emma, looks first-class, an ore body of nearly two feet of fine ore being in sight over 60 feet below the surface. This mine, it is rumored, will in a short time be sold to Eastern capitalists.

GOLD IN THE GRAND PRIZE.—Houston *Press*, Sept. 23: Since the finding of gold in the Big Copper mine the ore being shipped from the Grand Prize mine has been assayed for gold and gave such favorable returns that it will not be very much of a surprise if the mine develops into a paying gold property. The assays made were from ore taken out about 50 feet below the surface. The Grand Prize is only a short distance from the Big Copper and the owners will sink and explore for the yellow material.

MONTANA.

THE ELM ORLU.—Inter-Mountain, Sept. 20: The Elm Orlu, which six months ago was regarded as a comparatively valueless prospect, became suddenly prominent by the discovery of a surface bonanza of very rich ore which development proved to be permanent. It is opened by two shafts, one 60 and one 90 feet deep, and has been during the entire summer a steady producer of high grade silver ore. It was owned by Messrs. Clark Sigbee & McNamie. The latter's one-fourth interest was purchased a few days ago by Mr. W. A. Clark, and the deed was signed yesterday. The consideration was \$10,000.

BUTTE.—*Miner*, Sept. 23: During the past week the usual amount of work has been done in the mines of this district, the usual quantity of ore has been extracted from the mines and reduced, and our reporter, in his regular weekly rounds among the mines yesterday, noticed the average smile of satisfaction on the countenance of every mining man he met. The general response he received in making the inquiry as to the present condition of the mines was: "Oh, as usual." We might sit down and write columns on the present condition of the mines of Butte, but one look at some of these magnificent properties would convince the most sceptical person in the world that our mines are the richest and most permanent ones in the world. They are simply immense and a person who is fortunate enough to be a part owner in any of the mines of this district may well consider himself a lucky person.

THE MIDNIGHT MINE.—The Midnight is located between Walkerville and Centerville, close to the Lexington mine; and is claimed by the Silver Bow Company. The mine is at present worked under lease by Messrs. Charles and C. H. Rule, John and Pete Doble and Amford. These men are sinking the main shaft that is now down 58 feet. The shaft is going down on the ledge. A drift is being carried in on the 40-foot level, also on the ledge. The ledge varies in width from 6 to 18 inches, and assays well in silver. When the shaft is down 75 feet a horse which will be erected on the property. A large quantity of ore of good grade was seen on the dump, and the boys are well pleased with their lease.

THE ALICE MINES.—Work at the mines of the Alice company is being carried on in the usual manner. The mills are kept running with the ore extracted from the Alice and Magna Charta mines and the machinery at the mines was never in a better condition. The work of building a new carpenter shop was commenced at the Alice yesterday. The north and south crosscuts at the 800-foot level of the Alice are in more favorable ground for driving, and the ledge will be struck in the south crosscut in a few days.

GOLDSMITH NO. 1.—This mine is a veritable bonanza. The new body of ore recently discovered on the 130-foot level is opening out in all directions. It extends down to the 300-foot level and a continuation of it has been found in several other places of the mine.

MINOR NOTES.—The Anaconda mine looks better with every day's work done on it. Prospecting is being carried on at the Amy Silversmith with considerable vigor. Everything at the Rising Star mine is in good condition and the stopes are producing the usual quantity of ore. The Wild Bill looks grand, and the lucky lessees are reaping a reward

for the large amount of "dead work" they did on the property. The Moulton mine never looked better, and ore extraction is about the same. Every thing at the mine and mill is in good order and Superintendent Clark never looked happier.

THE MOULTON.—Inter-Mountain, Sept. 26: Active operations are progressing in the Moulton, where, after a lapse of about two years, sinking has been resumed in the main shaft. In the upper levels the stopes are in good shape and producing the usual quota of ore.

NEW MEXICO.

WATER CANYON.—Socorro *Bullion*, Sept. 23: John J. A. Dobbin is developing the Star of Bethlehem. The Maria, owned by Col. Roy and F. Vanderhaar, is dumping pay dirt. The Jane Bowman concentrator is running day and night, Sundays excepted, to its full capacity. The Jane Bowman is being worked with full shifts, and large amounts of ore are being dumped at the mill. The Las Vegas & St. Louis Mining & Smelting Company are deepening the shaft on the Nineveh gold mine, on pay ore. The Nichols Manufacturing Company of Denver, have just completed a concentrating mill for the Jane Bowman mine. The plant consists of a double Giant stamp mill and Rouse concentrator, and it is reported as being an immense success.

MAGDALENA DISTRICT.—The Hardscrabble mine is shipping ore to the Hilling smelter. The Kelly, Juanita, Graphic and Hardscrabble are in full operation. Several important negotiations are pending, involving the sale of a number of well-known and important Magdalena properties. At 15 feet, J. S. Hutchason recently reached a fine gold pay streak on a claim which is situated near the Brittenstene properties in the Pueblo district. Hutchason and Romero will commence to ship ore from the Ambrosia this week. The tunnel in this property, made to intersect the ore body is completed.

LADRONES DISTRICT.—Whitacre is still sinking on the Florence, and dumping very fine ore. Donald McRae has finished his assessments and is now at work with a strong team on the Lawrence, dumping high grade ore.

MISCELLANEOUS.—There is now a greater demand for mining property in Socorro than there has been since the exciting days of '81. Prof. Hill informed a friend of ours not long ago that the richest ore he had ever received came from Socorro county. Work and development is the order of the day, in the Water canyon, Pueblo and Magdalena camps, and all the boys find ready employment at good wages. H. R. Harris, one of the most reliable of our mining men, has returned from an extended trip through Magdalena, Pueblo and Water Canyon camps. He announces a great improvement in the outlook, and that work is progressing satisfactory in all of our neighboring camps.

OREGON.

A NEW DISCOVERY.—Grant's Pass *Courier*, Sept. 24: We are told of the discovery of another rich quartz ledge below the Yank on Rogue river. Our informant, Mr. Trimble, says it is quite rich in gold, and that parties who have tested it say it is better than the Yank. The ledge has been traced for several miles and they have named it the "General Grant." The Trimble brothers have taken three claims and others are becoming interested in this new discovery. We expect to get more definite returns from the ore shortly, and hope the boys have found a bonanza. N. C. McNair, of the Yank mine, tells us he has tested the ore from this discovery, and that it gives promise of being very rich in gold.

UTAH.

SANDSTONE MATTERS.—Southern Utah *Times*, Sept. 20: The strike made by Wilson & Phelps, on the north extension of the Barbee & Walker, last week, is the most important discovery that has been made in the Silver Reef sandstone deposits for a long time past. It is situated on the White Reef, which crops out plainly for over 1300 feet on the claim, the easterly end of the property being covered by a deposit of gravel and granite boulders which have washed down from the Pine Valley mountains during past ages, and covered over the reef. The White Reef, before it leaves the Barbee & Walker ground, begins to curve towards the east, so that the ledge on the extension appears on the surface in a bow shape, bending gradually from a northeasterly to an easterly direction. The claim is an old location and considerable prospecting was done on it in the past, but the ore found was of too low a grade to pay for working. About 30 feet from the ledge on which the late strike was made and running parallel to it, is a strong, copper-stained ledge which carries a small percentage of silver, assaying from 3 to 15 ounces per ton. It was on this ledge that all the work was done heretofore, while the ledge in which the ore was discovered last week, although cropping out plainly a few yards away, was never before touched by a prospector. The ore was struck on the surface about 1000 feet east of Main street, on ground that was trampled over by hundreds of chlorides and prospectors since the Reef was discovered. The ore is a soft, iron-stained sandstone carrying horn and native silver specimens of which will assay up into the thousands. A fair sample of the paystake, which is five inches thick, assayed 153 ounces, while the whole ledge no doubt carries a good percentage of silver. The formation is the same as that in the Tecumseh, Savage, California and other mines on the Buckeye Reef in which was found the richest ore. The scene of the late strike has been visited by all the leading mining men and experts in the camp, and the universal opinion is that it is one of the biggest and best strikes that has been made in the Silver Reef country for years past. It is the first time that this information and this character of ore was found on the White Reef, and is a pretty fair indication that the best ground in the Barbee & Walker, Bonanza, Leeds and other properties on that Reef remains to be prospected.

OTHER NOTES.—Both the Christy and Stormont Companies are working a full force of men in their mines, and are crushing 40 and 45 tons of ore each, every 24 hours. Within the past week several rich strikes have been reported from different parts of the camp, and, notwithstanding the depreciation in the price of silver, of late, a very hopeful feeling seems to prevail among our mining men.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

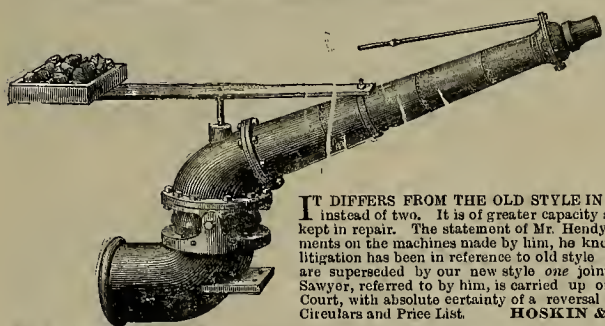
J. A. Fay & Co.'s Woodworking Machinery.
 Frank & Co.'s Woodworking Machinery.
 New Haven M'fg Co.'s Machinists' Tools.
 Bement & Son's Machinists' Tools.
 Bickford's Power Drills.
 Blake's Improved Steam Pumps.
 Perry's Centrifugal Pumps.
 Perin Band Saw Blades.
 Sturtevant Blowers and Exhausts.
 Shimer Matcher Heads.
 Brainard Milling Machines.
 Turbine Water Wheels.
 Bradley Cushioned Hammers.
 Massey's Steam Hammers.
 Schlenker's Bolt Cutters.
 Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
 Atlas Engine Works Engines and Boilers.
 Payne's Vertical and Horizontal Engines.
 Otto Silent Gas Engines.
 Clapp & Jones' Steam Fire Engines.
 Pickering Engine Governors.
 Judson Engine Governors.
 Tanite Co.'s Emery Wheels and Machinery.
 Nathan and Dreyfus Oilers.
 Korting Injectors and Ejectors.
 Disston's Circular Saws.
 New York Belting and Packing Company's Rubber Goods.
 Lane and Bodley Saw mills.
 H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



This cut represents our
**IMPROVED
 HYDRAULIC
 MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,
 218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, an GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

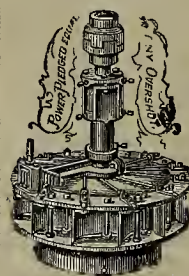
JAS. LEFFEL'S TURBINE WATER WHEEL,

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest Lowest head used in this country. Our new illustrated Book sent free to owning water power. Those improving water power should not fail to write to New Prices before buying elsewhere. New Shops and New machinery are pro for making this Wheel. Address



JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

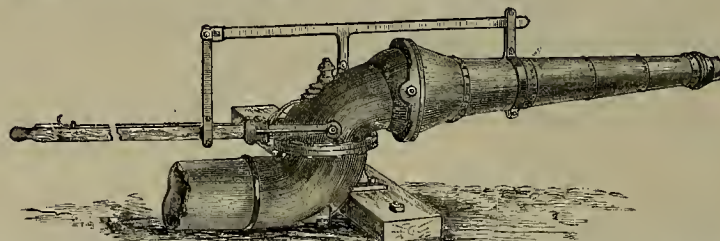
Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.
 E. G. DENNISTON, Prop'r.

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco, Cal.

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

... MANUFACTURER OF ...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

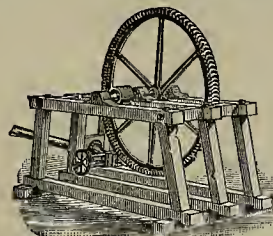
Punching and Shearing Machinery for Hydraulic Pipes

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

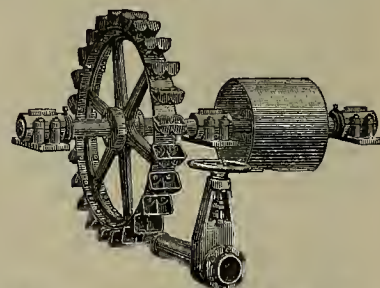
SEND FOR CIRCULAR.

EDWARD A RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent, distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

RICHARD C. REMMEY, Agent,
 Philadelphia Chemical Stoneware Manufactory,
 1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Brick for Glover Tower.

SAN FRANCISCO CREMATION CO.

[INCORPORATED SEPT. 5, 1885.]

CAPITAL STOCK, \$25,000, divided into 500 shares of the par value of \$50 each.

217 Shares Have Been Taken.

The remaining shares are now offered for sale and may be subscribed for at the office of GENERAL H. A. COBB, 321 Montgomery St., where further particulars may be obtained, also at the office of the Secretary, 109 Battery St. By order of the Board of Directors.

MAX LEVY, Secretary.

DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY is the oldest established and most successful on the Pacific Coast. No. 252 Market St., Elevator 12 Front St., S. F.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe,
Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.



WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

WAREHOUSE AND BRANCH OFFICE:

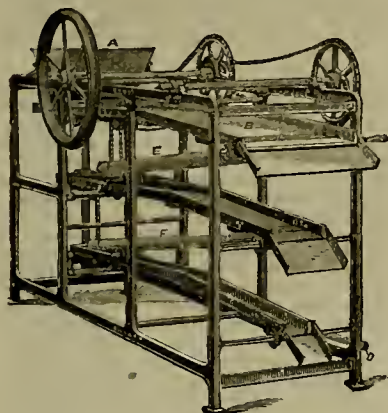
No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.
Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue, 17 and 19 Fremont St., San Francisco.

"ACME" DRAWING PAPERS

QUEEN & CO'S

CELEBRATED

PROFILE AND CROSS SECTION PAPERS



Extra Fine
Swiss
Instruments

QUEEN & CO'S Improved TRANSITS and LEVELS, TAPES, CHAINS, RODS, RULES, and Drawing Materials of every description. List and description of our Ten Catalogues sent on application.
JAMES W. QUEEN & CO.,
924 Chestnut St., Philadelphia.

INVENTORS. MODEL MAKER,

258 Market St., N. E. cor Front, up stairs, S. F. Experimental machinery and all kinds of models, tin, copper and brass.

L. C. MARSHUTZ

T. O. CATNRELL

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound
Engines,

FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

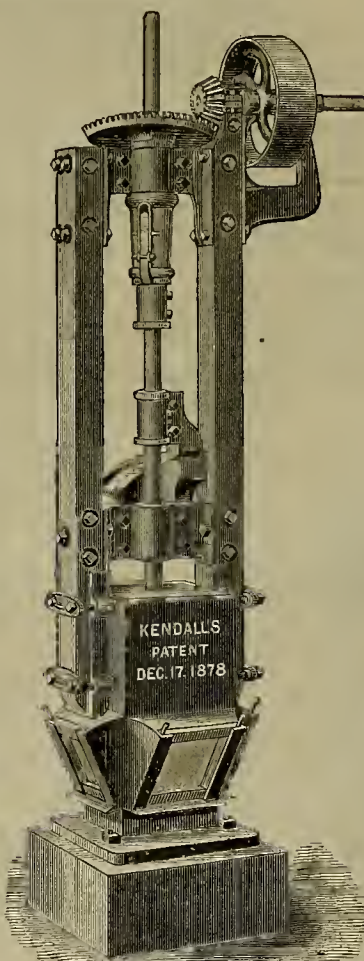
...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL.

Send for Circulars and Price List.



PATENT

LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

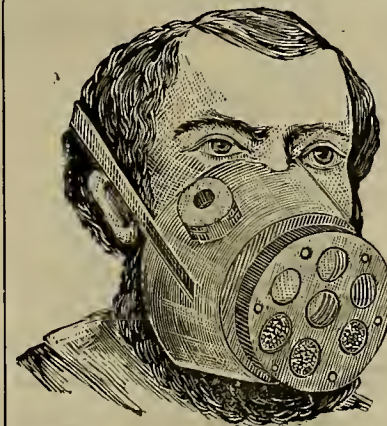
In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



DEWEY & CO. { No. 252 MARKET ST. } PATENT AGENTS.
Elevator, 12 Front.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

METALLURGICAL AND MINING ENGINEERS,
B. SALAZAR,
ASSAYER AND CHEMIST.

ASSAYER,
H. KUSTEL,
METALLURGIST.

PACIFIC

Reduction & Metallurgical Works.

SALAZAR & KUSTEL, Managers.

Location of Works: Melroe, Alameda Co., Cal.
OFFICE:

318 Pine Street (Basement), San Francisco.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL.

H. KUSTEL.

METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.

Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures correct returns.

Nevada Metallurgical Works,

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

THE new water works at San Diego will cost \$800,000.

Mechanics' Fair Premiums.

(Continued from Page 229.)

make. William Arnitage, cartoons in crayon. California Manufacturing Company, hydraulic clothes washer (Dannemeyer's patent). Sonoma county, display of undressed hops. E. W. Woolsey, Fulton, Sonoma county, pure bred Spanish merino wool, six months' growth. J. B. Hoyt, Suisun, Solano county, Shropshire wool. L. Walker & Son, display of scoured wool and dyed wool. Samuel Bloom, best exhibit of scoured wool. William Biteman, wire window screen. Albrecht and Waters, display of bronze hardware for architectural work. George V. Blackman, door knob and pantry lock. F. Thomas, display of cleaned and dyed articles. J. Spaulding & Co., for best preparation and process for renovating carpets, etc. G. F. Schilde, amplifier for pictures. A. S. Kaser, collection of fancy programmes. Larkins & Co., best specimen carriage, blacksmithing. Carville Manufacturing Company, best sulky, California make. Julius Joshua Klein, general display of photography and landscape views; stereoscopic views, broeze medal. Denning, Palmer Milling Company, best display of buckwheat flour. Deming, Palmer Milling Company, best display of cornmeal. Woodin & Little, best sprinkler. Woodin & Little, best spray pump. B. F. Bush, automatic gas regulator. Samuel Hill, Ventura county, display of wool. Henry Flint, Ventura county, display of wool. E. G. Denniston, display of nickel-plated ware. Schneider & Arey, explosive whale lance, California make. John S. Benna, best artificial flies, California make. George H. Croley, sealing wax strings for fruit cases. Mrs. S. B. Long, improvement on gas stoves. Hunter & Shackelford, draft regulator. G. P. Laid, Santa Cruz county, best general display of cheese. Ventura county, best display of California honey. Nectar Jelly Factory, display of jelly. Petaluma Fruit Packing Company, preserved fruit in glass. Robert Barton, Fresno county, Berger wine grapes. A. F. Evans, display of scourence. L. H. Moise, "Matchless Metal Polish." C. F. Bauer, best vegetable-cutter. G. G. Wickson & Co., best cream separator. G. G. Wickson & Co., best barrel churn. G. G. Wickson & Co., best single-tree. R. J. Knapp, best hillside plow. Baker & Hamilton, best plow for general purposes. Ventura county, best general display of fruit by producer, diploma and \$75. L. H. Moise, steam fruit-canner. T. A. Byler, patent coffee pot. David B. James, rocking stamp mill. J. T. Cutting & Co., display of germea and zeatine. W. A. Pettijohn, breakfast gem. L. F. Dolder, German pickles. H. B. Birnbaum, Cibils' extract of beef. Tatum & Rowen, display of Eastern leather belting. H. H. Kryger, display of Eastern leather belting. Fisor & Burgess, horse-collar with patent clasp. E. W. Woolsey, Fulton, Sonoma county, pure bred Spanish merino wool, six months' growth. J. B. Hoyt, Suisun, Solano county, Shropshire wool. L. Walker & Son, display of scoured wool and dyed wool. Samuel Bloom, best exhibit of scoured wool. Charles Morrell, display of banjos, California make. California Fire Apparatus Manufacturing Co., fire department supplies. O'Neal Bros. & Co., Santa Cruz, straw wrapping paper. Hanford Fruit Drying Co., Hanford exhibit, varieties of dried fruit. Ventura county, best display of cultivated nuts. B. T. Farrar, best hair mattress. T. S. Clark & Son, best camp supplies and household goods. T. S. Clark & Son, best woven wire mattresses. C. M. Peck, best pillowsham holders. Ventura county, best general display of dried fruits. B. T. Farrar, best metal spring bed bottom. B. F. Wellington, Improved egg food. G. G. Wickson & Co., Imperial egg food. J. M. Litchfield, best display of military goods. J. M. Litchfield, best display of regalias. Julius Weyand, Colusa county, samples of mohair. Eisen ranch, Fresno county, best general display of grapes by producers. T. C. White, Fresno county, best display of California raisins. Hawley Brothers Hardware Company, best sulky plow. Baker & Hamilton, Cem seed sower. David Bradley Manufacturing Company, best walking cultivator. Julius Weyand, Colusa county, samples of mohair. W. W. Broughton, Lompoc, Santa Barbara county, best general display of variety of apples, diploma and \$20. Baker & Hamilton, Cem seed sower. David Bradley Manufacturing Company, best walking cultivator. Ira Bishop, best sack elevator. R. T. Osborne & Co., brass curtain poles. Woodin & Little, best display of hand pumps. Woodin & Little, best sprinkler. Woodin & Little, best spray pump. Lock Spring Mattress Company, best lock-spring mattress. C. W. Corwin & Co., patent stopper. F. W. Kroh & Co., windmills. L. Cutting, device for turning eggs in an incubator. Forbes & Plaisted, weighing and measuring jar. Geo. V. Blackman, national cash register. C. W. Weston, patent fire-kindler. Acme Bath Manufacturing Company, best portable bath apparatus. H. A. Matthews, best display of audiphones. A. Bosche, model of hydraulic dirt conveyor. H. Bugelli, model of dredging machine. Willis & Landgrave, fare-box and change-gate. D. S. Ciphers, popcorn machine. G. G. Wickson, type-writer. G. G. Wickson, stenographer. G. G. Wickson, pneumatic copying-press. C. F. Marwedel, display of Prentiss vices. Charles Morrell, display of banjos, California make. Ira Bishop, best sack-elevator. Baker & Hamilton, best lawn mower. H. Liebes & Co., furs cleaned and dyed. Geo. H. Tay & Co., "Backus" water motion. J. T. N. Macay, rotary decanting filter. E. G. Denniston,

silver-plated amalgamating plate. Petaluma Foundry and Machine Works, model of wine and cider press. Fred. S. Jones, cake mixing machine. Thomas Mater, baker wagon. Baker & Hamilton, four-spring wagons. G. W. Burgtorf, road cart. Baker & Hamilton, buckboard. C. M. Peck, best pillowsham holder. Sherman, Clay & Co., for Coun's cornets. Albrecht & Waters, Gasoline stove, bronze medal; also flat-iron heater, diploma. W. H. de Payne, horse shoes. William Banks, combined wood-planer and edger. R. J. Knapp, best side-bill plow. Baker & Hamilton, best plow for general purposes. J. T. Cutting & Co., display of germea and zeatine, diploma to each. W. A. Pettijohn, breakfast gem. Frido Schultz, glass picture, "Diana Hunting." Hawley Bros. Hardware Company, best seed-drill. Fresno Co., display of variety of pears, diploma and \$20. Wester & Co., roller skates. J. H. Drummond, Glen Ellen, Sonoma county, best display and quality of grapes, diploma and \$50. O'Neal Bros. & Co., straw wrapping paper. Lock Spring Mattress Company, best lock-spring mattress. J. Matthews, best sherry wine, California make. A. D. Pryal, North Temescal, best display and variety of plums. J. S. Harvey, San Diego, best display of citrus fruits, diploma and \$50. Deming, Palmer Milling Company, best display of buckwheat flour. Deming, Palmer Milling Company, best display of cornmeal. C. W. Wescott, window sash stealer. Fresno county, best display and variety of peaches, diploma and \$20. Fresno county, best display of table grapes, diploma and \$50. Mrs. George S. Atkinson, turned articles from California wood. Baker & Hamilton, best mower. L. F. Dolder, German pickles. H. B. Birnbaum, Cibils' extract of beef. Duffy & Williams, gas logs. San Francisco Tool Co., best shaft coupling. Hawley Bros. Hardware Co., best seed-drill. Baker & Hamilton, best lawn mower. Hawley Bros. Hardware Co., best sulky plow.

Cash Premiums.

Ventura county—Second best display of citrus fruits, \$25. Ventura county—Second best general display of dried fruit, \$15. J. H. Thomas, Visalia—Second best display and variety of peaches, \$10. Mrs. Austin, Fresno county—Second best display California raisins, \$25. Sonoma county—Second best general display of fruit by producer, third week of the fair, \$25. Sonoma county—Second best display of table grapes, \$25. Eisen Ranch, Fresno county—Second best display and quality of wine grapes, \$25. State University, Berkeley—Second best display of variety of pears, \$10. Sonoma county—Second best display of variety of apples, \$19.

A Handsome Premium.

The publishers of this paper have had printed on fine paper and handsomely bound, a neat little volume, entitled "A Beautiful Poetic Review and Friendly Offering." It was written by Dr. J. R. Bradley, orator of Oakland Council, American Legion of Honor, and read in short sections by the author at different meetings, eliciting much praise from his listeners. The work is embellished with fine lithographic portraits of several noted poets whose writings are mentioned in the work. We believe the book will prove a pleasant and attractive keepsake in every family—it can be so readily taken up and read as leisure moments may occur. It will be mailed for 25 cents to subscribers (old or new), upon paying 12 months in advance for this paper. Or to those who pay one year and three months in advance we will send this beautiful souvenir free, postpaid.

THE GOLDEN GATE PLUG CLOSET is the latest improved form of plug closet which has been brought before the public. While economical in cost, its construction and operation are as perfect as the most expensive appliances of the kind. It is of good design and a thoroughly sanitary appliance, because it has a perfect airtight overbat. No sewer gas can pass through the closet either when it is in action or not in use. All real seats on the closet are made of brass. The valve is as simple and desirable as can be attached to a water-closet, and is operated by one extra heavy copper float. This closet is manufactured in this city by Joseph Budde, whose advertisement appears in another column.

THE SAN FRANCISCO Passenger Agents' Association has completed an organization which embraces all passenger agencies. The election for secretary and arbiter resulted in the selection of Sheldon Borden. It was agreed that the maximum commission to Chicago shall be \$2 and \$3 to all seaboard points, including European points; \$2 on all points east of Chicago, but not seaboard points, and \$1 on all Mississippi river points. It was decided to allow no commissions whatever to points on the Missouri river.

PHOTOGRAPHS.—We have received from E. K. Downer some photographs taken by D. F. Evans, of Downville, Sierra county, one of which shows the Mountain Messenger office. A printing office embowered in foliage is not a common thing to see. It makes a city journalist envy his brethren of the interior when he knows they can do their work in a building like the Messenger's surrounded by flowers and trees.

THE PACIFIC COAST

ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines, FOR ELECTRIC LIGHT AND POWER.

OFFICE 40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscriptions up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz:

- | | |
|--|-----------------------------|
| 2.—World's Cyclopedia, 794 pages, with 1,200 illustrations, worth \$1.75. | REGULAR PRICE. |
| 3.—Patent Binder (cloth cover) with name of this paper in gilt. | Postpaid for 50 cts. \$1.00 |
| 6.—To New Subscribers, 12 select back Nos. of the MINING AND SCIENTIFIC PRESS. Free .75 | |
| 7.—Any of Harper's first-class periodicals, 15 per cent less than regular rates. | |
| 8.—Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates. | |
| 9.—Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates. | |
| 10.—Pictorial Arizona, 350 pages, in cloth and gilt. | Postpaid for 25 cts. 1.25 |
| 11.—Californian, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos. | Postpaid for 3 cts. .35 |
| Per volume, unbound, 5 Vols., Postpaid for 20 cts. 2.00 | |
| Per volume, bound, cloth back and stiff paper sides. | Postpaid for 40 cts. 2.50 |
| 13.—Pictorial California Homes (40 building plans and estimates). | Postpaid for \$1 3.50 |
| 14.—Dewey's Patent Newspaper File Holder (8 to 30 inch). | 25 cts. .50 |

NOTE.—The cash must accompany all orders. If too much is sent for any article or publication, the balance will be returned immediately. Address this office, No. 229 Market St., S. F.

P. S.—No. 11 is really a valuable premium to newcomers and others who appreciate the better class of stories and a good standard of California literature. Webster's Dictionary, 634 pages, with 1,500 illustrations. 50 cts. 1.50
Grant Lithograph, size 24x19. 50 cts. .50
Cleveland Fine Steel Plate, size 12x16. 10 cts. .50
Grant Steel Plate, cabinet size. 5 cts. .25
De Groot's History of Mining in California. 5 cts. .25
Beautiful Poetic Review, handsome, entertaining and instructive souvenir of real merit. 25 cts. .50

Send for any further information desired. Readers will please inform their new neighbors and others concerning our paper and these offerings. On application, sample copies of this paper will be mailed free to the address of any persons thought likely to subscribe.

The owner of a kiln at Auburn, Placer county, has discovered that mining slickens is the very material needed with which to make good brick.

ASSESSMENT NOTICE.

Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley, Nevada county, Cal. NOTICE is hereby given, that at a meeting of the Directors, held on the 17th day of September, 1885, an Assessment (No. 12) of Five (5) Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 934 and 936 Mission street, San Francisco, Cal. Any stock upon which this Assessment shall remain unpaid on the second day of November, 1885, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday the twenty-third day of November, 1885, to pay the Delinquent Assessment, together with costs of advertising and expenses of sale.

GEORGE P. THURSTON, Secretary.
OFFICE—934 and 936 Mission St., San Francisco, Cal.

SAN FRANCISCO CREMATION CO.

[INCORPORATED SEPT. 5, 1885.]

CAPITAL STOCK, \$25,000, divided into 500 shares of the par value of \$50 each.

217 Shares Have Been Taken.

The remaining shares are now offered for sale and may be subscribed for at the office of GENERAL H. A. COBB, 321 Montgomery St., where further particulars may be obtained; also at the office of the Secretary, 100 Battery St. By order of the Board of Directors.

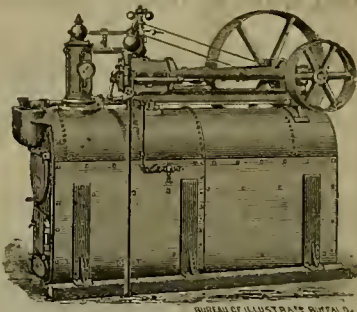
MAX LEVY, Secretary.

FOR THE BEST IMPROVED
ARTIFICIAL LIMBS
ADDRESS
MENZO SPRING,
9 Geary St.,
SAN FRANCISCO, Cal.
OFFICE 5,
Up-Street.

Send for Circular Blank for Self-Measurement.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

HEALD'S
BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.



SKINNER ENGINE COMPANY'S
CELEBRATED

PORTABLE ENGINES and BOILERS.

Three Gold Medals at the New Orleans Exposition over 25 Competitors.

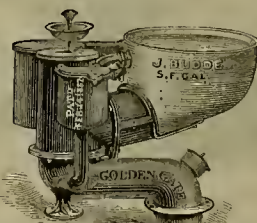
ALL SIZES CARRIED IN STOCK.

STEEL BOILERS

All sizes and styles made to order. (2-sheet Steel Boilers a specialty.) 2000 H. P. sold on the Coast during past three months.

STEARNS MANUF'G CO.,

29 & 31 Spear Street, San Francisco.

THE GOLDEN GATE
PLUG CLOSET.

The only secure locking device to keep sewer gas entirely away from dwelling houses.

JOSEPH BUDDE,
Manufacturer, 126 First Street.
Between Mission and Howard, S. F., Cal.

All kinds of Water Closets, Slop and Waste Hoppers always on hand.

Write for Information.

ANNOUNCEMENT.

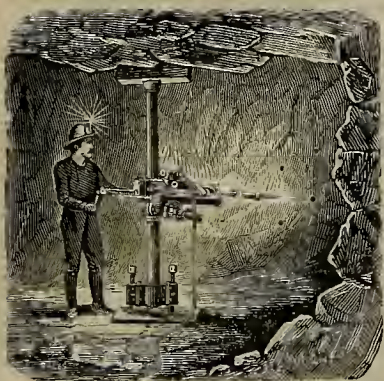
The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuses, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering and Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

H. M. RAYNOR,
No. 25 Bond St.,
NEW YORK.

ESTABLISHED 1858. FOR ALL

Laboratory
—AND—
Manufacturing Purposes.
Wholesale and Retail.
Native Platinum and Scrap purchased.



INGERSOLL ROCK DRILLS

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

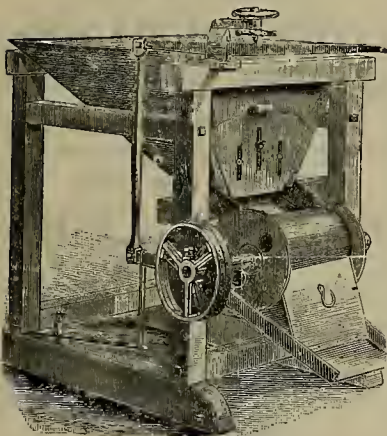
For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Chalmers" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS.
39 to 51 Fremont St., San Francisco.

GOLD MEDAL AWARDED

— AT —
Mechanics' Fair, 1883 & 1884

— FOR —
Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
— 1883 —
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and
Engine Works
22 Fremont Street,
SAN FRANCISCO.



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco.

Dewey & Co. { 252 Market St. } Patent Ag'ts

HOOD'S FOUNDRY COKE.

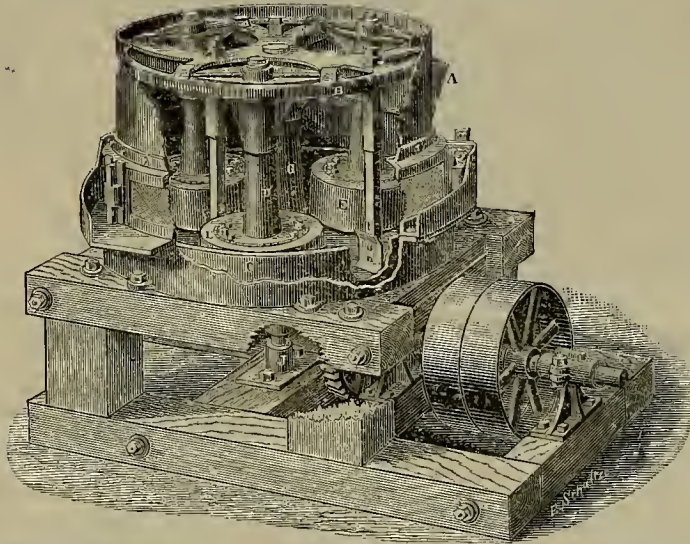
Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

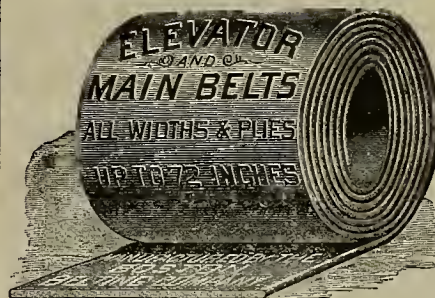
.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



Chicago Prices Beaten!
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Sand Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed.

Iron and Machine Works.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINOWELL.

H. OMAS THOMPSON

THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

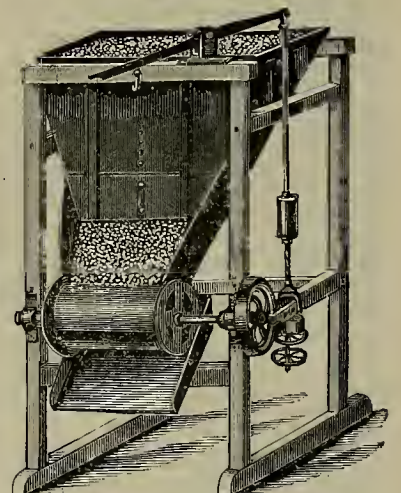
Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machine

Broads Rock Crushers,
Steam Power, Hydraulic,
Sides Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

THE ROLLER ORE FEEDER

(Patented May 28, 1882.)



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, SAN FRANCISCO, CAL.

San Francisco Cordage Factory.

Established 1858.

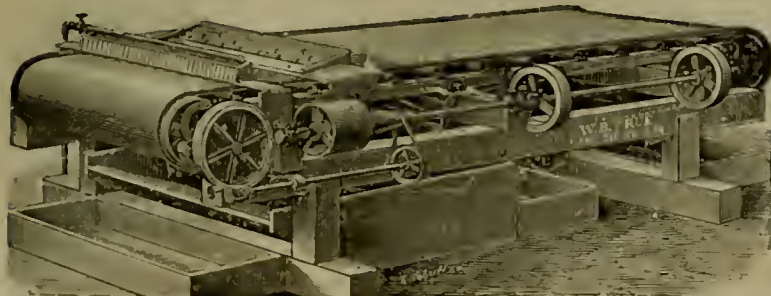
Constantly on hand a full assortment of Manila Rope, San Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove this Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE



Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Barbed Wire.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

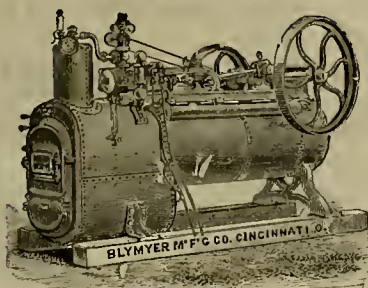
JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont Street, San Francisco.

Manufacturers of NEW and Dealers in SECOND-HAND

Boilers, Engines and Machinery of Every Description.

PORTABLE ENGINES AND BOILERS
On Skids.



Each engine is fitted with a governor, steam and water gauges, heater, flue brush, waste, blow-off cocks, brass whistle, smoke stack with spark arrester, oil cups, gauge cocks, combination check and stop valve, and pump. Both boiler and engine are fitted in complete running order, and are sold either mounted on strong wheels with wide tires, or on skids.

STEAM PUMPS

OF ALL MAKES.

Mining Pumps.

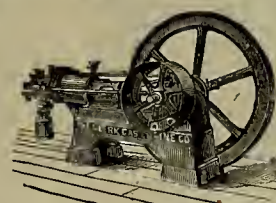
Quartz and Sawmill Machinery.

AGENTS FOR THE SALE OF

"Cummer" Automatic Engines,
Porter Man'g Co.'s Engines and Boilers,
Blaisdell & Co.'s Machinists' Tools,
Hot Polished Shafting,
Baker Rotary Pressure Blowers.

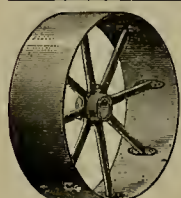
CLERK GAS ENGINES.

RELIABLE,
ECONOMICAL,
SAFE,
STEADY,
COMPACT.



NO BOILER,
NO ENGINEER,
NO COAL,
NO ASHES,
NO DANGER.

These Engines are eminently serviceable for use as motors for Printing offices, Workshops, Laundries, Factories where sewing and bag machines are operated, and in Hotels, Public Institutions, and Private Buildings where pumps, elevators, or electric lighting machines are in use; and generally in Cities and Towns (where gas is obtainable) for all mechanical purposes requiring small driving powers.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 120 and 131 Fremont Street

SAN FRANCISCO, CAL.



JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

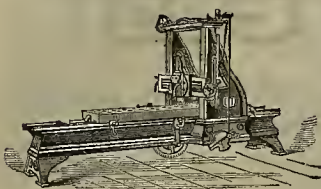
In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



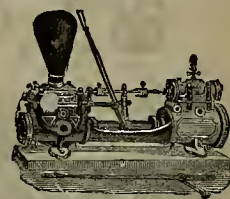
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

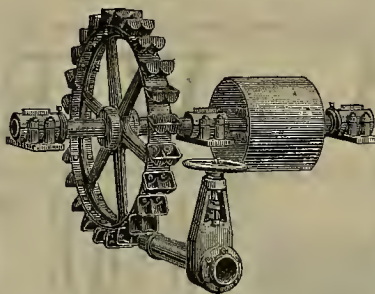
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

SOLE AGENTS FOR

SEND FOR CIRCULARS.

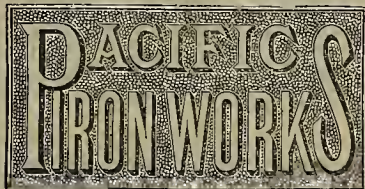
SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850.

1885.

RANKIN, BRAYTON & CO.,
.....BUILDERS OF.....
MINING MACHINERY.

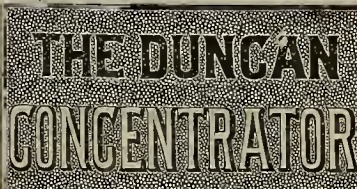
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
embracing machinery of LATEST DESIGN and
MOST IMPROVED construction. We offer our cus-
tomers the BEST RESULTS OF 35 YEARS' EX-
PERIENCE in this SPECIAL LINE of work, and
are PREPARED to furnish from SAN FRAN-
CISCO or CHICAGO, the MOST APPROVED
character of MINING AND REDUCTION MA-
CHINERY, adapted to all grades of ores and SU-
PERIOR to that of any other make, at the LOWEST
POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-
LIVER in COMPLETE RUNNING ORDER,
in any locality, MILLS, CONCENTRATION
WORKS, WATER JACKET SMELTING
FURNACES, HOISTING WORKS, PUMP-
ING MACHINERY, ETC., ETC., of any DE-
SIRE CAPACITY.

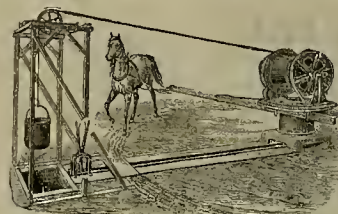
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
ores of NEW and ORIGINAL DESIGNS, covered
by LETTERS PATENT. No other Furnace CAN
COMPARE with these for DURABILITY, and in
CAPACITY for uninterrupted work. MORE
THAN 150 of them are now RUNNING in various
parts of THIS COUNTRY, as well as many in
FOREIGN COUNTRIES, giving results NEVER
BEFORE ATTAINED as regards CONTINUOUS
running, ECONOMY of fuel, AMOUNT and QUAL-
ITY of BULLION produced. These CLAIMS have
been PROVEN BY RESULTS in ANY NUM-
BER of INSTANCES, and the GREAT SUPE-
RIORITY of this SYSTEM of smelting ores DE-
MONSTRATED BEYOND QUESTION. COM-
PLETE PLANTS furnished to order of any CA-
PACITY, with ALL IMPROVEMENTS that ex-
perience has DEMONSTRATED as VALUABLE
in this class of work.



Beyond question the cheapest and
most effective machine of the kind
now in use adapted to all grades and
classes of ores.

This machine has been THOROUGHLY TESTED
for the past TWO YEARS, under a GREAT VA-
RIETY of CONDITIONS, giving most EXTRA-
ORDINARY results FAR IN ADVANCE of
anything EVER BEFORE REALIZED. A re-
cent COMPETITIVE TEST at the Carlisle Mine in
Mexico, showed an ADVANTAGE OF OVER 30
PER CENT in favor of THE DUNCAN. The
amount SAVED OVER THE TRUE being suffi-
cient to PAY THE ENTIRE COST of the ma-
chines EVERY MONTH of the YEAR. One
of its MOST VALUABLE features is as an AMAL-
GAMATOR. It saves all THE AMALGAM GOLD
and SILVER that ESCAPES THE BATTERIES,
PANS or SETTLERS, making the machine worth
MORE than ITS COST for THIS PURPOSE
ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist,
and affording means for the continuous operation of a
Pump or Blower, without interfering with a hoisting ap-
paratus. It is made entirely of iron, no piece weighs
over 300 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flat from 1 to 8 inch. Angles, Tees, Channels and other shapes
Steel Wagon, Buggy, and Truck Tires, Flow Steel; Machinery and Special Shape Steel to size and length
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

Geo. W. Prescott, President.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. Dickie, Manager.
J. O'B. Gunn, Secretary.

Irving M. Scott, Gen'l Manager.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 10, 1885.

VOLUME LI
Number 15.

Breech-Loading Shotgun Ammunition.

The Chamberlin Automatic Cartridge Loader.

Shotgun shells of the same interior capacity, when loaded by hand, are found to vary in their finished lengths, which is, of course, evidence that the wads are not level, or that the quantity of powder or shot varies, so that constant pressure is not used in ramming the charges. Unequal results must necessarily follow, much to the annoyance of shooters. The measurement of powder and shot in the usual way varies more or less. Shaking by hand does not always level the charge to even the wads squarely on the surface. It is impossible to always put the wad down perfectly in the shell by hand. Many trust to the rammer to level it as it goes down, which the rammer fails to do, and a weak-shooting cartridge is the result. Then, the degree of pressure upon the wads varies, it being found impossible to secure uniformity of hand pressure in this respect. Careful examination of a hand-loaded cartridge will reveal its defects.

A very ingenious machine for loading cartridges has been invented, and the right for its use on this coast has been purchased by the Selby Smelting and Lead Co. The defects of hand-loaded cartridges are all remedied by the Chamberlin machine, which insures the sportsman perfect accuracy in the load, and will also save him much time and trouble. The machine-made cartridges are now being placed on the market under the brand of "Standard." Of course all sizes are made, and for any kind of shooting. Each cartridge is perfect, since the machine automatically sorts and tests each shell, discarding all imperfect ones and refusing any or all which may vary from the correct size.

This machine is one of the marvels pertaining to the development of the science of modern gunnery. It is so constructed as to perform all the operations of loading shells with absolute accuracy, giving uniform charges of powder and shot and uniform pressure upon the wads, and with any desired number of wads. Each wad is inserted in the shell separately, with such pressure upon it as may be wished, and forced home in an absolutely level position, an advantage that cannot be secured in the hand-loaded article. The rammers are graduated and adjustable to any desired pressure up to 100 pounds, so as to obtain the highest explosive force without crushing the powder.

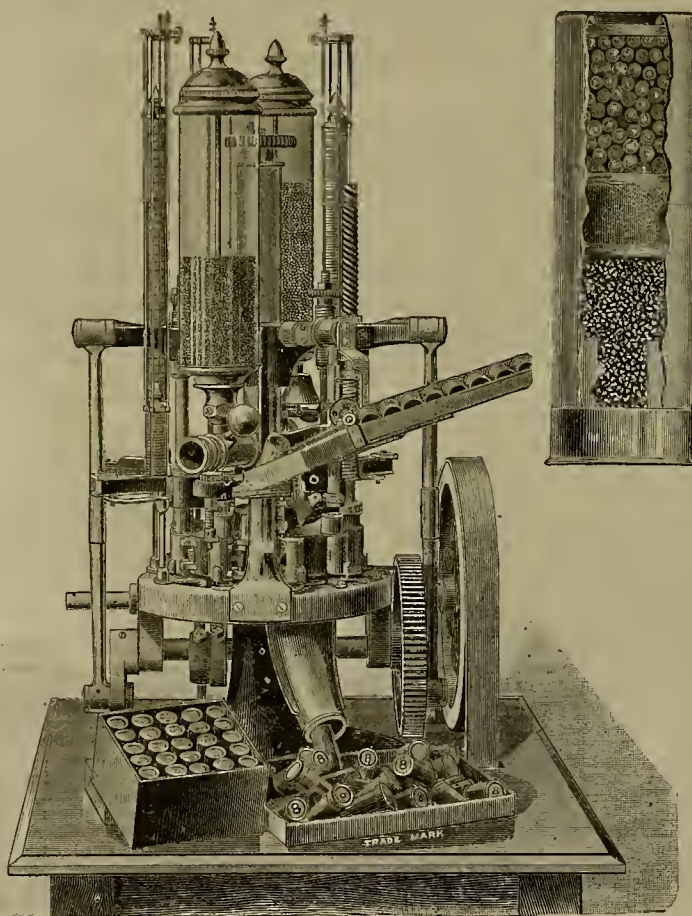
An engraving of this automatic loader is shown herewith, and is precisely like those used by the Selby Co. in preparing their new brand of cartridges. The machine is not very large, but is a very ingenious piece of mechanism indeed. The empty shells are placed in a guide or trough, and as the machine is revolved, they drop one after another into a small receptacle formed for to catch them, and each shell becomes part of the mechanism for this time being. That this is so is shown by the fact that if no shell drops into the pocket, no powder, wads or shot are fed in, while if the shell is there the different parts perform the functions for which they are intended.

As the shell drops into the little pocket, with the open end up, the powder from the glass receptacle, shown in front and on top of the machine, drops into the charge shown below it, and the fixed charger into the cartridge from said charger. This charge of powder is accu-

ately measured and is subject to graduation. It goes into the shell, to which a jar or shock is imparted, so as to level the powder smooth on top.

As the machine revolves, the powder-loaded cartridge next comes under a plunger which forces down a pasteboard wad upon it. The wad is tapped or tamped by a slight blow. The next plunger forces down a pink-edge wad upon the pasteboard; which is followed in turn at the next plunger by another pasteboard wad. Then the cartridge comes under a spout from which

One of the engravings shown herewith is a sectional view of one of the cartridges loaded by this machine. The Selby Company are now making 43 different varieties of loads to suit all game, from sandpipers to geese, and can load any fancy lots which may be ordered at short notice. This is an immense advantage to the gun trade, for dealers having the Selby S. and L. Company to draw from need keep no large stock of material, on which they never realize much profit. These shells are guaranteed to keep perfect in any climate for ten years, and



THE CHAMBERLIN AUTOMATIC SHOT-GUN CARTRIDGE LOADER.

the charge of shot comes, and, as it goes round, another pasteboard wad comes on top of that. All these wads are seated uniformly and evenly, and there is an even pressure on each, something that cannot be accomplished by hand. When the last wad is in, the cartridge is reamed smoothly, a stamp marks the number in the end, and the completed cartridge drops into the box ready for packing.

Since the machines were built, Mr. Prentiss Selby, the Superintendent of the Selby Co., has improved the ramming or crimping attachment materially, so that the edges are hard and smooth and is never broken or ragged. Each load is stamped by an automatic machine with the size and all this work is done delicately and accurately at the rate of 1000 an hour for each machine. Recognizing the large investment they have at stake, the Selby Co. use only the very best material in every respect, and owing to the automatic arrangements, no inferior grades could be substituted.

we have fired off an Ely paper cartridge pin fire for a Lefauchau gun which had lain in a drawer for more than a dozen years. The desire of this company is to so make their loaded shells that their standard character will be recognized by shooters, who will always be able to get the same quality at all times.

They have built a large cartridge factory close to their huge smelting and refining works at Vallejo Junction. Seven of the automatic machines were put up and are now in use, and more machines will be put up as soon as needed to meet the large demand for these cartridges. In this factory every part of the work of loading a shotgun cartridge is done by automatic machinery, and in this the Chamberlin cartridges differ from other so-called machine cartridges, which are simply hand-made cartridges filled with an automatic filler, but rammed, wadded and reamed by hand, thus possessing none of the essential advantages of the all-automatic machine-made goods. The super-

iority of the Chamberlin cartridges, arising from the fact that all this work is done by accurately gauged automatic machinery, is obvious. Hand-rammed cartridges cannot be uniformly pressed, but the automatic machine loaders, graduated to a hair's breadth, coming down on every load with equal pressures, must of necessity do uniform and perfect work. This machine is necessarily exactly accurate in the charges of powder and shot, and shooters using the Chamberlin cartridges, so soon as they have got the gauge of their ammunition, can depend upon every succeeding load firing as the other did. Another feature is that the cartridges loaded by the machine are sold for much less than the old-fashioned hand-loaded ones.

The Cable Road Boom.

There appears to be a veritable cable road boom in the East. New York, Philadelphia, Chicago and Kansas City have already each a road in operation. Chicago has been ahead—as she usually is in all new enterprises. The road in that city has been a success from the start, the projectors having been wise enough to come to San Francisco and pattern after the successful roads here. The other cities named have been trying something new, and, as they claim, better than the "Western ideas." The consequence is that they are having rather a hard time of it, but there is a prospect that they will finally succeed in getting their roads in good running order after remedying their mistakes and paying dearly for their new fangled notions. With the "boom" in cable roads naturally follows the "boom" in inventions. Up to this time over 300 patents have been taken out for cable railways; about 100 of which were for "grip" alone. The natural result of this patent business will be endless litigation. We presume there was one original inventor of the cable system, and we have no doubt he will receive his just reward in the end. He is entitled to it, and we hope he may not have to wait too long.

In this connection our attention has been called to a "perfect cable road, which solves the traction problem," as described in the *New York Mail and Express*. In the description we can see nothing new. It is so like the roads built in this city that we fail to see where the saving of three-fourths in the art of construction comes in. One feature is that of having two cables, one running fast and the other slow. With this complication of two cables in each tube, the cost very naturally would be much greater and with no material advantage, as the delays from the breakage of cables is reduced to a minimum. The double cable system is now being tried in New York, on the Tenth Avenue cable line, where they will have a fair test of its advantages after a year or two's experience. We have our doubts about working the remaining cable should one break in a tube, as the broken one will be very apt to interfere with the grip. With proper care the life of a cable can be closely gauged, and a new one put in at night, causing but little, if any, delay in the traffic of the road. After an experience of over ten years of successful working there has been no call for a double cable system in this city.

The first engine ever used on a mine at Calico has just been put up. Over \$2,000,000 in bullion has been produced there, and no hoisting apparatus other than the common windlass.

Discovery of Californian Gold.

Address Delivered Before the Society of California Pioneers, Sept. 9, 1885, by John S. Hittell.

Prominent California Inventions.*

And yet, if we should regard only such associations and traditions as are of local character, though we have none of ancient date, such as we have are extremely interesting. Our history, though brief, is full of wonder. Indeed, it is a common expression with pioneers of 1849 that here, within 36 years, they have witnessed a greater number of exciting events of a peaceful character than have been seen elsewhere in a century. Their experience has been so different from anything told in the records of other countries, that they sometimes feel disposed to doubt whether the facts of their memory are not fictions of the imagination. They saw the time when California was almost a desert; when wild Indians were a majority of the inhabitants of the Sacramento valley; when most Californians and San Franciscans lived in tents; when John B. Weller stood up in the National Senate and said that his State had no agricultural resources worthy of note; when for lack of coin gold dust was common currency, and every merchant had scales for weighing it; when, later, the coin most in use for large payments was the octagonal slug worth \$50; when not 15 years since the dime was the smallest coin in common use; when the introduction of the half dime and the five-cent nickel—now our smallest coins—were regarded by the poor generally as hateful evidences of an approaching era of low wages and small profits; when there were not 10 acres of level ground in this city east of Larkin and Ninth streets; when ships anchored east of Sansome street between California and Pacific; when wild ducks were frequently killed in a pond on Third street between Market and Mission; when the only road from Portsmouth square to the Mission, passable for loaded wagons, had a toll gate on Kearny street near Sutter; when most of the merchandise in the city was stored in dismantled ships at anchor in the bay; when gold mining gave employment, directly and indirectly, to four-fifths of the men in the State; when the leading branch of agriculture was the breeding of beef; when the California Steam Navigation Company and the California Stage Company carried most of the inland travel; when business was thrown into confusion by the decline of the gold yield; when the city and State were threatened with abandonment on account of the supposititious discovery of very rich and very extensive placers in the basin of the Fraser river; and when the people were astonished and delighted by the opening of speedier and cheaper channels of communication with the Eastern States, and by the development of numerous branches of mining, agricultural and manufacturing industry. We who can look back over such memories can never say that life here has been dull and unromantic.

The promptness with which the gold discovery followed the American occupation was an indication of the marvellous energy that was to mark all the steps in the growth of our State. The treaty of peace between the United States and Mexico was not signed until February 2, 1848, and the ratification, which finally determined the allegiance of California, did not occur until May 30th. The Americans had scarcely obtained undisputed possession of the country before they threatened to swamp the markets of the world with their gold, and then in rapid succession they poured out immense quantities of quicksilver, wheat, wool, fresh fruit, canned fruit, silver, and horax. They competed with Lucra in the quality of olive oil, with Malaga in raisins, and with Agen in prunes, and are hoping to surpass Smyrna in figs, and France in wines. No pre-eminence is safe from them.

I have spoken of the deep impression with which we have stamped the seal of our enterprise into the topography of the continent, leaving marks which the storms of thousands of years could not efface. Thrown into a wild country, where every appliance of a civilized life had, speaking in an industrial sense, to be created out of nothing, it would have been sufficient for our credit to use skillfully the arts of older communities in supplying our material wants. But we did more. Our work has not been exclusively muscular; our brains too have been busy. We stand alone in having codified all the branches of our law. The only Political Code, legally enacted, is that of California. In many departments we have made strenuous efforts to surpass whatever had been accomplished elsewhere. As poverty here often culminated in wealth, so sometimes ignorance had the laudable ambition of rendering signal service to science. The most skillful workmen of Europe were employed for years before they succeeded in casting the lens of the largest of all refracting telescopes for the Lick observatory, and the gift of funds for the construction of such an institution at a considerable altitude above the sea supplied with instruments of high power; but since Lick's death Italy and France have both built observatories at high elevations.

Our books are read, our pictures admired, our engineers employed, our machinery im-

ported and our inventions copied by distant lands. The productions of our literary and artistic talent have been made familiar to the general public by frequent mention and elaborate criticisms in the periodical press, but those of our inventive genius—not less creditable to local capacity, and far more important to the world at large—have received far less attention. The main responsibility for this neglect rests, however, in the inventors themselves, who have not placed the needful information within reach of journalism, and have even allowed false claims to pass without contradiction. California's inventions are so remarkable for their number, variety and ingenuity, and have contributed so much to the industrial wealth of the world, that our State has no better claims to the respect and admiration of her own citizens and of other communities. I shall here make a brief list of them, confining my attention to those approved in practical working, and destined to be adopted in all parts of the world where their respective branches of the useful arts are understood in their highest development.

The best methods of handling water in shallow and deep placers is entirely Californian. Here most of them were first invented, and all were carried to the highest perfection. The board sluice, known in other lands in ancient times, was reinvented in Nevada county and made far more effective than ever before. Hydraulic washing, the process of using a stream of water under pressure to loosen an alluvial auriferous gravel, first invented in the same county by Edward E. Matteson, was afterward improved by globular joints to connect the nozzle with the pipe, deflectors to enable one man to turn a nozzle 10 inches in caliber under a pressure of 400 feet, internal feathers to keep the stream from twisting and scattering, and many other devices. By the help of Matteson's invention at least \$500,000,000 have been added to the world's stock of gold in California. Delmar, misinterpreting Pliny, makes the mistake of asserting that hydraulic washing was used in ancient Spain, but Pliny's language does not imply anything beyond the ground sluice, a much inferior process.

By hold experiments the early hydraulic miners ascertained that sheet iron pipe would bear a much greater pressure of water than the engineering authorities recognized, and that by dipping it in coal tar at a temperature of 400°, it could be protected against oxidation for a long time, and its inner surfaces could be smoothed so that a swifter current would run through it. The pipes were enlarged and used as inverted syphons to carry water across ravines several miles wide, the greatest pressure being 1000 feet, equivalent to 770 pounds to the square inch, whereas 200 is high pressure in a steam boiler. These remarkable pipes were supplied with lead-covered joints, hydraulic gates to check or stop the flow, and cocks to let out air at the high points and to let out water at the low points, by the ingenuity of Joseph Moore and Francis Smith.

The machinery of the best quartz mills of our time owes its present form, in nearly every important feature to Californian ingenuity. The old square wooden stamp has been superseded by the revolving iron stamp, the cylindrical stem of which is lifted by a double arm cam with a single hub acting on a gibb tappet, both cam and tappet having received their present shape from Irving M. Scott, of this city. The simple mortar used before 1849 for all stamps, has been differentiated here into three patterns, one for gold, another for the dry crushing of silver, and third for the wet crushing of silver ores. The capacity of all the mortars has been increased and their expense diminished by self-feeding apparatus, first invented by C. P. Stanford, and since improved by others. Several valuable rotary pulverizers of Californian origin are in use. In gold mills much of the precious metal is caught on sheet copper covered with quicksilver. A Californian, whose name is not on record, plated his copper with silver with so much benefit that his example has been followed in all gold mills.

The method devised by John Reynolds for separating gold from silver in bars containing not more than 20 per cent in weight of the former metal, has entirely superseded the older process, and has an important place in refineries of the precious metals.

The systems of silver amalgamation used in Germany and Spanish America were so slow, and required so much manual labor, that the miners of the Comstock, at the beginning of their work, made an urgent appeal to the Californian metallurgists for some expeditious labor-saving process, even if a smaller percentage of precious metal should be obtained. Their want was supplied by the Washoe pan, first used in Almarin B. Paul's mill, and then made an unquestionable success by Zenas Wheeler's grinding shoe and guide-plate; but years of experiments, with pans that did nothing but grind, and others that did nothing but amalgamate, elapsed before the evolution of the grinding and amalgamating pan now used in all American silver mills. The Washoe pan has been the chief agent in separating \$500,000,000 of precious metal from its ores. Continuous feed into connected pans, a great improvement on the older system of feeding by separate charges into separate pans, is due to the ingenuity of N. P. Boss, who also devised the automatic method of handling quicksilver, an important matter when 60 tons of that metal were used and handled every day in a single mill. The hydraulic pressure of amalgam was introduced by W. H. Patton. The best roasting furnace for gold sul-

phurets and base silver ores was made by Wm. Bruckner; and the best water jacket for copper and lead smelting furnaces was invented here. The chemical process of separating gold from sulphurets was taught by Plattner in Germany, but it was of no metallurgical value in California, and of little elsewhere, until O. F. Deetken, in Grass Valley, devised an economical apparatus for its application.

The best hoisting machinery owes much of its excellence to Behr, Patton, Eckert, Amss, Dickie and Scott; and with their help rock is now raised from the lower levels of the Comstock lode, where a depth of more than 3000 feet has been reached, at a speed of a mile a minute. Among the notable improvements are the direct action of the engine, and new methods of indicating the position of the cage and of unclutching and braking reels. A. S. Hallidie, of San Francisco, was not the first person to construct a wire ropeway for the transportation of ores, but he was the first to use a single-moving rope and fix a load to it, thus employing gravity as a sufficient motive power on mountain slopes.

Of all deep pumps, the most remarkable was devised by George W. Dickie and Joseph Moore, for the Crown Point combination shaft. Driven by a column of water 1600 feet high, above the Suto tunnel in which it is placed, and pouring out 10,000 tons of water daily, lifted from a depth of 800 feet below the tunnel, it is as wonderful for the ingenuity and holdness of its design as for the handling of columns of water aggregating nearly half a mile of vertical pressure. Mr. Dickie has also invented a valve valuable to control the supply of steam to the cylinders of marine engines.

The pump-dredge of Alexis P. W. Von Schmidt, our fellow pioneer and ex-president, is the most important improvement of our century in the dredging business. In situations where low land within a mile of the dredge is to be filled in, it saves at least 50 per cent, as compared with any other dredge. It will greatly add to the value of mud flats or swamps in and near city water fronts that need dredging.

Pelton's hurdy-gurdy wheel makes a practical use of 86 per cent of the theoretical power of water under high pressure, and is a great improvement over any wheel previously devised.

Another revolutionary San Francisco invention, but of older date and of world-wide fame, is the cable tramway of A. S. Hallidie. It has been introduced into Chicago, Philadelphia, New York, London and other cities, and has made an epoch in the transportation of passengers. It has also been the mother of a multitude of supplementary inventions covered by 300 patents or more, relating to cable crossings, turning corners, grips, brakes and cable tubes. By a combination of cylinders and stops, Edward T. Sten adapted the hydraulic press to the raising of large and heavy buildings, the level of which was preserved, no matter what the inequalities of weight in different ends or sides.

The best system of blasting rocks under water, accessible by shafts or tunnels, was devised by A. W. Von Schmidt, and first applied by him at the Hunters' Point dry dock and Blossom Rock, in this city, though afterward used at New York without due credit to him.

The first series of connected time-pieces, driven from a central source of power, with trustworthy regularity, were the pneumatic clocks of Hermann J. Wenzel, copied in Europe, but the copyists there took the honor of the invention to themselves.

One of the most important improvements of our half century in the sawing of lumber, has been the adjustable saw-tooth, first invented by N. W. Spanning, and afterwards modified and improved in many ways. It materially increased the efficiency of saw-mills and diminished their expense. The head block for feeding the logs to the saws, the gang joist machines and the gang lathe machine of J. A. Rohh, have come into extensive use. By combining a circular saw working from below with another cutting from below, and a third from the side, D. Evans manages to convert a log 11 feet through into lumber, though neither saw can make a kerf more than three feet deep. The immense trees of our State—and logs 18 feet in diameter are handled here in the ordinary course of the lumbering business—required novel machinery for handling the logs, and John Dolbeer's steam logger moves them to the water or to the car used in transporting them to the mill. G. W. Swan's wood-slicing machine cuts logs into sheets more expeditiously and with less waste of material than the saw.

The telephone was a wonderful product of human ingenuity, but it had little influence in business until G. S. Ladd, in this city, connected the separate telephone lines in an exchange, and after the lapse of nine years the American people have more capital invested in telephone exchanges than in telegraph lines after 40 years. Mr. Ladd is also the inventor of the improved messenger box in common use, and with Stephen Field of the double electric machine, which rendered mechanical electricity available for ordinary telegraphic purposes.

Byron Jackson's horse-fork, portable derrick and threshing-machine have much reduced the expenses of harvesting grain in California; and the first successful straw-burning engine was that of H. W. Rice.

This hasty summary of the leading inventions of California omits much, explains nothing fully and is far from doing justice to the industrial genius of our State, but, unsatisfactory as it is, I challenge every other American State, even the most populous, to show a more re-

markable list within the last 35 years. It adds to the confidence with which I congratulate you on your lucky venture in becoming pioneers. I close with the remark that after looking far I have come to the conclusion that nowhere is there a community in which the people generally are more intellectual and better, or more respectful to the moral dignity of their neighbors than here, and that no other place offers to me a more enjoyable life than San Francisco.

Note.

The following are some authorities for facts mentioned in the address:

"The Life and Adventures of James W. Marshall, the Discoverer of Gold in California." By George F. Parsons, Sacramento, 1870.

"Hutchings' Magazines." San Francisco, 1857. (Containing, at page 193, Vol. II., statements of Marshall and Sutter.)

"Handbook of Mining." By John S. Hittell. San Francisco, 1862. (Containing the substance of a statement by Isaac Humphrey.)

"The Commerce and Industries of the Pacific Coast." By John S. Hittell. San Francisco, 1882. (Containing descriptions of some of the inventions mentioned.)

"Mining Industry." By James D. Hagus. Washington, 1870. (Containing history of Washos pan.)

"Hydraulic Mining in California." By A. J. Bowie, Jr., in press. (Containing a history of hydraulic mining and its processes, and much information about pipes for the conveyance of water under high pressure.)

Manufactures in San Francisco.

An Address Before the Manufacturers' Association by A. S. Hallidie.

This position of the manufacturer in San Francisco is somewhat unique. While he has a great many advantages, he likewise labors under many difficulties and disadvantages, and a careful man will consider with greater care the possible difficulties than the positive advantages of an enterprise. He knows that success is more often secured by an appreciation of difficulties existing, or that may develop, rather than a knowledge of the advantages that are visible to the eye of the common mind.

Every member of this association is familiar with the natural advantages of the location, surroundings and climate of San Francisco in respect to manufacturing, but it is possible that every member may not have considered the position of the manufacturer who has invested his means, cast his lot and taken on the harness in this city as a manufacturer or manufacturing merchant, and the conditions and circumstances that influence his enterprise in the direction of success or failure, and which are outside of his mode of managing his own affairs, with which I do not intend to deal, except so far as to assume that he does business in a business way with honesty and integrity.

In the first place let us consider how far

Our Geographical Position

Affects the manufacturer. We are situated on the margin of this great continent, 2500 miles west of the nearest manufacturing town of importance in the United States, with no greater town than our own for an equal distance to the north or south of us. At this time the only important raw materials we produce profitably are the precious metals, cereals, fruits and timber, so that it may be stated in a general way that nearly all the raw materials needed in manufacturing have to be imported. Now the importing of raw material, to be manufactured up into the finished goods is a very different thing to importing the finished goods. Raw material will not stand as high a rate of freight as the latter, but must be transported at the minimum of cost over the cheapest highway, by the most economical means. This, of course, means transportation by sea, in vessels of large capacity, propelled by favorable winds, and delivered on good wharves in a safe harbor.

It will be at once recognized that the above conditions exist here, that we possess them all, save and except that the harbor charges are not included in the minimum figure. But the distance from the great marts of the world to San Francisco by sea exceeds 15,000 miles, and the voyage occupies an average time of about 135 days by the routes now followed, the shortening of which by canal I will refer to later; hence, the manufacturer depending upon these marts for his principal supplies in the ordinary course of business, has to calculate on the lapse of seven months on an average from the time his order leaves the office to the time his goods reach him. He has no adjacent place of supply to draw from, as New York from Philadelphia or Boston or Pittsburgh, and hence has to keep a stock larger than his immediate wants require, so as to provide for the contingencies of trade; and unless his goods are shipped from important points like New York or Liverpool, doing a large business with San Francisco, he is again subject to delay in shipping.

But, on the other hand, freight rates by sea are not subject to very great fluctuations, on account of the legitimate competition existing in the sea-carrying trade, and because there can never be the concentration of interest or pooling as may be possible in the railroad interests.

Sea Routes and the Harbor.

I can conceive of nothing that San Francisco should guard with greater care and vigil-

*Continuation of address in last week's Press.

ance than her sea routes, her harbor and her water front. If her people should permit those to decay who would indeed be helpless; for, however beneficial the railroad may be, and however great a necessity it is to a commercial center like San Francisco, without the means of communication and transportation by sea she would be an absolute slave to her masters controlling the railroad system. And, again, American mercantile marine, by a combination of circumstances for which we are not to be blamed, and could not control, have been largely driven off the sea, and there remains to us only our own coasting trade; and this remains not by the laws of trade, but by the laws of Congress, for without those laws which reserve domestic commerce by sea to domestic ships, foreign ships would long since have monopolized this trade. Thus, it may be said that the ships sailing between New York and San Francisco furnish the only means of keeping up our supply of trained sailors, and any weakening of or blow at this nursery would be a national disaster eminently conspicuous in case of war; and the attempt to lessen the efficiency of this service (by compelling the withdrawal of freight, or by any other means) is unpatriotic and repulsive to the best interests of the nation.

So, in like manner, the coast routes should be maintained and encouraged—their maintenance means the maintenance of a navy, the nurturing of hardy seamen, and efficiency in seamanship, so that in time of trouble we may be better able to defend our coast that stretches over so many long miles on the Atlantic as well as the Pacific ocean.

Inland water navigation, although protected by national laws has, as a general thing, become subservient to railroad competition, and between these two interests there is an irrepressible conflict, and excepting where rivers connect important towns with the sea by deep channels, the conflict has generally resulted in favor of the railroad.

Portland and Los Angeles.

The peculiar conditions which exist to-day with respect to the trade of San Francisco with Portland on the north, and Los Angeles on the south, require some explanation, and from a manufacturer's standpoint, some consideration. The statement is about as follows: Los Angeles, 482 miles by rail or 411 by sea (including 22 miles by rail) receives its principal supplies overland from St. Louis and Chicago, 2500 miles distant, and points east of these two cities; but up to the completion of the Southern Pacific R. R., used to draw its supplies from this market. The freight charges overland for the 2500 miles from Chicago to Los Angeles being, say \$20 per ton, and for the 482 miles from San Francisco to Los Angeles \$23 per ton for the same class of goods by rail, or \$8 per ton measurement by steamer.

Portland 661 miles by sea and river navigation from San Francisco, is, by the completion of the Northern Pacific Railroad, in as easy communication with Chicago and other Eastern cities as Los Angeles, and receives the larger proportion of its supplies from these Eastern points, the rates of freight being the same as from the East to Los Angeles, or from the East to San Francisco, these three cities, Los Angeles, Portland and San Francisco, being on exactly the same footing as far as freights carried overland from the East are concerned. Portland, however, seems to have been favored by the railroad corporation in the peculiar arrangement of "reshipped" rates made by them in favor of those merchants who have imported their goods once over the lines of the company, and as a discrimination against importers by sea, or by other routes than their own. For instance, if the local rates from Portland to Cheney is \$1.50 to a reshipper it will be about .90 and so on. Now, although the steamers running from San Francisco to Portland are controlled by the same railroad company, shippers by these steamers are not entitled to reshipped rates. The San Francisco importer by rail has no advantage over the Los Angeles or Portland importer by rail. On the contrary, the Portland man has an advantage over the former, as I have just shown; but on the other hand the San Francisco importer by sea has an advantage over both, as he lands his goods directly at the wharf by large ships in a deep and safe harbor. Los Angeles having a landing, where goods have to be lightered ashore, 22 miles from that city, and Portland being situated on a branch of the Columbia river 120 miles inland from the sea, where ships of limited capacity have to cross a dangerous and difficult bar, and to be towed 120 miles against a strong current up an uncertain river and its tributary.

The Canadian Pacific Railway

Will have upon the affairs of this coast, and of this State in particular, is of course a matter of conjecture at present, but as that road is nearing completion and will probably carry passengers and freight by next May, it is evident that the policy of the Government of the Canadian Dominion, which virtually controls its management, will be decided before very long. That the road will carry passengers at a very cheap rate in order to settle up the country there can be no doubt, and also that every inducement will be extended to shippers to carry freight over that road. Arrangements for through passenger and freight rates by steamer from Europe via Canadian ports to the Pacific and way stations will be consummated, and opportunities for storage of foreign goods in Victoria, Vancouver Island, at very reasonable rates, will induce American merchants on the Pacific Coast to use that port as a storehouse. While the great body of immigrants will probably

not be content to remain in British Columbia but will move farther south, and as it is not likely the Canadian Pacific will enter into any pool or combination with the other transcontinental roads, I do not see but that the completion of that road will be of advantage to the people of the Pacific States.

For 25 years the policy of Congress has been to develop

Internal Navigation and Transportation.

To this end it has subsidized in the most liberal manner by actual money gifts and land grants, nearly all the important lines of railroads constructed in the country during that period, as well as many canals and wagon roads, and it may not be generally known that the number of acres of land certified to, or patented by the U. S. Land Department up to June 30, 1884, is as follows:

	Acres.
For aiding construction of railroads.....	47,994,044
" " " " " canals.....	1,124,073
" " " " " wagon roads.....	1,741,898
Total.....	50,860,015

While the number of acres granted by Congress for the construction of railroads, only part of which has been patented as shown above, far exceeds this: to the Pacific railroads alone being over 58,000,000 of acres.

In addition to these grants, there has been paid by the general Government in money subsidies about \$65,000,000 to aid in construction. This may be said to be an out-and-out gift; as under the Act of 1864 the first mortgage bonds held by the United States to secure these advances were practically retired by permitting preference bonds to be issued by the railroad corporations for an equal amount.

Thus if we take the net proceeds of the lands patented to the railroads, wagon roads and canals at \$2.50 per acre, it will realize \$132,925,037.50. Aided the amount paid in subsidies in money \$64,561,320 will give a total of \$197,486,357.50, or say in round figures 200,000,000 in 20 years or 10,000,000 per year.

Of course the effect of such profuse liberality on the part of Congress has been to develop energetically and rapidly the construction of wagon roads, railroads and canals, but almost exclusively in railroad construction, and consequently in distributing population throughout the country, expanding and developing enormously the resources of the nation. But this office having been performed by Congress, whether wisely or not time will determine, it is not likely that there will be any more occasion for public assistance being extended to the further development of the internal system of communication and transportation, and that the time has about arrived when such financial aid as may be needful to develop and maintain an external system of communication and transportation, will be extended by Congress in a wise and liberal manner so that American mails and American freight will be transported in American ships.

At this time we are threatened with the suspension of the American line of steamers to Australia, and the American line of steamers running between this port and foreign ports south, have refused to carry the mails because one of the officers of Government has put his own interpretation as to the intention of Congress in appropriating \$400,000 toward mail service at sea, by refusing to so appropriate it, and this in face of the fact that during the past year over \$18,000,000 were paid for carrying the mails inland, less than \$300,000 were paid for the transportation of mail by sea! The joint protest of the commercial and industrial associations of this city has been ineffectual in obtaining any remedy, and we thus are brought face to face with other difficulties in the way of extension of trade.

External Commerce.

While, as before stated, the large sum of nearly \$200,000,000 has been placed in the lap of speculation and enterprise in developing internal commerce, Congress has steadily refused any liberal assistance toward developing external commerce. And while it is the part of wisdom to strengthen and fortify our possessions so that by a complete system of rapid inter-communication and transportation we can resist foreign invasion by internal defenses and develop internal commerce, when that is fairly completed we should turn our host thoughts and our abundant means to the development of trade commerce and communication with foreign nations, and realize some of the profits that the internal commerce of the country invokes from abroad, by being carriers of our mails, passengers and freights; and by the acquisition of a mercantile marine capable of doing this, do more by the protection of American commerce on the high seas and the protection of our shores from foreign aggression.

In this connection I wish to say that one of the conditions under which such assistance should be granted is that freight rates should be limited to a certain amount per ton per mile of water traversed.

Ship-Building.

In times of commercial and industrial depression it is the duty of Congress to attempt to relieve that depression by the adoption of such measures as will stimulate industry and develop commerce. The expansion of our foreign trade has been very great, but it will be still greater if we can command the carrying trade now almost wholly controlled by foreign powers.

The impetus that would be given to almost

every branch of manufacture by the construction of a navy of merchant steamers adapted for Government use in time of war, and intended to carry the mails, passengers and freight in time of peace, would be incalculable and enduring.

The construction by private enterprise of such a navy would result from Government aid judiciously extended to external transportation, and which, while not requiring the vast amounts already expended by government in inland or internal transportation, would result equally as advantageously to the nation and supplement the great railroad enterprises of the past 25 years. And how unanswerable is this statement when we remember that the value of the railroads in the United States is 7500 millions (seven billions five hundred millions) of dollars, while the whole value of our shipping employed in the foreign trade is only 38 millions!

Manufacturer and Merchant.

The permanent benefit to the country from manufacturing does not depend upon the bare fact of manufacturing, although it carries with it the idea of employment and industry; for if the employment and industry thus understood is not remunerative to those employed as well as to the industry itself, such manufacturing had better cease, for the extraction from the laborer of the maximum of labor for the minimum of compensation results in the degradation of industry and blunts the self-respect and independence of the laborer.

As before stated the distance from San Francisco to Portland by water is 661 miles, and by steamer the freight rates are \$4 per ton, while Los Angeles is 411 miles distant from San Francisco and the freight rates are \$8 per ton, the difference being accounted for by the transportation company by charges for lighterage, \$1.50 per ton and rail for 22 miles, \$2.50 per ton, both of which are excessive.

Previous to the completion of the transcontinental railroads to these two points, all the territory now supplied from Portland and Los Angeles received its goods from San Francisco, as well as a large amount of territory which is not now supplied from either of these two points. When we consider this fact and what it involves with relation to the importer, it will be readily understood why there is a restriction of business in this city, and the mere importer cannot hope to extend the area of his transactions, except so far as they are influenced or controlled by cheap water freights.

The Manufacturer and the Merchant.

The manufacturer, however, is in a better position than the importing merchant, because if he manufactures on an average at the same cost as his Eastern competitors he will be able to sell as cheap, but until we produce or obtain the raw material consumed in manufacturing as cheaply as our competitors, there will be the difference in first cost of raw material to add to the finished article. Hence, the raw material being imported must pay the lowest freight rates, which will be, as before stated, by sailing vessel. Thus every consideration of this subject brings us back to the very great importance of keeping open our water routes, and to encourage ships to come not only with freight but for freight.

There is no doubt, with freights at say \$5 per ton on raw material, manufacturers in San Francisco should be able to send their goods over the interior railroad lines as far toward Chicago as the difference between sail freight and rail freight, that is to say, with freight from Chicago to San Francisco at \$20 per ton for 2500 miles. We may add the additional cost of the manufactured article when it exists to the transportation charges, or say, make the freight \$25 as against \$20, and there would be that proportion of difference against us in the distance we could ship toward Chicago, which would be 1111 miles against 1389 miles.

If then, with freight rates by rail the same out from San Francisco as they are in to San Francisco, the San Francisco manufacturer, on the \$1 per 100-pound classification, should profitably supply all that country included within the circle having 1111 miles for its radius, wherever there is a railroad connected with this city, and on the higher classification, or freight rates, this distance would be increased in proportion (and, in fact, in some instances, this has been done).

I cannot conceive that any other policy should guide the railroad companies whose lines run out from this city where they are left free to their own business judgment, for if it will pay to transport goods at a fixed rate for a fixed distance from New York or Chicago to San Francisco, it will also from San Francisco to New York or Chicago.

It must be admitted, however, that there is a disposition in railroad companies to go outside their legitimate business, and by their great power, and through the greed of individuals connected with such corporations, especially during construction of new lines, to ruin and build up communities and towns as the interest of the corporation or its officials may dictate (Yakima and Tacoma being illustrations on the Northern Pacific railroad), the exercise of which naturally creates an antagonism to these corporations where there should be a friendly feeling; and incites the passage, by legislatures, of laws regulating fares and freight which should be left to the laws of trade or a general national law, based upon experience and fair dealing.

Having so far considered the condition of our trade with Portland and Los Angeles as they

exist, and recognizing the fact that our relations with Portland are at present on a more satisfactory basis than with Los Angeles, let us first see if there is any

Remedy for the Los Angeles Difficulty.

The distance between San Francisco and Wilmington (Los Angeles' harbor) by sea is 392 miles. Freight is carried by steamer to Portland, 661 miles, for \$4 per ton, regular rates, or \$3 per ton, contract rates. At the latter figure, by the rule of proportion, the charge from San Francisco to Wilmington should be \$1.75 per ton. The lighterage charges from the anchorage to the wharf should not exceed 75 cents per ton, and this latter charge will be obviated when the Government improvements are completed. Then comes the short road owned by the Pacific Company, 22 miles to the city of Los Angeles, with its charge of \$2.50 per ton, which should not be over 4 cts. per ton per mile, or say 88 cents. This would bring the total charges for transporting goods from San Francisco to Los Angeles by this route, \$3.41 per ton, and competition would, without doubt, bring it down to that figure, or perhaps less. This would, in my opinion, place the San Francisco manufacturer in the Los Angeles market.

Looking again at the railroad charges from San Francisco to Los Angeles, 482 miles, if for this distance the same proportion was paid as from Chicago, the rate of freight on the 1-cent classification would be \$3.85 per ton.

Referring again to Portland, there can be no doubt as to the desirability of having direct railroad communication with that point. The Pacific Company, I have every reason to believe, have made their arrangements for the early completion of this line, and which will give them an unbroken connection from New Orleans to Portland via San Francisco of 3250 miles, and from Ogden to Portland via Sacramento of 1483 miles; but it remains to be seen how far their policy will favor San Francisco. Under a fair arrangement, it will open up a large and desirable intermediate country to the local manufacturers.

Inter-oceanic Canals.

The consideration of this subject having, I think, conclusively proved the great value of water navigation to San Francisco as it exists to-day, that conclusion naturally suggests the thought as to how far and in what manner that great marine highway can be improved and made valuable to us. It is evident that the solution of this suggestion comes in the shortening of distance and consequently time, by means of a ship canal across the American continent; and the influence the construction of such a work would have upon the manufacturing and commercial interests of this city can scarcely be exaggerated.

Whether this canal should be constructed across the isthmus at Panama or through the Nicaraguan Republic, or across the Republic of Mexico at Tehuantepec, has been the subject of much discussion. The fact of the Panama Canal having actually been commenced, gives it prominence, especially as it is under the management of such a distinguished canal engineer as De Lesseps and backed apparently by inexhaustible capital, but it is a work that necessarily will take a great deal of money and time, the difficulties being enormous and the sphere of operation comparatively restricted. On the other hand, Nicaragua seems to present a natural although longer route for a canal, and an opportunity exists for its construction by American capital and its control by American influence, that should recommend it to the American people. This may also be said of the Tehuantepec scheme, which is proposed to pass through the Republic of Mexico, and which presents some engineering peculiarities worthy of consideration. Each of these schemes has its strong advocates, and comparisons are drawn between each as to its value and practicability. I must confess, that I attach but little weight to the denunciation of Mr. Eads' ship railway, for I believe in its practicability. Yet it is better for the people of the United States to concentrate their influence in favor of but one project which shall be emphatically controlled by a national policy emanating from this country. All these projects involve very large amounts of money—Panama about \$350,000,000, Nicaragua, \$120,000,000, Tehuantepec, \$80,000,000. And the fact that one of these enterprises has already swallowed up about \$150,000,000, and probably \$500,000 have been expended in preliminary work on the others, shows the importance attached to water routes by commercial nations, and is additional evidence in favor of our guarding with jealous care the water routes now existing. What effect the completion of

No one will deny the right of the mechanic or laborer to earn more than enough to eke out a bare living. His labor should be invested as capital yielding an interest over and above the investment, so that food may be provided, rents paid, clothing bought, schooling furnished, taxes met, reasonable luxuries enjoyed, and a certain percentage set aside for a rainy day. To the careful and thrifty this should not be denied; to the thriftless and the shiftless this cannot be supplied.

Convict Labor and Corporations.

We are coming more and more to face two facts—the increasing power and influence of wealthy corporations, and the conflict of convict with free labor. The former, if misdirected, may become dangerous and antagonistic

(Concluded on page 254.)



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

Advertising Rates. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 10, 1885.

TABLE OF CONTENTS.

ILLUSTRATIONS—The Chamberlin Automatic Shot-Gun Cartridge Loader, 241. Scorpion Gopher Trap; Klappertich's Improved Fifth Wheel for Vehicles, 245.

EDITORIALS—Breech Loading Shot-Gun Ammunition; The Cable Road Boom, 241. Passing Events; Placer County Mines; The New Star in Andromeda; Scarcity of Water; The Manufacturers' Association, 244. An Improved Gopher Trap; Improved Fifth Wheel for Vehicles, Academy of Sciences; Steam Colliers, 245.

MECHANICAL PROGRESS—Safety Valves; Gas-Tight Rubber Tubes; The Use of Coal Cinder in Construction; German Shop Practice, 243.

SCIENTIFIC PROGRESS—Producing Electricity from the Oxidation of Coal; Who Invented Photography; The Commercial Production of Hydrogen; Photo Emulsions Spoiled by Thunder; Action of the Sun on the Capitol Building; Measuring the Candle Power of a Light, 243.

ENGINEERING NOTES—Cylindrical Ropes; A Tunnel Thirty Miles Long Through Solid Rock; Rendering Steel Tough; Iron Cars in India, 247.

USEFUL INFORMATION—Danger from Hot Air and Hot Steam; Matches in the Shop; A Solid Floor; Egotism in the Shop; To Render Sea Water Drinkable, 247.

GOOD HEALTH—Hope as a Remedial Measure; Something Smokers Should Heed; Burning Fastilles to Clear the Rooms of Disagreeable Odors; Growth of the Heart; Take Care of the Skin; Poisoned by a Wool Sample; The Odor of Dark and Fair People; Blood Circulation, 247.

MISCELLANEOUS—Discovery of California Gold; Manufacturers in San Francisco, 242.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 243-42.

MINING STOCK MARKET—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 252.

Business Announcements.

Paint - Paraffine Paint Co., S. F.

See Advertising Columns.

Passing Events.

The scant supply of water in the mountains is troubling some of the mill-men and miners, but the river-bed miners are profiting by it. Some quartz mills have had to shut down and will not start up till the rains come.

Lake district, in Nevada, is the scene of a gold excitement, some very rich rock having been found about 12 miles from Hawthorne.

Although Bodie is supposed to be very dull, and is dull, yet the mines have produced \$103,-865 during the past three months.

In many mining camps assessment work has already commenced, as the miners do not care to jeopardize their claims by delaying the necessary work to hold them, till the last hour.

OUR SUBSCRIBERS are reminded that the present is a very good time to renew their annual favors. The heavy expenses we have incurred this year in moving, fitting up new offices, composing end press rooms render any little pecuniary offerings in the shape of subscriptions very acceptable. The long winter evenings will be better enjoyed by all who have a clear conscience in the matter of their newspaper subscriptions. We always feel more encouraged to improve the paper when appreciation in this form is apparent.

THERE are now in progress in California fourteen railroads, with a total projected mileage of 604 miles. The most active work during the past six months has been prosecuted on the Atlantic and Pacific extension.

Placer County Mines.

Pleaser, one of the oldest of the mining counties of the State, has been coming to the front during the last few months with discoveries and developments that are attracting considerable attention among mining men, the more so, perhaps, that the prevailing impression has been not only that Placer county did not contain any mines of consequence, but that it could not. That the great system of buried river channels, blue leads and hydraulic banks that lie on the western slopes of the Sierras, rich in gold from Sierra county on the north, to Tuolumne on the south, either skipped Placer county entirely or were too barren or spotted to justify the investment of capital and working on a large scale. That the great quartz mother lodes and systems, well-defined, permanent and rich in the precious metals in Nevada and Sierra counties northward and Amador and Calaveras to the south, did not exist in Placer county: instead only shallow, narrow veins, perhaps containing an occasional rich pocket, but no great milling properties that could be worked with certainty of return to a thousand and more feet in depth. That these views are incorrect is now appearing by the irrefutable logic of accomplished facts that cannot be set aside by mere theories, arising from the failures of mismanaged mining enterprises ten years since. The placers of this county, that is, the deep buried blue gravel leads, form a very intricate system, the unity of which over large areas is just beginning to be understood by the miners. Without going into a detailed description of this blue lead system of gravels, it is sufficient to say that the workings of 30 years have practically left untouched the main great gold bearing channel, to which most of those known and worked already are only tributaries. This great channel was first struck about four years since in the Mountain Gate mine at Damascus, found to be very rich, but only workable under great disadvantages. It was next found four miles to the south in the Turkey Hill mine two miles from Michigan Bluff, the gravel rich in gold, but mined under great difficulties. The third strike and the most important is that in the Mayflower mine at Forest Hill. In this mine the prospecting work had been directed for this channel, and its discovery was not the result of accident as in the two former noted instances, but of science, faith, persistence, and not less than these, money. The mining in this mine is very expensive, but the gravel found is wonderfully rich in gold: so much so that the monthly yield of gold since the last of May, when the strike was made, has averaged over \$50,000. Within the last few days a fourth strike has been made in the Excelsior mine a mile and a half south of the Mayflower; how extensive sufficient developments have not yet been made to determine. These four discoveries have practically outlined the course of the channel for 15 miles, a greater continuous extent of unworked placer mining ground having every indication of extreme richness than is possessed by any other mining county in the State. The mining claims in the range of this channel have naturally much appreciated in value under these strikes, and in many of them active work is being done toward reaching the gravels of the golden river.

In quartz mining, as in gravel, there is also a revival based on the developments and discoveries of the last few years. Sections of the county in which the ledges have been considered barren of gold have been found to contain some most promising lodes, which are being slowly developed into mines. This is particularly the case with the Last Chance, Bald Mountain and Emigrant Gap region, where several strong veins of high grade ore have been found and opened during the past summer. In the vicinity of Auburn and Ophir also there is an increased activity, based on legitimate grounds—the discovery of large bodies of milling ore in several of the largest mines. It should be borne in mind in considering the quartz mines of this county, that the work done is hardly more than prospecting; there are only three shafts down to greater depths than 350 feet, and in the one of these three which could have the most influence on the development of a district—the St. Patrick at Ophir—the mismanagement and stock-jobbery wrecked this mine and gave the mines of Placer county a setback from which they are just beginning to

recover. There is no doubt but that honest management and scientific mining can bring Placer county close to the first in annual gold yield and dividends, instead of the seventh place it at present holds.

Scarcity of Water.

The whole State of California is this year suffering from scarcity of water. The main rivers are lower than they have been for years, and many of the smaller streams and water-courses have almost entirely dried up. One of the characteristics of the coast is the fact that many large streams are filled only in winter. Others, again, run until this fall and then dry up. But this year streams which usually run all the year are now dry. The writer recently made a trip through Sonoma and Mendocino counties, and there many of the water-courses are very low. In many instances springs that had flowed constantly since settlers could remember [had stopped running]. The larger Mendocino rivers were exceedingly low, a circumstance interfering greatly with lumber milling interests. In the interior of the State the same condition of things exists. There is comparatively little rainfall in the mountains last winter, so the supply of the springs and streams has fallen short. Many of the mining and irrigating ditches have a scant supply of water and in others it has given out altogether. This has, of course, caused the closing down of many mines. The hydraulic miners, not being allowed to work their claims, have not stored up the winter water, but allowed it to flow off from the reservoirs and this has had an effect on many streams and rivers.

The scarcity of water has affected the lighthouse department of the Government on this Coast. Facilities for supplying the different lighthouses up and down the coast with water, because of their situation, necessarily limited. An unusual amount of water is required to generate steam to keep the fog signals going. Within the past month it has been found necessary to send a water-boat to Santa Barbara, Monterey, Santa Cruz, Goat Island and Mare Island. Now a famine in water is hourly looked for at Point Reyes and Point Bonita, and should it not rain within a week or so it will be found necessary to stop the signals at both those points. Bonita depends on a creek and well for the water supply. The former is already dry and the latter almost so. An attempt will be made to hoist water from a water-boat, but as this will have to be done through a hose up a cliff 150 feet high that it will be accomplished is a matter of conjecture. Last week the signal there had been kept going constantly 140 hours—an unprecedented length of time. There is nothing strange in fog continuing for twenty-four hours, or thirty-six hours, at a stretch. Point Reyes depends solely for its water on the rain supply, there being only one other way of getting water there, and that is by laying pipes for eighteen miles from the foothills near Oleme.

During the past few days the weather has been such as to lead people hereabouts to expect rain, but it has not come. Still, as we are so far along in the season that a good rain may be expected at any time.

The New Star in Andromeda.

The newly discovered star in the nebula of Andromeda is just now a topic of interest among astronomers. A short time since Prof. Davidson described it before the Academy of Sciences and gave directions where it could be found. Since then he has made frequent observations. On Saturday last he examined the new star when the atmosphere was moderately quiet and there was no moonlight.

With a magnifying power of 100 diameters the star was quite as sharp as those near the nebula; but the nebula was apparently much brighter than at previous observations. This may be on account of the clearness of the atmosphere. Prof. Davidson thinks the star had almost exactly the same brightness it had two weeks before; it certainly was not brighter. He examined the star with eye pieces of 150, 300, 400 and 500 diameters. The object was starlike with the power of 300, but the disturbance of the atmosphere was now magnified and rendered the star also unsteady. This appearance was unsatisfactory with this higher power on this or the neighboring stars of the same magnitude.

The Manufacturers' Association.

A very important meeting of the Manufacturers' Association of California was held last week, with President A. S. Hellidie in the chair. Mr. Geo. C. Hickox, the Secretary, read a very complete report of the progress of the association since its origin in October, 1883. His reading closed with the announcement that the meeting had been called to discuss matters of vital importance to the manufacturing interests of California.

President Hallidie then read a carefully prepared and important address, which we give in full on page 242 of this number of the Press.

Patronize Home Manufacture.

T. S. Clark presented the following resolutions that were adopted:

WHEREAS, The growth and prosperity of our city and State are dependent upon the profitable employment of industrious men and women; and whereas, the retention and circulation of money on this coast are seriously retarded by the purchase and use of imported goods and articles to the detriment of similar articles manufactured here of equal quality and price, and believing that our citizens do not realize the disastrous and serious condition which thereby results both to the employer and employed, be it

Resolved, That we earnestly appeal to the thoughtful consideration of the residents and citizens of the city and State requesting that they will purchase such goods as are made here, and use their influence wherever possible to the same end, giving preference to home-made goods of equal quality and price.

Ocean Mail Service.

In regard to the ocean mail service, Isaac Hecht presented the following resolutions, which were unanimously adopted without discussion:

WHEREAS, We are threatened with a suspension of steam communication with New Zealand and Australia, and believing it cannot but be disastrous to the interests of this State and city and humiliating to the dignity of the commonwealth; and whereas, Congress at its last session appropriated \$400,000 for the transportation of our ocean mails, and, fearing if the present interpretation of the law is enforced it will cause great hardship and depression upon the industries of this coast, be it therefore

Resolved, That we respectfully and earnestly request the Honorable Postmaster-General to reconsider his decision in withdrawing the appropriation and hereby curtailing the commercial facilities with foreign countries, which the community have heretofore enjoyed and benefited by.

WHEREAS, The Government of New South Wales has appropriated \$150,000 annually for the continuance of mail service between this country and Australia, be it

Resolved, That we deem the suspension of steam communication between California and Australia as a misfortune and greatly detrimental to the interests and convenience of the people of the Pacific States.

Resolved, That it is wise, patriotic and desirable that regular and prompt delivery of mails from the United States abroad should be by American ships, and we appeal to Congress to take such steps as will accomplish this purpose.

Convict Labor.

On one of the subjects referred to in the President's address—convict labor—Mr. William T. Garratt offered the following resolutions, prefacing them with an argument against employing convicts in labor that would affect outside mechanics.

WHEREAS, There is a growing tendency on the part of State Governments through false motives of economy and without regard to the condition and rights of the workmen and women of the country, to educate, farm out and employ the convicts and criminals in the prisons in various branches of mechanics, art and manufactures in competition with and underbidding free labor,

Resolved, That we earnestly protest against such employment of convict labor and pledge ourselves to use our best effort to discourage the same.

Resolved, That we petition our Senators and Representatives in Congress to pass such laws as shall restrict and prohibit the employment of convict labor in competition with skilled labor.

Resolved, That in the opinion of the Manufacturers' Association the convicts of the State should be employed, but at such employment as will not conflict with free skilled labor.

Appended to the resolutions was the following, headed as being the sense of the committee:

"Employ the convicts in such labor as getting out granite for use in the seawall construction and paving stones for our streets; also in grading city and State property, and generally improving and beautifying such as it will not pay to have done except by convict labor. Never was there a city so important to the commercial interests of the world as San Francisco, and with the material at its door, so lacking in its enterprise regarding its facilities for commerce. With a water front of from seven to nine miles in length, all of sufficient depth for the largest ships, we have not wharves or seawall sufficient for their accommodation. We have the finest of granite surrounding our State Prison at Folsom and belonging to the State. Why not utilize the prison labor for preparing this granite for the seawall so much wanted for the accommodation of our commerce? By having this seawall there would be a large amount of property just inside of it that would be brought into the market, thereby increasing

the revenue of the State by taxation. This is only one of the things that can be done by prison labor; there are many others that might be done without interfering with skilled labor."

Mr. Gregory P. Harte, who is connected with the San Quentin prison management, was present by invitation, and gave his views on the resolutions. His remarks briefly stated, were: "There are two classes of convicts incarcerated in the penitentiaries. The first and smaller class is that of criminals who have committed assaults on persons. The other class, which is by far the largest, is composed of men who have outraged the laws of property. The causes which have brought these people to the penitentiary are numerous, but the principal cause is neglect in early education. Now, there are two reasons why prisons are established; the first, no doubt, is to punish the criminals for outraging the laws, but the other should not be overlooked. It is to reform those prisoners and make better men of them. For that purpose they are taught trades and given the habits of regular work, and when they have finished their term of imprisonment they can go out into the world and battle in an honest manner for their living. Should that resolution be endorsed and its sentiment permeate the entire State the result will be that the prisoners will cease learning how to earn a living, and when liberated will be forced back among their old associates and mode of living, sooner or later to be again imprisoned for fines similar to their first offenses. When consideration is given the little competition they prove to skilled and honest labor, I am astonished that the question should be raised as one of such great importance. In the jute factory at San Quentin, for instance, four prisoners are employed at one machine, where, at the jute factory in Oakland, one girl, receiving a salary of \$9 a week, is found efficient to run two machines. So it is in the various manufactories, and certainly the work turned out at that rate by a few hundred men cannot be claimed to enter into serious competition with the work of a State."

Arpad Haraszthy declared himself in favor of the resolutions being adopted.

W. T. Garratt answered Mr. Harte in a forcible speech. He was not in favor, he said, of spilling sympathy over a lot of convicts. They were not ignorant, as Mr. Harte claimed. Some of the smartest and cutest men were among the convicts at San Quentin. There were more convicts on being released from prison, even with a trade at their finger-ends, who made a dishonest living by working harder than an honest one. He trusted that the resolution would go forth as the unanimous sentiment of the association. The resolution was not intended for this State alone, but it was desired that manufacturers all over the United States should take up the matter. He has known of work being sent East from here, and performed by convict labor and sold in the market here in competition with that done by free men. On the other hand, we do not want our convicts idled by any means, but we do not want them to compete with us when their expenses are all paid by us. I served seven years at my trade, and did not expect to come into competition with convicts. If I figured on giving my men 40 or 50 cents a day for their work, as I might have to do if competing all the time with convicts, I should deserve a coat of tar and feathers. The object of the resolution is not to make the convict idle, but to put them at proper work which will benefit the community. Why not set them at work on the seacoast. We pay taxes for it and for them. Put them to quarrying stone for the seacoast. We can employ mechanics to lay the stone after they make it. We have no passable roads out of San Francisco; set them at work on the roads. If I can have farmed out to me 500 men from the prison, I can shut up my brass foundry on this coast, and the same in other trades. The men should work, of course. They are put there to be punished, and given severe labor to do.

Mr. Isaac Hecht had his doubts about the resolutions, after hearing Mr. Harte. Boots and shoes were the first things made at the penitentiary, but men still make a good living at that in the city. The harness and other leather work the prisoners do is so small in quantity that they do not interfere with the work of free men.

Mr. Haraszthy thought Mr. Harte had pre-

sented the benevolent side only. We have to consider that 1500 prisoners are perhaps unfortunate in having had bad parents, but there are 100,000 people outside, however, who have resisted temptation. The prisoners, by carelessness or neglect, are sympathized with. How about the others? The prisoners ought to be put at good hard work.

Upon being put to a vote the resolutions were endorsed unanimously.

The Debris Question.

Mr. Denicke introduced a resolution to the effect that the representatives of California in Congress be requested to give their urgent attention to pushing the matter of having Congress take action in the debris question in regard to the filling up of the Sacramento river with the tailings from the hydraulic mines, and if possible to secure an appropriation to dredge the river.

Congressman Morrow, who was present,

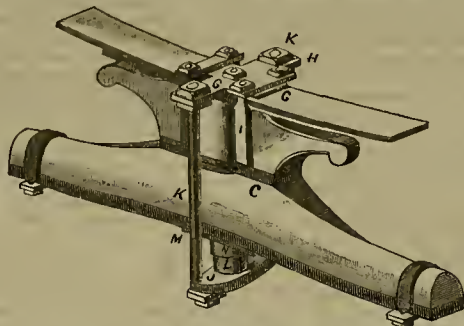
stated that the delegation would do all it could in the interest of the people of the State in the debris matter. He said, though, that there was already a \$250,000 appropriation for the purpose lying idle, as the War Department refused to handle it.

William T. Garratt desired to make a few remarks on the subject for the purpose of showing that the slickens matter had two very distinct sides. He stated that it was true that thousands of acres of land along the Sacramento and San Joaquin rivers were rendered barren by debris from the hydraulic mines, but those mines

Improved Fifth Wheel for Vehicles.

John S. Klapperich & Son, of the Grand Avenue Carriage Factory, on Grand avenue, between Ninth and Tenth, and Howard and Mission, not long since patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, fifth wheel for vehicles, which they are now successfully introducing. The main feature of the invention consists of a means for connecting the front axle and bolster, so that they can be turned about a central point, without the use of a king-bolt to extend through and weaken the axle.

By reference to the engraving the method of accomplishing this result is shown. The metal axle is secured to the wooden axle bed by clips in the usual manner. Upon the top of this bed in the center, is secured a wear-plate, C, having a short pin projecting upward from it. The bolster has a similar plate secured to it, and hav-



KLAPPERICH'S IMPROVED FIFTH WHEEL FOR VEHICLES.

ing a hole in the center, into which the pin extends, where the parts are in place together. The spring, shown in the engraving, rests upon the bolster and a plate, G, with lugs, H, projecting in front and behind, rests upon the spring and is clipped with it to the bolster by bolts, I, as shown. A plate, J, extends from front to rear beneath the center of the axle, and has rods or bolts, K, extending from it up through holes in the lugs H, of the plate G, where they are secured by nuts which screw down upon them.

The plate J has a cup L formed upon it, and another plate, M, is secured above it, beneath

FIG. 1.

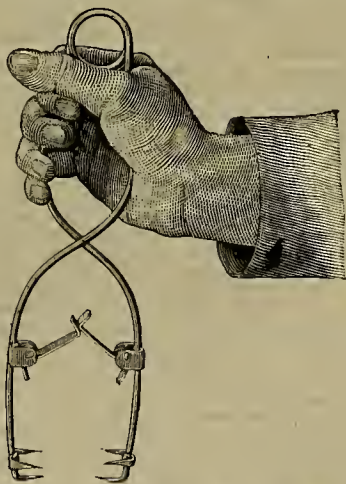


FIG. 2.



SCORPION GOPHER TRAP.

were also of great enough importance to receive some consideration. He believed the affair could be settled in an easy and quiet manner. He was of the opinion that three dredgers could be put in the Sacramento river and two in the San Joaquin and that the debris they would dig up and dump into the tule lands and along the river banks would improve one and strengthen the other against the periodical overflows with which the valleys are threatened. "Let the slickens pour out of the Feather river as fast as it may come," said the speaker; "every cubic yard of it will be worth from three to five cents."

The meeting was well attended, and there was great interest in the proceedings.

THE MECHANICS' FAIR.—Superintendent Gilmore reports that the exhibitors at the recent fair numbered 390. The largest attendance was on the last day, when 19,976 people entered the doors. The expenses were \$334.96 daily for 29 days. Out of the fair receipts \$20,000 have been paid on the mortgage on the pavilion.

An Improved Gopher Trap.

Mr. A. S. Hallidie, of this city, well known for his various inventions in the system of cable railways, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency a new and very simple form of gopher trap, which is shown in the accompanying engravings. This improvement in gopher traps consists of a pair of spring-arms having barbs or points at their outer ends, with plates or leaves having their outer ends hinged to the respective arms and their inner ends formed to meet and rest against each other to hold the arms apart. When the trap is to be used it is introduced into the gopher hole, with the barbed points opposite the other, and extending into the hole. When the animal comes out, forcing the pile of dirt before him, the pressure of the dirt against the plates forces them backwards about their hinges, thus allowing their spring arms to close and the barbs will impale the gopher.

The trap is set by simply compressing the springs by the hand as shown in Fig. 1 of the engravings. This separates the lower portions of the spring arms so that the hinged plates will drop into a straight line with each other. When the pressure on the arms is relieved, the central angular portion of these arms will come together so as to hold the arms apart, the trap being then set. Fig. 2 shows the trap set ready for use. The trap is then introduced into the gopher hole, with the barbed points standing opposite each other. When the animal comes out, forcing the pile of dirt before him, the pressure of this dirt against the plates forces them backward about their hinges, thus allowing the spring-arms to close, and the barbs or teeth will impale the animal and kill him. There is a projecting lug at the joint near the wire, and by bending this a little the adjustment of the hinge or plate can be made more or less delicate. This trap is very readily and quickly set, and is inexpensive, being made almost wholly of wire. It is made by the California Wire Works in this city.

Steam Colliers.

Most of the coal supply of this coast comes from the northern coast and abroad. California yields very little now that the Mount Diablo mines are such small producers. Oregon, Washington and British Columbia furnish us with large quantities. Of course an immense amount comes from Australia and England in the vessels which come here for wheat freights. Of late the supply from those sources has been lessened, owing to the fact that ship-charters here are unsatisfactory and there are now so many idle vessels in port. The northern coast coal, however, comes in abundance.

Formerly this coal was brought to San Francisco by sailing vessels. Old ships were used in the trade and made regular trips all the year round. A few years since five large steam colliers have been doing this work. The Oregon Improvement Company and the Pacific Improvement Company have both been running large steamers specially built for the purpose of carrying coal. It is now announced that they have not been profitable and have run behind in expense since they started. If rumor be true, the steamers will soon be taken out of this trade and sailing vessels be utilized instead, as it is said the latter can carry the cargoes for 50 per cent less than the steamers do. This looks like rather a backward step, especially when the shortness of the trip is considered.

Academy of Sciences.

At the regular meeting of the California Academy of Sciences last Monday evening, Vice-President Harkness presided. Among the interesting donations to the museum was a Gila monster from Arizona, donated by Oray Langdon. Capt. Churchill described the reptile and spoke of the conflict of opinion as to the poisonous nature of the bite. He had been bitten by it twice, and although the teeth were sharp enough to make a wound, there were no poisonous effects apparent.

Dr. Harkness called attention to an edible fungus (holitus) which is found in abundance at Berkeley and other neighboring localities. Specimens had been cooked and eaten, and found to be quite palatable.

Dr. Harkness also described, and illustrated by means of the microscope, a new fungus affecting the oaks. The early stages of this fungus is a white powdery mass, attacking and destroying the young shoots of the oak. The specimens shown were found by the doctor on Senator Stanford's grounds at Menlo Park.

A short note on the new star in Andromeda was read by the Secretary for Prof. Davidson,

MECHANICAL PROGRESS.

Safety-Valves.

It is surprising, says the *Boston Journal of Commerce*, to what an extent this important appliance is neglected in laying out, constructing and running boilers. When it is considered what its functions are in connection with the boiler, it would seem to be the point which should receive the first attention, after proper material had been selected and its proper construction specified, yet how often is it the case that elaborate specifications will be made out, calling for the best grade of steel, the highest class of workmanship, rivets of the best quality and to be put in just so longitudinal, seams to be double riveted and spaced in such a way, seams to be caulked so and so, gage cocks and water glass of the most expensive kind and of the nicest finish, connections for feed and blow to be reinforced, nozzles, dampers, lugs, front, etc., all specifically described and stipulated and modestly slipped in among the "fittings," a safety-valve of such and such a size. The builder, too often anxious to reduce his bid to the lowest notch, and not finding it specified that any particular kind or style of safety-valve is required, figures upon the cheapest arrangement which will pass under that name, and the owner gets a boiler with nickel plated and gilt edged trimmings, supposed to be of the best in every respect; but in this all-important respect of the safety-valve, it is fitted with a trap which is all the more dangerous, from its supposed superfine quality.

Do not have a boiler without a safety valve upon it; get a valve that is amply sufficient in area to clear your boiler when it is steaming its hardest; get one which is scientific in construction and honest in workmanship, so that it will not be found wanting, with the rest of the premises, when the crisis comes, and then have a cord conveniently arranged by which it can be tried at least once a day. A pop-valve will pay the increased cost in comfort, economy, and safety, but whatever description of a valve you get, pay at least as much attention to it as you do to the nickel plated trimmings upon your boiler front.

The editor of the *Locomotive*, of Hartford, Conn., writing upon the same subject, says: The safety-valve, as its name would seem to indicate, is one of the most important, if not the most important fitting that a boiler can be provided with, and it would seem that the most ordinary regard for life would be a sufficient incentive for any one who has charge, either of the construction or operation of boilers, to exercise every precaution that could be suggested or devised to keep it in good working order.

Yet this is not always the case. We frequently find, during the course of our periodic visits, the grossest violations of the simplest rules of mechanical construction and ordinary prudence, and this, too, by men of experience and recognized ability, and from whom we might expect better things.

A few of the many "outs" in the safety-valve may be mentioned here. One of the most common is the method of connecting up the escape-pipes to safety-valves, whereby they are carried into some flue; or, where there are several boilers in a battery, and consequently several safety-valves, connecting them all into the pipe, which leads sometimes into the chimney-flue, and sometimes out of doors. We should never advise connections to be made in this manner, for it will be found impossible to see when the valves leak; or, if they do leak, it is sometimes a matter of considerable difficulty to tell which ones leak, and which don't; now, under these circumstances, neglect is apt to be the rule, and the leakage goes on indefinitely.

The best way to run the escape-pipe from safety-valves is to run one from each valve independently. In most cases, these may be dispensed with altogether to great advantage, and steam allowed to blow directly into the boiler-room. If this plan is adopted, more care will be exercised by the attendant with regard to the uniformity of the steam pressure, and any leakage of valves will at once be noticed, and will be much more likely to be attended to.

We have known cases where escape-pipes from safety-valves have been run into flues passing over the tops of boilers, and the drip from leakage of the valve dropping down on top of the boiler-shell corroded the plate through in a short time, rendering a patch necessary.

The causes of leakage of safety-valves are, of course, various, but the principle is either bad design or poor construction, bad design being responsible, in the majority of cases, for too tight casings, which spring in connecting up the valves, or from unequal expansion of heat, etc. Too broad seats are a frequent source of annoyance, as it is impossible to keep them tight for any length of time, and such valves do not act with that sharpness and precision which is desirable.

GAS TIGHT RUBBER TUBES.—It is well known that illuminating gas will readily pass through ordinary rubber tubing. This often becomes a matter of great annoyance as well as loss. And now it is said that an Englishman has succeeded in making an elastic rubber tube perfectly gas tight and free from small. The tubing is made of two layers of rubber, with pure, soft tin foil vulcanized between. It is perfectly and permanently gas tight under any pressure,

and free from the slightest trace of small after long-continued use, while it retains the flexibility and elasticity of an ordinary rubber tube. The tube has been in use for some time, and has been thoroughly tested for months under continuous and heavy pressures. A rubber preparation of this kind would be of great service if used in the manufacture of the gas bags, which are of indispensable use in many gas engines.

The Use of Coal Cinder in Construction.

M. A. Louvier, an architect of Lyons, France, has sent a communication to the *Société Centrale des Architectes*, giving the result of some experiments upon the use of coal cinders in construction. The idea took its origin in the attempt by the contractors about Lyons to substitute this waste product of coal for beaten earth in their works. As they were not able to solidify it sufficiently by simply ramming, they mixed with it a little slacked lime. This was found to work very well, and arches were tried made of this material; the agglomeration took place rapidly, and this masonry, if it can so be called, presented enough cohesion to allow the uncentering of the arches within one month.

At the time the trial was made the cinder was so abundant about the various workshops of Lyons that the cost of the construction was only about one franc per cubic meter in place, but soon after, including transportation, plant and labor, it cost about five francs for the same volume. At the present time, after 13 years' trial, this method of construction has so expanded in places where economy is required that the cinder of Lyons is about exhausted, and the distance from which the material is brought has raised the price to the neighborhood of 11 francs per cubic meter.

In using this coal cinder in the foundation of workshops, warehouses, etc., the usual proportion is four parts of the cinder to one part of lime. At first an ordinary fat lime was used, but this has been replaced by hydraulic lime. But if a still greater resistance is required the proportion of lime is increased or hydraulic cement is used. In building up a wall the material is applied in beds about six inches in depth and well rammed. The walls are usually about 20 inches thick, but partition walls from 6 to 8 inches thick can be made either by ramming it between plank formers or by making it into the form of hollow bricks or flagging and then putting these together with plaster or cement. Arches in this material are made like those in beton, the only care required being to ram it tangentially and not perpendicular to the extrados of the arch; the latter action causes a tremor in the centering which has a bad effect upon the solidification of the material. The thickness of the arch will be in direct proportion to the weight to be carried.

This class of masonry, for a long time only used in structures of little importance, has within the last two or three years been adopted by the Lyons architects in works of greater pretensions, and M. Louvier has lately built with it almost the whole of the vaulting in the ground floor of the new municipal buildings at Lyons.

M. Louvier, previous to these heavy works, had made careful experiments upon which he has founded his calculations. It has been proved that fire has less injurious action upon this material than upon any other class of masonry.

German Shop Practice.

A German correspondent of the *Railroad Gazette* says: "Wood-working machinery in German shops is comparatively small in amount, owing to the great and yearly increasing use of iron in all parts. This is due to increasing cheapness of iron as compared with wood in proportion to its security. The use of wrought-iron instead of cast is very extended. I saw narrow-gauge stock building at Chemnitz and Leipsic with iron frames throughout, which had absolutely no cast iron in any part except the journal boxes. The increased use of iron is regretted by some master mechanics, on account of the great rigidity and of the consequently greater violence of shocks in train service. A surfacer, band-saw, cut-off saw, or driving planer and boring machine are the tools ordinarily found in German wood shops. Suctions for carrying shavings to the boiler-room are not used in the shops I have seen. The shavings are used, however, very extensively for firing, in combination with about nine times their weight in coal slack. This coal slack costs 84 cents per ton, delivered at the railroad. It is fired automatically with a hopper and a screw, which pushes the fuel in under the fire. It is also fired by being run from a hopper above the fire-door over a grate, inclined forward, from which it drops into the fire. The latter is raked partly back under the inclined grate, so that the fuel is well heated before joining the fire, and its smoke products pass over the front portion of the fire on their way to their flues, and are very effectually consumed. This firing method is common, I believe, to several styles of fire-box, but I do not remember to have heard before of its application to this kind of fuel, to which it is well adapted. By the use of this fuel and firing the boilers of the Chemnitz shops of the Saxon State Railway evaporate 100 pounds of water at an expense of 1.11 cents."

SCIENTIFIC PROGRESS.

Producing Electricity from the Oxidation of Coal.

The first step, it seems, has been taken in securing the heat efficiency of coal by direct process—that is, without employing any intervening substance, as water, which must be first converted into steam, at a great loss of heat, and then applied to a motor with another large percentage of loss—the two amounting to four-fifths of the entire heat efficiency of the coal consumed. Mr. J. A. Kendall, of North Ormsby, Middlesborough, England, exhibited at the recent International Inventions Exhibition an electric battery, which appears to be a decided step in the direction of producing electricity from the oxidation of coal without the intervention of a steam engine. The battery is based upon the well-known phenomenon of hydrogen passing through platinum at a red heat, two platinum plates being used as the poles, one exposed to hydrogen and the other to oxygen. These plates are arranged in the form of concentric tubes closed at one end, and are separated by a fluid medium of fused glass. Hydrogen gas is continuously supplied to the inner platinum tube, while the entire apparatus is maintained at a high temperature by means of a furnace fed with coke or liquid or gaseous fuel. The absorption of hydrogen by the platinum is accompanied by electric generation, and the current is led away by wires connected with the platinum tubes. It is curious, however, that, so long as the two platinum tubes are not connected by a metallic circuit, the passage of the hydrogen is slow, but that as soon as the electric circuit is completed, the rate of flow is suddenly increased and is steadily maintained at the higher amount. In the case of a group of cells or battery, the same gas furnace may be used to heat the series. The cells are connected for quantity and intensity as in the voltaic battery.

With the new generator, all that is required to maintain the working is a supply of fuel and a little water. The inventor estimates that a ton of coke used in heating the battery, including the hydrogen producer, will give at least three times the electrical energy that would be produced by the same quantity of coke used in working a steam-engine and dynamo. It is also hoped by the inventor to develop the new process of electric generation for lighting purposes. Houses can in this way be lighted by incandescent lamps by means of coal gas supplied to the premises; and larger centers of illumination could be economically worked by use of ordinary fuel, such as coal and coke. The invention promises to be one of much importance.

Who Invented Photography?

It has been generally taken for granted that the discovery of photography dates back only to the year 1839, when Daguerre, in France, and Talbot, in England, published the results of their investigations. It appears probable, however, that the art was discovered and practically applied by Matthew Boulton, partner of the celebrated James Watt, as long ago as the last century, and was then allowed to fall into neglect and to be forgotten. Boulton belonged to a secret scientific society, which was accustomed to meet at his house. He died in 1809, and on the subsequent examination and removal of the vast collection of documents stored in his library, there were found a number of crumpled and folded sheets of paper with pictures on them of the most puzzling kind. On smoothing out these pictures they were found to consist of copies, on large sheets of very coarse paper, of well-known designs by Kauffmann, the porous water-marked paper being thickly coated with some varnish-like substance, on the surface of which the picture had been produced. All the sheets found in the library, as well as others afterward discovered, presented the same characteristics—a glossy surface, with minute varnish-like cracks, the drawing of the figures most elaborately finished, the lights and shades so fully rendered as to give much of the effect of a mezzotint, and an invariable reversal of the position of the figures. Further research also led to the discovery of two silver metal plates, about the size of a sheet of note paper, precisely resembling in appearance those used by Daguerre in the early days of photography. On each of these plates was a faint image of Boulton's house, so unmistakably taken from nature and so evidently produced by the aid of light that experts at once pronounced them to be photographic pictures, taken directly by means of a camera. Attached to these plates was a memorandum stating that they were "sun pictures," representing the house prior to alterations made in 1791. All these facts led to the inevitable conclusion that the discoveries of Daguerre were anticipated by Boulton.

THE COMMERCIAL PRODUCTION OF HYDROGEN.—The old problem of the cheap production of hydrogen by decomposition of steam is being attempted afresh by M. M. Hembert and Henry. The process by these chemists consists essentially in passing steam, superheated to the point of dissociation, over incandescent coke. There is thus immediately produced a gaseous

mixture formed of equal volumes of hydrogen and carbonic oxide. This mixture passes into a second retort heated to a full red, into which is admitted a fresh quantity of steam at the same temperature as the former. This steam acts upon the carbonic oxide, and causes it to pass into the higher state of oxidation, that is, into carbonic acid. The volume of hydrogen produced by this second reaction goes to join that already formed; so that, when the operation is perfectly managed, 3200 cubic meters of hydrogen can be obtained from a ton of coke. The hydrogen is afterward purified with lime, to get rid of the carbonic acid; and there remains with it only a small proportion of carbonic oxide.

M. M. Hembert and Henry are now organizing a factory for the production of hydrogen by their method, and they hope to find a use for the gas for heating purposes.

Photo Emulsions Spoiled by Thunder.

The most noticeable effect of thunder upon gelatinous solutions or on emulsion is, says the *Photo. News*, to bring about a certain decomposition, which interferes more or less with the setting properties of the gelatine; and if the solution be kept, it quickly becomes putrid. In some extreme cases the emulsion refuses to set altogether; in others, where the injurious effect is less marked it does set, but tardily, and then, although the plates may turn out otherwise good, they generally fall or blister to such an extent, during the fixing and washing, as to render them next to worthless.

What is the actual effect, chemically, of thunder upon gelatinous solutions, at present is very doubtful. Whatever the effect may be, the cause is by some attributed to the presence of ozone, which usually accompanies violent electric disturbances in the atmosphere. But ozone will scarcely account for all the injurious changes wrought by thunder upon substances which are similarly affected to gelatine. For example, it is no unusual circumstance for ale which is stored in air-tight casks in underground cellars to be rendered both turbid and sour by a thunderstorm, and we have known an emulsion, while in a closed vessel, being spoiled from a similar cause. It is difficult to conceive, under these circumstances, how ozone can possibly be the cause.

Curiously enough antiseptics, which, under ordinary condition, prevent decomposition in gelatine, appear to have little or no influence in the case of thunder. It is worthy of note that thunder appears to exert little or no influence upon cold or jellied emulsions, neither has it upon concentrated solutions of gelatine, even when they are in a fluid condition. Therefore, as a piece of practical advice, we suggest that when electrical disturbances of the atmosphere are apprehended, precaution be taken that all emulsions be got into the jellied condition as quickly as possible. Also to bear in mind that it is during the emulsification, with the small proportion of gelatine, that the injury is most likely to arise.

It is a curious fact, but not the less true, that a severe storm may sometimes occur without causing the slightest inconvenience, while on another occasion, the conditions being apparently identical, a very slight one, even a single clap of thunder, will cause an immense amount of trouble. In all cases it is wise, when possible, to defer preparing emulsions, particularly on a large scale, when violent electrical disturbances of the atmosphere are anticipated.

ACTION OF THE SUN ON THE CAPITOL BUILDING.—Some time since U. S. Architect Clark suspended a plummet line from the interior of the dome of the capitol building at Washington, and it was found by actual measurement that the lead swung over a space of four and a quarter inches, making a total dip from the perpendicular of eight and a half inches. This movement involves the entire dome, and to some slight extent the entire structure, and is caused by the alternate contraction and expansion due to the action of the sun upon the material of which the building is composed. No doubt the principal part of the motion is due to the more ready expansion of the iron of which the dome is constructed; but similar experiments at Bunker Hill monument show that a structure built entirely of stone and mortar is also similarly affected by the sun's action. It has been very properly said, that by this motion the statue of the Goddess of Liberty upon the summit of the dome daily courtesies to the rising sun, and salutes him in a like manner as he sinks to rest, but without the formality of turning herself around.

MEASURING THE CANDLE POWER OF A LIGHT.—The candle power of a light may be approximately calculated by comparing the shadow cast by a rod in the light of a standard candle with the shadow cast by the light to be tested. By moving the latter toward or away from the rod a point will be reached at which the shadow cast by both lights will be of the same intensity. The intensities of the two lights are directly proportional of the squares of their distances from the shadows, i. e., suppose the light to be tested in three times the distance of the candles, its illuminating power is nine times as great.—*Electrical Engineer.*

SOLID BODIES shine in the dark, or become luminous, when heated from 600 degrees to 700 degrees F., and in daylight only when they reach a temperature of 1000 degrees,

ENGINEERING NOTES.

Cylindrical Nuts.

The substitution of cylindrical nuts for those of a square or hexagonal form has been advocated, with very good reasons as a backing. Recently an opportunity was given to see a practical illustration. A machinist had an order for a small ornamental steam engine, to be placed in the show window of a collar and spice establishment, and on it he used cylindrical nuts instead of hexagonal ones. This engine was a horizontal one, with steam chest on the top of the cylinder, and all the hold-down bolts were furnished with cylindrical nuts, through the tops of which protruded the flattened convex ends of the bolts, making a very neat finish. The bolts were three eighths of an inch diameter and the nuts three-quarters of an inch diameter; to have made them hexagonal they would have been a trifle over even-eighths of an inch from corner to corner, and if squares they would have been a full inch across corners, and neither the hexagonal nor the square nut would be any stronger than the cylindrical nut—the protruding corners give no additional strength. For a wrench he took a tool with opening jaws operated like a pair of pliers. These jaws, while slightly open, were reamed to fit the diameter of the nut, so that when closed on the nut the jaws would embrace almost its entire circumference; the leverage of the handles made a very slight pressure necessary to set up the nuts. The wrench did not have a short biting jaw, like a pair of pipe tongs, which dig into the pipe at each grip, but the inside of the jaws were perfectly smooth, and left no mark on the nut in using.

Another advantage that the cylindrical nut has over the angular nut is that the wrench may get a grip in moving through the smallest arc of a circle, an advantage that will be understood by the setter-up of the machinery under difficulties. With this square nut an entire quarter turn is required before, in a confined space, the wrench can get a new hold, and with the hexagonal nut not less than one sixth of a revolution is necessary before the wrench can take a fresh grip. When the wrench handle is long and the working place is limited, these considerations are of consequence. Cylindrical nuts can be made much quicker and for less cost than either the square or many-sided nut.

A TUNNEL THIRTY MILES LONG THROUGH SOLID ROCK.—The new Croton aqueduct tunnel now under construction from Croton to Harlem river will have a maximum capacity of 320,000,000 gallons per day, and will cost, when completed, \$15,000,000. The aqueduct will be a tunnel blasted through nearly thirty miles of solid rock, and lined throughout with cement and three layers of brick masonry. The contracts for this enormous undertaking were let on December 13, 1884, and the work is now under full headway, and to be completed within 33 months from the date of beginning. No less than 6000 men are toiling underground on this great work. On the whole line there are 26 shafts. The sub-contractors are under agreement to tunnel out the rock in their respective sections at so much a yard and to build the brick and stone waterway inside of it at set prices. At the bottom of each shaft the miners work in two directions, so that while one set of men is drilling southward there is a set of men in another shaft working northward to meet them. These shafts are about a mile apart, and yet so delicate and accurate are the plans of the engineers that in no case, they declare, will the line of the tunnel be more than an inch out of the way when the miners in the different tunnels meet each other underground.

RENDERING STEEL TOUGH.—Further tests of the new French treatment of steel for rendering it tough appear to confirm its value, imparting also to it a fineness of grain, an increased hardness, and a notable accession of strength to withstand rupture, this effect being most marked in the case of highly carbonated steel, and in this respect the metal is made to resemble tempered steel, without being in all points identical with it. The cause of this alteration in physical condition is attributed to the rapid heating and no less rapid cooling of the metal; that is, when the red-hot steel is first strongly compressed, which is the peculiar feature of this process, the conversion of the mechanical energy into heat serves to raise the temperature of the entire mass, at the same time that the particles of the metal are more closely cemented together. This effect is followed by a rapid cooling due to the contact of the plates of the hydraulic press with the surfaces of the metal, and the very close pressure very materially increases this conducting effect of the cold metal.

IRON CARS IN INDIA.—India seems to be taking the initiative in introducing iron cars. For several years the Government of India has been purchasing iron cars for freight business on Indian railways. Cars of this material are said to give entire satisfaction in service. Contracts were recently closed for the construction of 60 iron box cars and ten flat cars of the same material. All these cars are to be 25 feet long, and will be built in the American style, with center-bearing trucks and center coupling. The frame will be made of channel-iron steel, and the transoms of the trucks will be steel. The floor, sides and roof of the cars are made of sheet-iron riveted to angle irons.

USEFUL INFORMATION.

Danger from Hot Air and Hot Steam.

At a discussion on the spontaneous combustion of wood before the French Academy in 1879, M. Cosson described an accident which had occurred in his laboratory a few days before. While the narrator was working in his laboratory, a portion of the boarding of the floor spontaneously took fire. The boards were in the vicinity of an air hole, fed with warm air from a stove four metres (13.12 ft.) away on the floor below.

A similar accident had occurred two years ago, and in consequence M. Cosson had the boards adjoining the air-hole replaced by a slab of marble. The boards which now ignited adjoined the marble. The heat to which the boards were subjected was, however, very moderate, being only that of air at 77° F.; still the boards slowly carbonized and being thus rendered extremely porous, a rapid absorption of the oxygen of the atmosphere had resulted, and sufficient heat was thereupon produced to originate combustion. The danger thus disclosed, said M. Cosson, is one to which the attention of builders ought to be directed. In the instance in question, M. Cosson was able to extinguish the fire with a little water, as he was present and witnessed its beginning; but had it occurred at night, during his absence, it would undoubtedly have completed its work of destruction. M. Faye stated that at Passy, a few days before, a similar case of spontaneous fire, due to the action of the warmth from the air-hole of a stove upon the woodwork, had occurred at the house of one of his friends. The boards in these special cases may have been peculiarly subject to carbonization (it is not stated what they were). The case is of sufficient interest to push the examination still further.

The Journal of the Franklin Institute relates an experiment illustrating the effects of superheated steam in causing spontaneous combustion, which was once tried as follows: Steam was taken from an ordinary boiler through a pipe 40 feet long; 10 feet from the farther end a collar of wood was fitted closely to the pipe; 10 feet from the boiler a lighted kerosene lamp was placed under the pipe. In ten minutes the wooden collar was on fire. The Institute of Technology, at Boston, long ago decided upon the danger of steam pipes passing through and in contact with wood. It was shown that the wood, by being constantly heated, assumes the condition to a greater or less degree of fine charcoal, a condition highly favorable to spontaneous combustion. Steam was generated in an ordinary boiler, and was conveyed therefrom in pipes, which passed through a furnace, and thence into retorts for distilling petroleum. Here the pipes formed extensive coils, and then passed out, terminating at a valve outside the building. To prevent the steam when blowing off from disintegrating the mortar in an opposite wall, some boards were set up to receive the force of the discharge, and as often as the superheated steam was blown, the boards were set on fire.

MATCHES IN THE SHOP.—Matches are apt to be used carelessly in the shop, especially when they have to light up to finish out the day. Then smokers will be careless with matches even when they are not allowed to smoke in the shop. The boys will carry matches in the vest pocket. When so carried they are very apt to work out and fall into the shavings. A very good way, if matches must be used, is to buy the kind that will ignite only when rubbed upon the box which contains them. They are sold in little boxes having a sliding cover which extends entirely around the inner box. Get out a piece of wood which will slide into the cover one inch; then while in this position nail against the wall. It makes a neat little matchbox, and they may be put up at every gas burner. Every wood-working establishment is bound to burn up sooner or later. It seems to be their natural end, and they take to fire as naturally as a boy to a molasses hoghead. Some of them ought to burn; it is all they are fit for and that is all some owners keep them insured for. The other day a planing mill in Boston got on fire and burned up the watchman. It is generally customary for the watchman to wake up in time to give the alarm, but there seems to be an exception to every rule nowadays.

A SOLID FLOOR.—A friend of this writer once worked in a shop where they used to sweep the iron turnings under the floor. This sills and floor timbers were within six inches of the ground, and the dirt-boards through the floor soon got filled up. A new plank would be started up, and as the space beneath it got filled, still another one would be utilized. As time went on the space beneath the floor got all filled up solid. When the floor rotted out the iron filling was as hard as rock. New floor timbers were put in place of the old ones, but they had to be made smaller in order to get them into the holes. Cement was run in between the new timbers, the new floor laid, and no machine shop in the world has a better foundation. It was just simply "solid." The chips and turnings can't well be spared this year for such a purpose, for the greatest possible economy must be exercised in the present state of business depression. They must all go for the present to the cupola, because they will come out again as good as new and effect a material saving of stock.

Egotism in the Shop.

The opinionated man is likely to be a disturbing force wherever he may be placed, but nowhere is his more objectionable than in the factory or the shop. There he is a bar to progress, a foe to improvement, unless perchance the progress or improvement lies in the direction of his own inclination or belief. Every man is entitled to a wholesome respect for his own opinions, but it is stating a self-evident fact to say that no man should consider that he is master of all information on any one given subject. A machinist may be a most excellent workman, and yet there are those who can tell him many things about his work that he never thought of before. An inventor may be very ingenious and have a very fertile brain, but it is not unlikely that he could find men "within a stone's throw" who could offer him suggestions that would materially aid in perfecting his invention.

It is wonderful how little success will satisfy a man. As soon as certain mechanics are enabled to accomplish a portion of their work with reasonable skill, they at once conceive the erroneous idea that they have nothing more to learn, and assume by this very attitude that they are masters of their art. Upon observing such workmen we are forcibly impressed with the belief that "a little learning is a dangerous thing."

But if egotism is deleterious in the workman, how much more is it so in the manager of an establishment. If the workman is old foggy he need not necessarily impart his antiquated notions to his collaborators, but if the head of the establishment is such, the whole institution will be more or less influenced by his peculiarities.

The machine shop is a bad place for a man possessing an inordinate bump of self-esteem. He, like the hull in the china shop, is likely to do a great deal of harm. A machinist, above all others, should be a man of enterprise and of broad comprehension. He should be a many-sided man, with a keen observation and a power to grasp new ideas and make them valuable to himself. But when the machinist is a man of one idea, he is likely to stand in his own light and to bar the progress of others who depend upon his judgment.

TO RENDER SEA WATER DRINKABLE.—Thos. Kay, of Stokeport, England, has devised a process for making sea water drinkable. His process is to remove the chlorides by the use of citrate of silver. One ounce of citrate of silver will make half a pint of sea water drinkable. He proposes that bottles of citrate of silver be placed in the life boats of ships.

GOOD HEALTH.

Hope as a Remedial Measure.

It is perfectly useless for us to attempt to portray the influence that "hope" exerts upon mankind. It is a proverbial fact that a man without hope in the fight for life is already half whipped. The sick man without hope is desperately ill, indeed, however slight his physical ailment may be. It is equally as true that there is a very slight chance for the undertaker to be benefited in the case of a patient who has no disposition or idea of dying. The whole system, digestive, circulatory and nervous, is directly under the influence of the mind; and if we will ever bear this in mind in treating our cases, we will often have a more potent remedy, easy of administration and more pleasant to give and take than anything found in the country doctor's saddle bags or upon the shelves of our metropolitan pharmacists. Bad news, grief, or sudden disappointment has been known to reduce the circulation to a minimum, to cause a strong man to become as helpless as a child, and to arrest the process of digestion and assimilation as suddenly as if the patient's throat had been cut. Just the reverse of this may be observed under the influence of pleasant emotions and the life-giving power of bright, beaver-born hope. Never enter a sick room unless your countenance, manner and words are such to cheer and comfort the patient. However slight their hope may be, make use of that little, encourage and stimulate them to exercise that fortitude coupled with reasonable hope which has tided and will tide many a patient over dangerous shoals where medicine would have been utterly ineffective. With castor oil, turpentine and cheerful hearts, physicians can do a power of good and very little harm.

SOMETHING SMOKERS SHOULD HEED.—"I have been a physician," says an English contemporary, "stop a surgical operation and light a cigar, and I have seen the same cigar used in lighting other cigars. A brass finisher, on his way home from work, borrows your cigar. He returns it to you with a small quantity of brass dust adhering to it. This dust works itself into your mouth, which is a trifle sore already. The consequence is that your mouth is poisoned, and it may take months to repair the evil. A friend of mine cut his finger the other day. Before the cut had healed some sort of poison was deposited in it. The hand became stiff and swollen, and finally began to puff up as though it were inflated with air. He came to me, and after I had prescribed for him, we left my office together. I had just lighted a fresh cigar. In the street my friend asked me for a light. I handed him my cigar. When he returned it to

me I threw it away, and drawing a fresh cigar from my pocket, lighted it with a match. My friend looked at me in astonishment, and said he was sorry I considered it necessary to throw my cigar away. I told him I did that to show him that he had no more right to handle my cigar with his injured hand than a leper has to kiss a healthy baby. Of course he saw what it meant right off, and was always very careful after that. If I had acted as a great many men and women would consider it right to act, he would have gone around hauling cigars promiscuously, and perhaps have caused a great deal of trouble."

BURNING PASTILLES TO CLEAR THE ROOMS OF DISAGREEABLE ODORS.—The agreeable fashion of burning pastilles and fragrant herbs in rooms that are apt to grow "stuffy" in damp weather is almost a substitute for a fire on the hearth, which purifies and cheers the whole house. Ever since the mania for Japanese decoration came in there has been a demand for the delicious pastilles or "reeds," which are the condensation of Eastern fragrance, and their use brought about a greater love for aromatic odors of a refined and purifying nature. The subtle sweetness, permeating articles that come from China or Japan will last for years, and affect the atmosphere, not only of the room they are in, but of the entire house. There is not a Rimmel nor a Lubin in Europe that can produce this intoxicating, and, if one may say, high-bred perfume from the Orient, try as he may. A bunch of Japanese pastilles, mouldering one at a time in a little incense burner, will last several weeks, while for olfactories disliking any perfume, however delicate, a bit of gum camphor or little stack of pine needles produces a most refreshing odor while burning. Pine needles can be gathered by the bushel and kept all winter, to be thrown on coal fires in city houses.

GROWTH OF THE HEART.—Dr. Boeckx, of Marburg, communicates his observations on the growth of the human heart, the fact appearing that the increase is greatest and most rapid during the first and second years of life, its bulk at the end of the second year being exactly double what it originally was. Between the second and seventh years it is again almost doubled. A slower rate of growth now sets in, until about the fifteenth year, the augmentation of volume during this intervening seven or eight years being only about two-thirds. In the period of maturity which now approaches the growth of the heart again makes progress, the increase keeping pace with the advance toward maturity of the other portions of the system. After the twentieth year up to the fiftieth, the annual growth is about .061 of a cubic inch, the increase ceasing with the fiftieth year, a slight diminution then ensuing. In childhood the male and female heart are alike; after maturity the male heart develops more than that of the female, and the difference of one and a half to two cubic inches thus established is said to be maintained throughout the remainder of life.

TAKE CARE OF THE SKIN.—Many people are invalids, and large numbers will become invalids, for the want of paying the most ordinary attention to the requirements of the skin. This membrane is too often regarded as a covering only, instead of a complicated piece of machinery, scarcely second in texture and sensitiveness to the ear and the eye. Many treat the skin with as little reference to its proper functions as if it were nothing better than a bag for their bones. But this inconsideration for the skin is the cause of a very large proportion of the diseases in this world. When we remember that, even in a state of rest, an insensible perspiration carries from the body almost double as large an amount of fluid as is done by the lungs, and which is, of course, turned back upon the system as a poison, when the delicate little openings of the skin are stopped, we can begin to understand that health must depend, to a large extent, upon this exhalation through the skin, and it proves to us the vital importance of frequent and thorough ablutions of the whole body.

POISONED BY A WOOL SAMPLE.—A remarkable case of poisoning occurred at Nuttschein, Germany, in January last. Mr. Perl, a carpet manufacturer, was taken ill from a swelling of the upper lip, which he attributed to a cold. The next day symptoms made their appearance, which were recognized as symptoms of a splenic disease by his physician. This disease is very contagious, and is frequently found with animals, especially sheep. Mr. Perl said he had received a wool sample, on which he smelled several times, after which he felt a burning sensation under the nose. There was no doubt the wool came from a diseased sheep, and that the poison was taken up through the skin being affected with a cold. Mr. Perl died two days afterward in great pain.

THE ODOR OF DARK AND FAIR PEOPLE.—The cutaneous exhalation of Alexander the Great, according to Plutarch, had an odor of violets. A smell of prussic acid is said to be given off by dark-complexioned individuals, while blondes are said to smell slightly of muck.

BLOOD CIRCULATION.—A medical authority gives the time taken by the blood of a dog in making the entire circuit of the body as 17½ seconds, during which the heart makes 51½ pulsations.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

QUARTZ.—Amador *Sentinel*, Sept. 30: Capt. Glenn & Co. are said to have a very good quartz prospect in the Rancheria region. The Gillick mine, Volcano, is said to be a fine development. The ledge is of considerable extent and the ore of exceeding richness. Work at the Tellurium mine, near Pine Grove, is progressing as rapidly as it can be done. The hoisting machinery has been repaired and put in good running order. There is talk of starting up the Downs mine, of Volcano, again. A good many thousand dollars have in the past been taken from this mine, and it does seem as though there should be more gold there yet. The tunnel of the Mammoth mine is being pushed ahead at the rate of five feet a day and is now in 2500 feet. It is now in several hundred feet beyond the point immediately under the shaft, which fact would indicate the determination to tap by its means other mines nearer Jackson, possibly coming as far as the Moore. No attempt has yet been made to drift for the Mammoth ledge, but we understand that that work will shortly be commenced. Crushing at the Amador Queen mine has been going on with more or less regularity as the supply of water would permit. Mr. Shugert expresses himself perfectly satisfied with the result of the crushing, though is restless under the fact that he cannot get enough water to crush steadily. All available space is filled with ore, and the ledge being 30 feet wide it could be taken out with rapidity if it could only be crushed. This winter when the water supply becomes steady lively times may be expected at this mine, and its success will stimulate the development of others in the same vicinity. Mr. Skinner, a mining expert from San Francisco, has recently been prospecting around Volcano, and expresses himself as very favorably impressed with that region. He says with considerable show of confidence that good mines can be developed there, and if capital could be induced to take hold results would be obtained of sufficient value and extent to insure the permanent prosperity of the town.

THE KENNEDY MINE.—*Dispatch*, Sept. 3: It now begins to look as though the old Kennedy mine, which has been lying idle the greater part of the time for several years past, is to be started up again and worked on a large scale. On last Monday night Mr. Francis Reichling came up, in company with two other San Francisco capitalists named Belshaw and Varnum, for the purpose of making the necessary arrangements for resuming operations as soon as possible. The new company, we understand, will spend about \$35,000 in sinking, running crosscuts and getting the mine in good working order, after which they will put up a new 40-stamp mill, with all the modern improved machinery for saving gold—something like the works at the Zeile mine. When this is done there is scarcely any doubt but that the Kennedy will take its place as one of the best paying mines in the county.

El Dorado.

GRIZZLY FLAT.—*Placerville Observer*, Oct. 7: We visited this old camp recently, and found it duller than we have seen it for some years, notwithstanding the Mt. Pleasant, which has long been the mainstay of the town, was running with full force, as usual, with about 40 men on the pay-roll. Captain Smith, the superintendent, informed us that the mine did not make expenses the past two months, (though the men received their pay just the same) but the indications were favorable for a fair surplus the current month. The plant of this mine is most substantially constructed and embraces all the most approved machinery for economically and effectively working the ores and saving the bullion product. But little work was being done at the Melton mine in consequence of scarcity of water. There is some little prospecting being done in the vicinity, but we could learn of no particularly flattering results, though it was rumored that some flattering prospects had been obtained at Dogtown.

Inyo.

MAXIM MILL.—*Inyo Register*, Oct. 1: John Alexander ran this mill last week on a lot of gold ores from the Poleta, using plates and concentrators, and on a test lot of copper-silver ore from the Brockman mine to see how well it would concentrate. In both cases, the concentration was down to about one-fourth. The clean-up of the Poleta ore was satisfactory, it being selected ore, but the point of greatest moment was not to find out what the first-grade ore would pay, but whether, through concentrating, the mass of the ores in the mine will pay to handle. The value of this lot (both lots in fact) is yet to be determined, and if found satisfactory, a separate test of the inferior grades of the ores will be similarly made. The great issue hinges upon the latter; if through concentrating a margin for profit is shown on the general average of ores from either of these two dissimilar mines, mining here will receive a most wonderful impulse. The system has brought success elsewhere, and we are confident it will do the same here. The appearance of the copper concentrates indicates success almost to a certainty, though, as before stated, a more extended trial upon the inferior grades of the ore must be made before the matter is finally determined.

PANAMINT.—*Independent*, Oct. 2: Mr. N. G. Fairman has a gang of 17 men employed on a road between the town Panamint and the mouth of Panamint canyon, under his personal supervision. Two-thirds of the distance is now covered and it is expected that the work will be completed in about three weeks. It is Mr. Fairman's intention to put the force at work in the mine as soon as the road is completed, and also to build a mill as soon as practicable. A number of miners are at present chloriding in this district. Mr. J. C. Eddy is preparing to make a run at Snow's canyon. From the character of the ore it is expected to be very successful. Messrs. Gorman & McKenzie have just completed a short run and turned out some high-grade bullion.

Mono.

BODIE CON.—*Bodie Free Press*, Oct. 5: The east crosscut 700 (Lent shaft) level is now in 61 feet; the north drift same level, is in 58 feet; the joint east

crosscut, same level, is in 18 feet. The joint upraise, 400 Mono level, is up 56 feet; north drift 400 Mono level, is in 55 feet; 37 men employed.

MONO.—The south drift 700 (Lent shaft) level is in 46 feet; east crosscut 200 level is in 22 feet. The joint upraise 400 level is up 56 feet. South drift from No. 1 winze 550 (Lent shaft) level, is in 64 feet. They find rich ore in this drift; 13 men employed.

CON. PACIFIC.—Winze No. 2 has been sunk to a depth of 10 feet; ground working fairly and vein looking as well as when first cut.

Mariposa.

THE HOPE OF MARIPOSA.—*Mariposa Gazette*, Oct. 3: On the 27th ult. the new mill of the Francis mine (rechristened the "Hope of Mariposa") was started up with appropriate ceremonies. The mill is a 10-stamp one, and is run by an engine 14" dia. and 36" stroke supplied by steam from a boiler made at the Risdon Iron Works. The stamps were run at 80 drops per minute. There are two tunnels run in on the Francis ledge, and an incline is sunk 30 feet deep on the Morrell ledge. The ore in sight is abundant and looks well. In the mine the tunnel is now ready for stoping and extracting the ore, which work will be speedily pushed by the force under Mr. Mitchell, from this time forward. The company have another mine bonded from Surveyor Gould and Jimmie Craighead, called the Moore Hill mine, located on the creek about a mile below the present works. The vein carries a honey comb quartz with free gold, and is looked forward to as being a good property.

Nevada.

DEVELOPMENTS AT THE BANNER.—*Herald*, Oct. 3: Last week a ledge varying in thickness from six to eight inches was unearthed at the old drain tunnel of the Banner mine, southeast of town about three miles. It is supposed to be the old Gillean ledge. Samples of ore shown us were good specimens of rock. Some of the pieces were filled on one side with sulphurets, which to the uninitiated looks fine, while on the reverse side large quantities of ochre are present. Some porphyry was taken from the ledge, which also contains much ochre. The development is considered good by judges who are competent to give an opinion. The company have been working a long time, and anything of this sort is hailed with much gratification. Some of the members reside in this city, Mr. Earl and Ed. Brown. The mine is known by the name of Banner, and is an extension of the old Banner, famous in former years, and out of which a mint of money was taken.

WASHINGTON DISTRICT.—*Nevada Transcript*, Oct. 1: The Spanish mine, three miles north from Washington, continues to pan out splendidly. Two Huntington mills are crushing about 75 tons of ore per day. This mine is a very peculiar formation, being apparently quartz and chrome iron decomposed and forming a substance something like pulverized bricks, in all shades, from light yellow to dark brown. It runs in parallel streaks, from an inch to six or eight feet thick, with streaks of slate of about like thickness intervening. The entire thickness of the lead is about 100 feet. All the intervening slate contains considerable gold, but as yet none of it has been milled. The company owns 4500 feet in length of the lode, and will soon put in two or three more Huntington mills. Sam. Baxter and J. D. Harroun have the first locations south of the Spanish company. Many other locations have been made in all directions from the Spanish, and some of them get good prospects. "Coon" Grissell and E. T. Worthley in working their river claim just above town, cut through a fine looking quartz vein about three feet thick. Henry Kohler, Charles Helgeson and others have some rich looking ore in their mines on Canyon creek. The Baker mine, on the south side of Yuba, opposite the mouth of Canyon creek, is yielding good ore, and to all appearances there is plenty of it. The ore is crushed at the Ocean Star mill. Between the Ocean Star and Helgesonville, less than three miles up the river, hundreds of locations have been made on both sides of the river, but no work is being done on any of them yet. The Blue Jay mine, belonging to Messrs. Peck, Campbell, Chadwick and Baugh, of Blue Tent, and Frank Young, of Nevada City, is turning out some exceedingly fine ore as they drive their tunnel. The lead in the face of the tunnel now is from 20 to 30 inches thick, with free gold showing throughout. The Cornucopia, the first mine ever located in the district, belongs to an English company. It has lately erected new hoisting and pumping machinery heavy enough to work the mine 1000 feet deep. The incline on the lode is being sunk night and day, and is now down about 100 feet with a good-looking, fair-sized lead in the bottom. The Yuba mine, the second location in the district, is one of the best mines in the county. For nearly 20 years it has been worked by various parties who contented themselves with running into the mountain side. A few years since the property was purchased by Messrs. J. B. Haggins and J. N. Webber, of San Francisco. At first they tried the tunnels in the mountains with the usual results, but finally concluded to sink below the bed of the river. At once the mine assumed a new aspect. The lead was found thicker, richer and more regular the deeper they went, and the ground became softer and more easily worked. The shaft is now more than three hundred feet below the river bed. They have added 10 new stamps to their mill this summer, making 25 in all, and contemplate erecting 25 more stamps next spring. They have an unlimited free water power. The mill is run by an overshot wheel, and the hoisting, pumping and compressor machinery is run by Pelton wheels. On the north side of the river, a little further east, is the Governor Morton G. M. Co.'s (or Champion) mine. This company has lately erected a Huntington mill and has extracted some exceedingly rich ore. There are three or four good sized lodes running parallel. East of the Champion is the Blue Bell, belonging to J. G. Fredenburr. This is a strong, well defined lead, from three to 6 feet thick, traceable for a long distance. Within the exterior boundaries there is another larger lode running parallel about 100 feet east of the Blue Bell. The Eagle Bird mine is situated on the south side of the Yuba river, and nearly south from the Governor Morton and the Blue Bell, both of which apparently run right into the Eagle Bird. The shaft on the Eagle Bird is now down over 300 feet, in as good or better ore than ever. In sinking the lead was found to be from two to ten feet thick, but the thin places were the exception, so that the average was about eight feet. The various levels averaged even more, some of them showing a lead of more than 20 feet thick. Every pound of

rock taken out is crushed at a profit. The 20 stamps and two Huntington mills are kept running night and day, crushing about 60 tons each 24 hours. Mills, hoisting works, pumps and compressors are all run by water, of which the company owns an unlimited supply. Several Pelton wheels are used. The company has lately purchased and is now putting in place a large new compressor with power to run six air drills. The one now in use being only sufficient for two drills, will be discarded. On the same side of the river, a few hundred feet east of the Eagle Bird, is the Waters mine, on which there is a Huntington mill and ample buildings; but from some unknown reason operations thereon have been suspended. Further east, up the canyon of the Yuba on either side, many more locations have been made within the last year, but from the inaccessible character of the country there has as yet been no attempt at development.

CENTRAL QUARTZ MINE.—*Grass Valley Union*: Energetic work is being done on the Central mine, on Greenhorn creek. It has been but a few weeks since the lessees commenced work, but in that time they have raised an air shaft from the tunnel 80 feet, and driven the tunnel ahead quite a distance, finding a large ledge, which has increased to 10 feet, 10 feet of which is taken out as they go. The quartz is of fair milling quality, estimated to yield from \$12 to \$14 per ton. The tunnel is to be driven ahead to a point where the backs will be about 175 feet, as shown by survey, where the vein is strong and good as demonstrated years ago by the old company, before the whole of the ground was owned by the present company. The work now being done is by two regular shifts of miners, and when the objective point is reached, as stated above, regular stoping will be commenced. The company design erecting a mill at an early day, and by the time the stamps are ready to drop there will be a large amount of quartz ready on the dump. Everything about the mine is working to excellent satisfaction, and the prospects for the future are regarded as encouraging.

Siskiyou.

KLAMATH.—*Yreka Union*, Sept. 3: Woods & Co., on Klamath river, struck bedrock last Monday and are greatly encouraged at the prospects obtained. In reaching bedrock they worked a streak of gravel which paid \$3 a day to the hand. The owners of the Kittlewood claim, on Klamath river below the mouth of Scott river, cleaned up 218 ounces last week, the result of one week's work. The company had almost decided to suspend operations for the season when pay was struck.

Plumas.

THE WEST ELIZABETH.—*Plumas National*, Oct. 3: This mine is situated about two miles northwest of the famous Plumas Eureka, and is showing a well-defined ledge that prospects well, and under the able management of Mr. Hiram Pilsen, promises to develop into a good paying property.

Sierra.

CLEAN UP.—*Sierra Tribune*, Oct. 2: A cleanup was made at the Young America mine this week, after a nineteen days' run. Manager Busch, accompanied by Superintendent Saunderson and Messrs. Casserly and Deidesheimer, Jr., brought down the bullion yesterday, which consisted of two very handsome gold bars, and another lot milled in the shape of a wedge.

A NEW ENTERPRISE.—Some twenty-five years ago a party of Mexicans discovered a quartz ledge at the head of Avalanche ravine, built an arastra thereon and worked on the vein to a depth of about twenty-five feet, and then abandoned it. Since that time the claim has remained unmolested, until last month, when Mr. Lawrence put a location upon it. He also organized a company to join him for the purpose of developing the mine. The company is comprised of twelve, among which are the following names: John Rose, Watt Hughes, D. Mitchell, R. Castagna, Joe Giurovich and others. The claim has been properly surveyed and the lines brushed out. Three men are up there working, and they have already run a tunnel in twenty feet. This tunnel, it is calculated, will reach the vein in about 120 feet, at which point it will give 200 feet of backs. The claim is located two miles east of the Keystone mine, in the Keystone district. Very fine prospects can be obtained from the rock.

FLORENCE CONSOLIDATED.—I. T. Mooney and S. R. Stephenson returned from San Francisco last week, and a day or two later were followed by a couple of gentlemen named Shepherd and Green, who came up to look into the merits of the Florence mining property. Last Sunday these parties went up to the mine, and we are pleased to state that as a result of their investigations, all the arrangements have been concluded for beginning the work of developing this really promising property at once. It is the intention to start a tunnel on the newly discovered vein at a point which will ultimately give some three hundred feet working depth. The work on the tunnel will be pushed ahead night and day this winter, and as soon as it is possible to proceed with the work next spring, a 10-stamp mill will be erected at the mine.

AMERICAN HILL.—*Mt. Messenger*, Oct. 3: Supt. Burman was down this week from American Hill, and reports the tunnel of his company in Bunker Hill 269 feet, with face of hard blasting rock. When in 300 feet it is his intention to raise for gravel, which is expected to be about 22 feet above the tunnel, and to pay at least \$6 to the carload.

FOREST CITY NOTES.—Bald Mt. Extension Co., Forest city, cleaned up for last week's work 153½ ounces. The streak of cemented gravel encountered in the Extension two weeks ago was very limited in quantity, passing away in a few days. The channel is at present 170 feet wide, all free gravel, and pays well clear across, and is still growing wider. All channels contain more or less cemented gravel in spots. The Extension company has purchased from the South Fork Co. the bed of the South Fork of Oregon creek, to be used as a tailing claim. Supt. Lawry spent several days at Columbia Hill last week making arrangements to forward the new pump for the Pliocene. B. F. Littlejohn and partner are still driving ahead on their lower tunnel to tap the old arastra ledge, located at Middle Waters. The Bald Mountain Co. expect soon to put on their full force of men.

Tuolumne.

BUCHANAN MINE.—*Cor. Union Democrat*, Oct. 3: The Buchanan is the coming mine of Tuolumne county, and ere long, when the stamps begin to

drop, the bullion shipments will furnish plenty of practical proof of the fact. About sixty white men are now employed in the mine and on the various works connected with it, besides quite a large force of Chinamen. All the lumber needed for the present having been sawed out, the sawmill has ceased operations. The flume will be finished in about two more weeks. It will be 5¼ miles in length when completed. Boarding house, blacksmith shop, office and other outbuildings have been erected, so that around the mine begins to look like a village. The ore tramway has been completed, and the only important thing yet to be put up is the mill. Work commenced on that last week and is now being pushed ahead. The boiler has already been put up. Steam power will be used to drive the machinery, as it is not possible to obtain water power. In the mine work is confined to drifting on the 600 foot level and sinking the shaft, and from what I can hear the mine is looking better every day.

ALBANY.—*Cor. Tuolumne Independent*, Sept. 3: The new Albany mine has resumed work. At present there are a few men engaged in bailing the water out of the main shaft. As soon as it is low enough to permit, active operations will commence in the mine. John Summers & Co. have recently performed assessment work on the Mammoth Sulphurets claim. The boys report a large vein of good looking rock.

STRIKE.—Hearing that Mr. R. O'Donnell, of Jamestown, had made a very rich strike, I took occasion one day of last week to visit his mine, situated in the old Sayre ranch, close to the Campo Seco road. The shaft in which he is working is about 55 feet in depth, where is found a 20-inch vein, in which gold may be plainly seen with the naked eye. The mine is worked by Mr. O'Donnell and his son, who thus far have, though working at a disadvantage, taken out about 65 tons of rock, worth (a few tons having been crushed) from \$15 to \$20 per ton.

NEVADA.

Washoe District.

HALE & NORCROSS.—*Enterprise*, Oct. 3: Work was not resumed on the lower levels quite so soon as anticipated the first of this week, and increased difficulties were found to contend with in the drift south from the deep winze on the 300 level of the Hale & Norcross, on account of the drift being run on a slight down grade for drainage purposes when the connection shall be completed with the drift coming to meet it from the Combination west drift. The debris from the south drift of the Norcross has all to be taken north to the winze and up through it to the 3000 level and thence to the Combination shaft. There remains less than 30 feet to be cut through in order to make the connection between the two sections of the drift. The main crossdrift west from the bottom of the deep winze is still in fine streaks and bunches of ore, showing signs of concentrating into a good ore body before long. Meanwhile the north lateral drift on the 3000 level is being again actively pushed ahead. It is in vein porphyry and quartz, and its face is only 160 feet from the Savage south line. The bonanza outlook in that direction has always been considered good, and when the 300 level connection is completed and the big hydraulic pump is in full working trim, ready to handle all the water that may come along, the main lateral drift north on that level will eventually be continued to the Savage.

CHOLLAR.—The north lateral drift run through into Norcross ground, to meet the drift coming south from the deep winze, is advancing along the east bordering of the ore vein, and will make connection with the other section of the drift tomorrow or next day, if not sooner. After this connection is made, and a good air circulation established, the main drift west from the Combination shaft will be driven ahead in Chollar ground, 60 feet north of the Norcross line, and be pushed through to the west wall of the lode. A lateral drift south may also be started at some eligible point for Chollar explorations.

CON. CALIFORNIA AND VIRGINIA.—The Morgan mill on Carson river, being run by steam, is being kept steadily supplied as usual with ore from the 1750 level, about 110 tons per day being extracted on company account. This ore gave average assays last week of about \$25 per ton. The surface machinery at the old Consolidated Virginia shaft is now all in complete order, and the shaft is being repaired from the 1550 level up to the 1200. Quite a number of men are also employed in opening out more ore breasts and giving better facilities for extraction when it shall be deemed advisable to resume ore and bullion production.

KENTUCK.—The regular daily yield from the old upper workings still continues, keeping the Rock Point mill, on the Carson river, steadily running. This is one of the most quietly and continuously worked mines on the Comstock. The milling never stops, and the mine never fails to keep the mill supplied.

SIERRA NEVADA.—During the past week the crosscut west on the 520 level, 1000 feet north of the shaft, has been extended 38 feet, making a total distance of 369 feet, leaving a little over 100 feet yet to go in order to reach the west wall. The face is principally in hard vein porphyry, with a slight seepage of water coming in at present.

CROWN POINT.—The repairs to the surface works are completed. A few men are employed in the mine opening up ore breasts and preparing for active ore extraction as soon as a proper increase in the Carson river shall furnish the requisite motive power for the mills. Little or nothing doing in Belcher.

OPHIR.—The drift west from the old Mexican shaft, on the 400 level, is now in over 100 feet, and appears to be getting into the old Ophir ore vein, where large quantities of fair-grade quartz were left in the early days, which it is thought can be made to pay well now for extraction and milling.

GOULD & CURRY.—Owing to other work having to be attended to, only 10 feet was added to the length of the crosscut west on the 1000 level, near the Savage line, making a total length of 422 feet. Material still in dry vein porphyry, with a little quartz and clay.

BEST & BELCHER.—West crosscut No. 2 on the 1000 level has been extended 30 feet during the week, making a total length of 442 feet. A little more quartz appears to be coming in at the face.

ALTA.—Good progress continues to be made run-

ning the crossdrift west on the 700 level. Rock hard blasting. About 250 feet further to go in order to reach the vein.

MONTICRISTO.—The new shaft is down 150 feet, with its bottom in hard, dry blasting rock. Judging from the dip of the vein, as shown in the workings hitherto, this shaft will have to be sunk about 50 feet further before intersecting it.

YELLOW JACKET.—The Brunswick mill pursues the even tenor of its way working steadily on ore from this mine, which is extracted at the rate of between 160 and 170 tons per day, from the old workings on and above the 1300 level.

UNION CONSOLIDATED.—The total length of the main lateral drift north on the 500 level is now about 700 feet. The material in the face is porphyry with streaks of quartz and clay.

MEXICAN.—The middle crosscut east on the 500 level is now in about 300 feet. Material, vein porphyry with streaks of clay and quartz, and a little water.

ANDES.—The drift west on the 175 and 375 levels are making good progress in favorable vein matter, some of the quartz met with in the lower level giving low assays.

Bernice District.

MILL REPAIRED.—*Silver State*, Aug. 21: A note from Lovelock to the *Silver State* says the Bernice mill has been thoroughly overhauled and repaired, and will be started up this week by G. W. Bothwell. W. W. Williams is making arrangements to build a new mill on the east side of Bernice Canyon.

EAGLE BIRD QUARTZ MINE.—*Grass Valley Union*, Sept. 3: The Eagle Bird quartz mine in the Washington District is situated on the south side of the Yuba river. The shaft on the mine is now over 300 feet in as good or better ore than ever. In sinking the lode was found to be from two to ten feet thick, but the thin places were the exception, so that the average was about eight feet. The various levels average even more, some of them showing a lode of more than 20 feet thick. Every pound of rock taken out is crushed at a profit. There has never been 20 tons of waste rock taken from the mine. The 20 stamps and 2 Huntington mills are kept running night and day, crushing about 60 tons each 24 hours. Mills, hoisting works, pumps and compressors are all run by water, of which the company owns an unlimited supply. Several Pelton wheels are used. The company has lately purchased and is now putting in place a large new compressor with power to run six air drills. The one now in use being only sufficient for two drills, will be discarded.

Dun Glen District.

THE AUBURN MINE.—*Silver State*, Sept. 1: Two gentlemen named Brown and Underhill, stockholders in the Auburn mine near Dun Glen, arrived here Monday and went to the mine, from which they returned yesterday and left for the East. One of them intends to return again shortly, with a view of resuming operations on the mine. The company have a 20-stamp mill, from which a tramway runs to the mine. Work was suspended on the property over two years ago in consequence of the scarcity of water at the mill, and has not been resumed since. The ore was worked exclusively for gold, and it is said that if properly managed it would pay, as it assayed from \$10 to \$22 per ton, and there are large quantities of it.

Eureka District.

ADAMS HILL.—*Eureka Sentinel*, Oct. 2: A reporter of the *Sentinel* visited Adams Hill yesterday afternoon and found some 40 miners there busy as bees. In the Morning Star mine were five men working, among them being Messrs. Faulkner and Fulton. They were hoisting waste rock at the time, but on the dump were several tons of ore ready for shipment, and they expect to again resume the extracting of ore to-day or to-morrow. In the Frazier and Molino a couple of miners, formerly of Ruby Hill, and Frank Rogers, the crack shot of the State, were hard at work. These miners made a shipment of ore last week that worked over \$700 a ton. In the Silver Lick three gangs of men were found hard at work, among them Tom Rosevear, Tommy Jacks and Giles Weller. All these miners, especially the former, have for a long time past done and are still doing very well. Alec Frazier and Joe Molino are working in the Wide West with good results. In the Marguerita Messrs. Haynes, Hall and Morrison are working and doing well. Frank E. Wittenberg and Wm. Spencer were found in the King Lear, with some good ore on the dump and more in the mine ready to be extracted. All the miners of the Hill ship now and then a number of tons of good ore, but little of which assays less than \$100 a ton. In value it works from one-half to two-thirds gold. The feeling among all employed there is good. While they are tributaries and leasers and take chances on making something, they say they prefer it to working for \$3 a day.

Lake District.

GOLD DEVELOPMENTS.—*Hawthorne Bulletin*, Oct. 1: Last Wednesday the sale of Bradley's interest in the Lapanta was completed, and Archie Farrington and Yerington & Bliss took possession. Bradley received \$35,000 for his two-thirds, and immediately made preparations to open another mine which promises even better than the one just sold. Within a few days Fox and Henry have discovered some rock which astonishes those who have been accustomed to panning out Lapanta rock, and it is the general impression that they are in the real center of the gold deposit. The district is a vast pile of limestone, containing a network of ledges of decomposed quartz, and there seems to be no boundary to the gold area. In all directions, and in the most unpromising places, prospectors are finding deposits of the precious metal, and all orthodox rules of search have been abandoned. The theory which is now popular is that the gold is where it is found, and how and why it came there is left for future consideration. A toll road has already been projected, two townships are beginning to show their pin feathers, and a stage line will soon be in operation. Lake District has many prospectors and there is room for many more, but it is not a land flowing with milk and honey. Those who expect to find gold must be prepared for a rough, difficult country. Nature does not hide her treasure in flower gardens, and those who come are warned that they will have to take everything they require with them. Water and wood must be hauled from Hawthorne. The district is an absolute desert and

the hardy men who live there earn the gold they find. Already town lots have been sold on Water street and Fountain avenue, in Lake City, and the real estate fever has taken a good start. Lake District is the center of attraction, but were it not for the wonderful discoveries there many an eye would be directed to the eastern slope of Mount Grant, where Gardener and his partners are finding quartz containing enough gold to create an excitement at any other time. There are immense quartz ledges on the mountain and they have discovered the place where the gold lies. As there are wood and water in abundance on the ground a mill or system of arrastras will probably soon be erected.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Oct. 2: Crosscut west 350-foot level advanced 19 feet, total length 236 feet.

NORTH BELLE ISLE.—Drift north 150-foot level, advanced 18 feet. No material change. No. 1 winze, 70-foot level has gained a total depth of 53 feet. The vein is small and ore low grade.

NAVAJO.—Crosscuts were extended east and west from the south drift on the 650-foot level 104 feet. There is no change worthy of note. Good progress has been made with the work at all other points.

GRAND PRIZE.—South drift on the 400-foot level has been extended 14 feet, and upraise above the 400 has been extended 14 feet. East crosscut on the 300 is in 170 feet. It has reached the foot wall—and not finding any ore there, work has been discontinued. North drift on the 200 level, east vein, has been extended 22 feet, and the south drift 20 feet. Will get through milling about the 4th inst.

ARIZONA.

STOCKTON HILL.—*Mohave county Miner*, Sept. 28: Stockton Hill has long been known as the richest mining camp in the county, and for the size of its ledges and the general average of its ores, it is probably one of the richest in the world. The ores of this camp on the hill run from \$50 to \$250 per ton, and in some instances run beyond the latter figure. If all the ore ever taken from the mines of this camp was thrown together and sampled the general average would be in the neighborhood of \$200 per ton, for every ton ever brought to the surface. The Cupel claim contains in its boundaries six parallel veins, all of which contain rich ore, and all of which will be worked in a few weeks. This property is the oldest and best known on the hill, and is owned at the present time by the wholesale liquor firm of Spruance, Stanley & Co., of San Francisco. About a year and a half ago this firm spent some \$20,000 in an attempt to develop the mine, but the management was placed in incompetent hands with the usual result, or to speak more correctly the mine was run more in the interest of the superintendent's boarding-house than that of the owners. For that \$20,000 the owners have nothing to show but a double compartment shaft 110 feet deep and a drift run on the 100-foot level about 200 feet long. After this work was completed the mine lay idle for months until Mr. J. K. Mackenzie, our well-known ex-County Recorder, leased the property for six months. He has now been working about two months and has already demonstrated that the owners have a mine in every sense of the word. In two months work Mr. Mackenzie has taken out about \$10,000 worth of ore, on which he pays a royalty of 25 per cent. His last shipment sampled a little over \$300 per ton, and he now has a full carload of this grade of ore on the way to Kingman. Another well-known claim on Stockton Hill, and one which is credited with having produced in the neighborhood of \$100,000, is the Little Chief, owned by Johnny Kennedy, who has become rich from the proceeds of the work he has done on it. At the present time the mine is being worked under three leases. At the lower end of the claim Messrs. Taggart and Peasley are having a tunnel run in to tap the lead. These gentlemen made a small shipment of ore last week from which the returns were as follows: First class ore, one ton, 568 ounces silver; second class ore, two tons, 188 ounces in silver per ton. The Moonbeam is one of the richest ore producers on the hill, and adjoins the Cupel ground. This mine has produced about \$30,000 in the last year, but at this writing nothing but development work is being done. The Dictionary and adjoining claims owned by Messrs. Labarre and Moore are situated at the foot of the hill, and are good steady ore producers. The mine which is now attracting the most attention of any in the vicinity of Stockton is the Franklin formerly owned jointly by Caldwell Wright and William Engle. These parties segregated a few weeks ago, taking the center of the main shaft as a dividing line. This shaft is down about 65 feet, and in drifting south Mr. Engle has opened up what is by far the largest body of ore ever seen on Stockton Hill. The writer measured the ore at the bottom of the drift in the presence of Messrs. Luthy, Hardy, Conkey and Engle, and found it to be over seven feet wide. A sample taken across the ore streak for five feet, on the day previous, assayed 212 ounces in silver to the ton.

NEW MILL.—*Mohave Miner*, Oct. 4: Messrs. Stevens, Osgood & Co. owners of the well-known Ida mine in the Lost Basin district have contracted for a mill and concentrators, the machinery for which was to have been delivered at Hackberry last Saturday or Sunday. The mill and concentrators are to have a capacity of about 15 tons per day. All the timbers and lumber for it has been lying on the bank of the Colorado at Scanlan's Ferry for two or three weeks past, ready to be hauled to the millsite. Messrs. Stevens & Co. have also let a heavy wood contract to W. H. Gann who has already a large force of Indians at work gathering and cutting up drift wood. They have also a large force of men at work grading roads from the millsite to the river, and also to the mines in Lost Basin, and in addition have several teams hauling lumber and supplies from Hackberry. A large boarding-house is also to be erected near the mill, the lumber for which is on the road from Hackberry. The mill is to be erected on the Gann Spring millsite in the Wallapai wash, about half a mile from the Lost Basin mines. The possibilities for a mill in this district are immense, and with careful and economical management cannot fail to be a success. On the Ida mine Messrs. Stevens & Co. have eight men at work. There is about 200 tons of high-grade ore on the dump, and a large quantity opened up in the mine ready for stopping. When the mill is completed the force of men will be increased. There is an abundance of

ore in sight in the mine to keep the mill running for an indefinite period.

COLORADO.

ELK MOUNTAIN.—*Pilot*, Oct. 1: The Gray copper mine, which is supposed to be an extension of the Sylvanite mine, is looking very well. Mr. Hough, of Cleveland, Ohio, who recently purchased an interest, had some tests made of the ore by Burlingame, of Denver. One sample ran 264 ounces, and the other sample ran 1117 ounces. Garrett Fitzgerald has shipped two carloads of ore from the Little Daisy mine to the Gunnison smelter, and the first grade we believe, netted him about \$50 per ton.

CRYSTAL CITY.—There promises to be several good mining properties worked the coming winter, and so our camp is slowly pushing to the front. The Black Queen is in splendid ore and is giving a good income at present. Mrs. Jack is superintending the working of the mine. Andy Anderson and George Jones are taking out some fine lead ore from the London, and will make a shipment soon. W. L. Kingsbury has eight feet of carbonate ore in the Lead Chief and will take out a mill-run to Gunnison for a test.

AIR DRILLS.—*Idaho Springs News*, Oct. 3: Mr. Thoe. Keith was down from Dumont Tuesday, after supplies. He will have his air drills running about the middle of next week, on the Keith tunnel properties. He reports mining matters around Dumont as looking up. Several contracts have been made to sink upon the different mines. Mr. N. G. Stirm, of Denver, operating on the U. P. R. lode, just below the Champion mine, on Bellevue mountain, has taken a lease on the Osborne & Mumm 10-stamp mill on Fall River. A flume will be constructed at once, and within ten days the mill will be pounding away on the ores of the U. P. R., which is one of the largest and strongest fissure veins in the county, for the amount of development. Since taking the property a little over a month ago, the main adit level has been driven over thirty feet, making its length on the vein something like eighty feet. This has opened up considerable stoping ground, and ore enough with what is on the dump, to keep the mill constantly employed. Mr. Stirm, has also purchased for some of his friends the McCall properties on Fall river, three very promising looking properties. Men have been put to work, and good smelting ore is being taken out. Mr. Stirm has done more work in less than two months, in the way of opening up the U. P. R., building roads and getting things in working order, than most companies have accomplished in six months.

IRWIN.—Last week Charley Julian was kept busy hauling four carloads of ore, two of which came from the Forest Queen, one from the Ruby Chief, and one from the Bullion King. The Hopewell mine is being worked under a lease by Edgar Johnson. He has flumed the creek and got the shaft comparatively dry, so that he can work. He is satisfied that he will get pay ore from the start. The shaft at the Bullion King is being rapidly sunk by Wm. Bainbridge, who has the contract for sinking 50 feet. The Ruby Chief mine is looking well and producing some rich ore.

IDAHO.

LAVA DISTRICT.—*Wood River Times*, Sept. 30: There has been quite a noticeable improvement here, both in trade and mining interests, since the sale of the Horn Silver mine was finally consummated and work commenced to develop the property and resume the shipment of ore. It seems to be the intention of the company to ship all the high-grade ore, of which there are several carloads now on the dump, that they can, during the next month or two, and then suspend all but development work, during the winter. They are now working about 25 men, but will reduce their force to 8 or 10 as soon as the ore shipments are made. Mr. Egan, the superintendent, states that there is now ore enough on and near the surface to run a 20-stamp mill a year, and that his company will direct one in the spring. Considerable work is being done by the prospectors who have located the ground adjoining and contiguous to the Horn Silver, and alleged extensions are being found on every hill and in every direction for a mile around. John Ward and son are taking out ore of a good grade, and have a fine showing on the IXL lode, which is an extension property, though not claimed as an extension of the Horn Silver. The St. Louis, a high-grade galena lode, is attracting considerable attention, having shipped several lots of ore during the summer. Shipments have been recently made from half a dozen claims on Antelope Creek, and the results generally have been quite flattering.

BULLION.—*Idaho World*, Sept. 28: Charley Magee brought down five more bars of bullion from Banner last Tuesday. We stated in last Tuesday's *World* that the Banner mine had turned out 50 bars of bullion up to that date, worth about \$60,000. The number should have 58 bars. This makes 63 bars up to date. The 63 bars are worth \$92,000—assay value. The Banner mill, with 20 stamps, commenced crushing the latter part of July, and was stopped two or three weeks last month for repairs. The mill was shut down last week so as to make a complete clean-up, and the five bars brought down Tuesday is the final lot as the result of the run commencing July 26th. Ninety-two thousand in less than a month and a-half, is immense, and comment is unnecessary. Is there a mine in Idaho that can equal the Banner? We are of the opinion that this mine has made the best record so far this season. We received a letter from Banner yesterday after the above was "set up," from a gentleman who knows the figures. He gives them the same as given above, with this addition. The \$92,000 was produced from 485 tons of ore and the stamps ran only 49 days.

NEW MEXICO.

STARTED UP.—*Silver City Enterprise*, Sept. 30: One of the Hillsboro mills started up recently and made a successful run. The other mill of the camp will soon start up with a new concentrator which is expected to save all the gold. Bob Redding is hauling a lot of ore to the concentrator this week, from Lone Mountain, which camp will furnish many tons monthly towards supplying our reduction works in the future. We learn that a strike of extraordinarily high-grade ore was made upon the Old Man mine. The extent of the ore body was not learned but it is

said to be large. A contract was made by Shufeldt & Co., of the Silver City concentrator, for 80 tons of the second grade ore from the claim of T. N. Childers & Co., of Bear mountain, this week. Much of the ore is already upon the dump of the mine and the balance can be speedily broken.

COW SPRINGS DISTRICT.—Since a market for ores has opened up in this city and Deming, this district is again coming to the front, and will make a fine record towards swelling our county's output the present year. The claim of Laswell & Maher has a large body of 25-ounce ore that is of a very desirable character, besides having a two-foot vein that, without assorting, runs \$180 per ton, on the same claim. From reports this mine is a bonanza.

NEW CONCENTRATOR.—*Socorro Bulletin*, Sept. 29: W. C. Tonkin left on Thursday evening's train for Cleveland, to attend the meeting of the Grand Tower Mining Company, called to make final arrangements to erect a 20-ton concentrator on the site of the Grand Tower mine, in the Magdalena district. The present plant will be of such a nature that its capacity can be increased as necessity or the circumstances may demand. The Grand Tower mine is well situated for exploitation, and, like all the properties in the Magdalenas, can be worked the year round, regardless of the season, which is an important and economical factor. The prosperity of Socorro is based upon these immense ore lodes, and upon just such enterprises as this, which succeed each other as rapidly as the development of our camps and the progress of our mines warrant. Mr. A. D. Coon, general manager of the M. M. & Co., is employing 20 miners in the Merritt mine; the greater number of these are exploring and developing the property in a systematic manner. This is the proper course to follow, as a claim only becomes a mine when the work performed in it realizes a profit to those who exploit it. That the Merritt mine possesses a large body of paying silver ore is beyond dispute, and is admitted by good miners.

OREGON.

QUARTZ.—*Jacksonville Times*, Oct. 2: Considerable quartz of a promising nature is being taken out of the ledges on Wagner creek. There is considerable excitement in the vicinity of Jump-off-Joe over quartz recently discovered there. Prospectors are numerous. Geo. Howard, of Applegate, was over this week, and informs us that Keaton, Klippel & Co. are busily engaged in preparing for winter and expect to make an extensive run before next summer. S. F. Chadwick is at Gallice creek looking after his mining interests in the Yank ledge. Considerable work in the way of tunneling and prospecting is going on in that section. Fred Grob has done considerable work on his ledge on the south fork of Jackson creek, and has taken out sufficient quartz to make a good working test as soon as the new mill arrives. He is now improving the road to his mine, so that the ore may be hauled out to the mill without difficulty. Work at the Gaylord Bell-Moody mine on the north fork of Jackson creek is being steadily pushed and the owners have already on the dump a considerable quantity of ore which prospects very high. We have seen the assayer's certificate of two tests of this ore, and the indications are that Bell & Moody have struck it rich.

UTAH.

THE STORMONT CO.—*Southern Utah Times*, Sept. 28: The mill is crushing an average of 40 tons per day. The stopes in the Savage and Puckeye mines are showing up well and some fine ore is being extracted.

THE CHRISTY COMPANY.—The mill will continue to crush the regular quantity of ore, as the stopes in the California, judging from their present appearance, will furnish sufficient ore until relieved by the New Shaft. The drift running north and south at the bottom of the winze 250 feet north of the working-shaft in the California, is proving that the ore goes down. The winze below the 250-foot level in the New Shaft, has reached a depth of 157 feet, and a force of miners is now engaged in cutting out a station in which will be placed a small donkey engine to hoist the ore extracted from the stopes opened up by this winze to the 250 level. These stopes will not be worked again until the engine is in place and the necessary connections made, which will be in about four weeks' time. The body of ore opened up here is immense.

OTHER NOTES.—There are a number of chloriders at work on the west side of the White Reef, and their number will be largely increased by the time the new leaching works are in operation. A force of men are employed in taking out the old machinery at the Leeds mill, to make room for the new leaching works which will occupy the building.

MARSAC MILL.—*Park Record*, Oct. 3: At the Marsac mill everything is bustle and rush. The masons will probably have completed their work in another two or three weeks. The new brick smoke-stack will be completed in about a week, and will be nearly 135 feet high. Johnny Lenzi, who has the contract for the painting, commenced that work on Thursday. The whole mill, roof and all on the outside will receive two coats of brown mineral paint, and with the force of painters he intends to employ, will take him over a month to complete the job. The mill will be a fine one when completed, and there is little doubt that by Christmas it will be in operation.

CHRISTY.—*Southern Utah Times*, Oct. 5: The Christy mill closed down on the 1st inst. and will remain idle until the 15th. While there is sufficient ore in the California and Maggie stopes to keep the mill running, the managers of the company thought it advisable to refrain from crushing until the donkey hoisting engine can be put in place in the new shaft, when both mines can be worked together.

OTHER NOTES.—Both mills were running during the past week and crushed about the usual quantity of ore. Alphin Montgomery and Barbee are at work on the old Bonanza mine, in the White Reef, and have opened up a large body of low grade ore. All the old machinery will be cleared out of the Leeds mill this week, when preparations will be made to put the new rolls and tanks in position as soon as they arrive on the ground. Two new strikes were made in the Vanderbilt within the past week. The ore streak, opened up at the bottom of the incline is over eight inches in width and is high grade. The mine looks better than it ever did before, and is without doubt a bonanza.



HERCULES SLAYING THE GIANTS.

HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretensions claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE

THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. IOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

IS SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

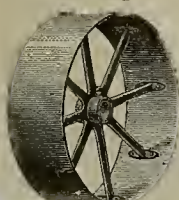
JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

THE PACIFIC COAST ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

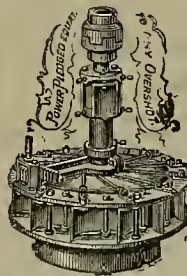
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD,

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.

E. G. DENNISTON, Prop'r.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

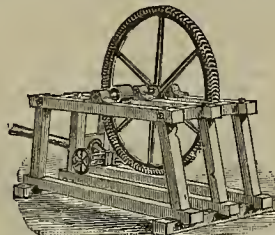
J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Sinter Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.

KNIGHT'S WATER WHEEL "ACME" DRAWING PAPERS

QUEEN & CO'S

CELEBRATED PROFILE AND CROSS SECTION PAPERS



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

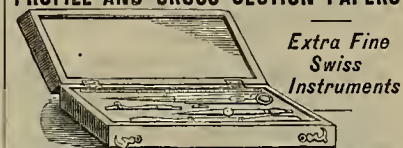
San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc. Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.



Extra Fine Swiss Instruments

QUEEN & CO'S Improved TRANSITS and LEVELS, TAPES, CHAINS, RODS, RULES, and Drawing Materials of every description. List and description of our Ten Catalogues sent on application.

JAMES W. QUEEN & CO.,

924 Chestnut St., Philadelphia.



FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco,

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrowes,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

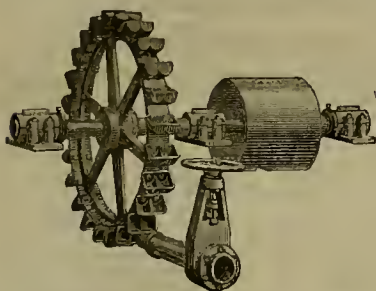
WAREHOUSE AND BRANCH OFFICE:

No. 243 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Cata-
logue. 17 and 19 Fremont St., San Francisco.

INVENTORS. MODEL MAKER,

258 Market St., N. E. cor Front, up-stairs, S. F. Experiment-
al machinery and all kinds of models, tin, copper and brass.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven M'fg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matcher Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

Lane and Bodley Saw mills.

H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

DEWEY & CO.'S

Scientific Press Patent Agency.



Inventors on the Pacific Coast will find it greatly to their advantage to consult this old
experienced, first-class Agency. We have able and trustworthy Associates and Agents in Wash-
ington and the capital cities of the principal nations of the world. In connection with our edi-
torial, scientific and Patent Law Library, and record of original cases in our office, we have
other advantages far beyond those which can be offered home inventors by other agencies. The
information accumulated through long and careful practice before the Office, and the frequent
examination of Patents already granted, for the purpose of determining the patentability of
inventions brought before us, enables us often to give advice which will save inventors the
expense of applying for Patents upon inventions which are not new. Circulars of advice sent
free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.
A. T. DEWEY. W. E. EWER. GEO. H. STRONG.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

METALLURGICAL WORKS, STRONG & CO., 10 Stevenson Street, S. F. ORES SAMPLED, TESTED, ASSAYED.

METALLURGICAL AND MINING ENGINEER,
B. SALAZAR,
ASSAYER AND CHEMIST.

ASSAYER,
H. KUSTEL,
METALLURGIST.

PACIFIC Reduction & Metallurgical Works.

SALAZAR & KUSTEL, Managers.

Location of Works: Melrose, Alameda Co., Cal.

OFFICE:

318 Pine Street (Basement), San Francisco.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials, MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Humbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. EUSTEL. H. KUSTEL.

METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my

Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical instruction given in Treating Ores by im-

proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

WM. D. JOHNSTON, ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the

most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

Manufactures in San Francisco.

(Continued from page 243.)

to the best interests of the people. The latter is, in my opinion, always dangerous, degrading and unfair to free labor, and this is aggravated when brought in contact with free skilled labor, for in the acquirement of that skill the intelligent freeman has spent the best years of his life, perhaps to find himself at last face to face with prison labor; to the maintenance of which prison and the sustenance of this very labor he has been compelled to contribute his share. I will not now enlarge on this subject this evening. It should be treated by able lips than mine, but I earnestly submit it to the attention of this association.

Local Industrial Depression.

From the foregoing perhaps the thoughtful man can draw some inferences and conclusions as to the causes of and remedies for the local and general industrial depression now existing. And whether the suggestions add anything to the common explanation of overproduction, which, while true as applied to specific things and specified periods, is not the whole truth, or to the concentration of power and wealth in fewer hands, or to the natural reaction from times of great industrial vitality and activity, I will not presume to say: but the cognate facts of dull times, reduced incomes and restricted commerce warn us to economize our expenditures by simplifying our habits, and to take advantage of dull times in business by fortifying our brain and body by reasonable activity, and while seeking for the causes of stagnation and depression in the vital and economic industries of the country, suggest, aye more, insist on the execution of remedial measures within the reach of corporation, State or General Government.

Another Process.

EDITORS PRESS:—I hear that an effort is being made to resuscitate the, so called, Mindelef, process which proved such a signal failure about ten years ago, in this city, when it was attempted to introduce it for the reduction of copper and other ores. This time it is the "Nickel ores which are to be metalized" by the magic touch of gas. The fallacy of this so-called discovery was so thoroughly exposed at that time in your paper (see 1876, pages 360 and 392) that the affair collapsed soon afterwards, and the reduction (?) works were shut up so quickly that some of the ores which had been sent there for treatment were never paid for.

San Francisco, Oct. 7th.

A VICTIM.

Mining Share Market.

Dullness continues to prevail in the mining stock market. The delay in the development of the middle Comstocks is displeasing to operators and affects the market unfavorably. When the much needed connection drift on the 3100 level of Chollar and Hale and Norcross, with that coming north from the combination west drift, is made and the drift put in good working shape, crosscutting west will be done in two or three places directly into the ore vein, when good results may be expected, judging from the good bunches and offshoots of ore cut through in skirting along the east bordering of the vein. Meanwhile the north lateral drift on the 3000 level of the Norcross from the deep winze station is again being pushed ahead in vein porphyry and quartz, and is now within 160 feet of the Savage south line. This is an important advance in favor of the Savage mine, as it penetrates directly into virgin ground, at a point where bonanza developments are believed to exist.

Bullion Shipments.

Moulton, Sept. 24, \$14,816; Alice, 28, \$21,920; Lexington, 20, \$29,080; Silver Bow, 30, \$13,872; Alice, Oct. 1, \$24,736; Moulton, 3, \$19,760; Oro Fino (Idaho), 2, \$30,967; Richmond Con., 2, \$14,571; from districts of Eastern Nevada, 2, \$34,344; Germania, Sept. 29, \$10,929; Hanauer, 29, \$7,000; Mayflower, 29, \$19,000; Honerine, 30, \$60,444; from Silver Reef, Utah, Oct. 1, \$34,433; Hanauer, 1, \$68,500; Crescent, 1, \$72,000; Queen of the Hills, 1, \$14,000; Stormont, 2, \$95,500; Hanauer, 3, \$35,000; Germania, 4, \$56,620; Ontario, 4, \$40,923. The banks of Salt Lake report the receipt for the week ending Sept. 30th, inclusive of \$83,730.49 in bullion, and \$28,243.10 in ore, a total of \$111,973.59.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLETT—Sacramento and San Joaquin.
A. G. KNOX—Nevada (State).
G. W. INALLS—Arizona.
E. L. RICHARDS—Los Angeles and San Bernardino.
R. O. HUSTON—Idaho and Montana.
GEO. McDOWELL—Tulare and Fresno Co's.
HUON ELIAS—Nevada Co.
J. DE PUE, Colusa and Butts Co's.
B. E. LLOYD, Contra Costa and Stanislaus.
J. WINKLER, Alameda Co.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Andes S M Co.	Nevada.	27.	25.	Sept. 3.	Oct. 8.	Oct. 28.	B. Burris.	309 Montgomery St.	
Benton Con M Co.	Nevada.	14.	10.	Aug. 21.	Sept. 30.	Oct. 21.	W H Watson.	302 Montgomery St.	
Blue Bluff G M Co.	California.	9.	24.	Aug. 21.	Sept. 26.	Oct. 19.	L S Adfield.	419 California St.	
Benton Con M Co.	Nevada.	14.	10.	Aug. 21.	Sept. 30.	Oct. 21.	W H Watson.	302 Montgomery St.	
Buchanan M Co.	California.	13.	15.	Aug. 21.	Sept. 23.	Oct. 16.	P J Sullivan.	121 Post St.	
California M Co.	California.	7.	15.	Aug. 21.	Sept. 30.	Oct. 21.	S Gardner.	330 Pine St.	
Eintraet Gravel M Co.	California.	15.	05.	Aug. 11.	Sept. 28.	Oct. 17.	H Kunz.	239 Sansome St.	
Eschequer M Co.	Nevada.	22.	20.	Aug. 31.	Oct. 7.	Oct. 29.	C E Elliott.	309 Montgomery St.	
Excelsior Water & M Co.	California.	8.	1.	00.	Sept. 23.	Oct. 21.	W G Stewart.	215 Sansome St.	
Giant M Co.	New Mexico.	1.	02.	Aug. 11.	Sept. 18.	Oct. 19.	S P Middleton.	116 Montgomery St.	
Golden Piece M Co.	California.	2.	30.	Aug. 31.	Oct. 5.	Oct. 27.	P Schumeyer.	309 Montgomery St.	
Holmes M Co.	Nevada.	10.	1.	00.	Sept. 23.	Nov. 2.	C T Bridge.	224 California St.	
Independence M Co.	Nevada.	15.	20.	Aug. 20.	Sept. 23.	Oct. 17.	J W Pew.	310 Pine St.	
Johnson Gravel M Co.	California.	2.	05.	Sept. 3.	Oct. 15.	Nov. 20.	G Wile.	318 Front St.	
Mexican G & S M Co.	Nevada.	32.	25.	Sept. 21.	Oct. 27.	Nov. 18.	C E Elliott.	309 Montgomery St.	
Martin White M Co.	Nevada.	22.	25.	Aug. 22.	Oct. 7.	Nov. 4.	J J Seaville.	309 Montgomery St.	
Mountain Tunnel G M Co.	California.	1.	10.	Sept. 28.	Nov. 2.	Nov. 20.	A B Paul Jr.	328 Montgomery St.	
Navajo M Co.	Nevada.	12.	30.	Aug. 31.	Oct. 5.	Oct. 27.	J W Pew.	310 Pine St.	
North Belle Isle M Co.	Nevada.	8.	10.	Aug. 20.	Sept. 24.	Oct. 15.	J W Pew.	310 Pine St.	
Ornilab M Co.	Alaska.	3.	10.	Aug. 22.	Sept. 23.	Oct. 24.	C Robinson.	339 Kearny St.	
Potosi M Co.	Nevada.	20.	40.	Sept. 23.	Nov. 4.	Nov. 25.	C E Elliott.	309 Montgomery St.	
Savage M Co.	Nevada.	64.	50.	Oct. 5.	Nov. 9.	Nov. 30.	E B Holmes.	309 Montgomery St.	
Sierra Nevada S M Co.	Nevada.	83.	25.	Sept. 30.	Nov. 4.	Nov. 24.	E L Parker.	309 Montgomery St.	
Sulphur Bank Q M Co.	California.	4.	50.	Aug. 29.	Oct. 9.	Dec. 3.	T Wittingham.	336 California St.	
Tyrolum Co.	California.	1.	50.	Sept. 15.	Nov. 13.	Dec. 15.	H J Hyla.	309 Montgomery St.	
Union Con M Co.	Nevada.	31.	50.	Sept. 14.	Oct. 19.	Nov. 9.	J M Buntington.	309 Montgomery St.	
Virginia Creek M Co.	California.	2.	10.	Sept. 11.	Oct. 16.	Nov. 6.	J M Quay.	406 Montgomery St.	
Willow Creek M Co.	Nevada.	1.	1.	00.	July 23.	Sept. 7.	Oct. 12.	R Eillon.	310 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con California M Co.	Nevada.	A W Havens.	309 Montgomery St.	Annual.	Oct. 12
Eureka Con M Co.	Nevada.	E H Wilson.	328 Montgomery St.	Annual.	Oct. 19
Mayflower Gravel M Co.	California.	J Moriozo.	328 Montgomery St.	Annual.	Oct. 19
Silver Lick M Co.	Nevada.	W Van Norden.	429 California St.	Annual.	Oct. 26
Silver West M Co.	Nevada.	F R Bunker.	623 Montgomery St.	Annual.	Oct. 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Jackson M Co.	California.	D C Bates.	328 Montgomery St.	10.	Oct 5
Kossuth M Co.	Nevada.	C K Shurtz.	328 Montgomery St.	06.	Mar 16
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept 1
McDiablo M Co.	Nevada.	R W Heath.	318 Pine St.	20.	July 30
Navajo M Co.	Nevada.	J W Pew.	310 Pine St.	25.	Feb 13
Plymouth Con M Co.	Arizona.	J Nash.	328 Montgomery St.	50.	Apr 6
Silver King M Co.	Nevada.	J Stadfield Jr.	419 California St.	10.	Sept 8

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.	Red Bluff.	Sacramento.	S. Francisco.	Los Angeles.	San Diego.
Sept. 30-Oct. 7	Rain.	Rain.	Rain.	Rain.	Rain.	Rain.
Thursday.....	.00 72 NW Cl.	.00 87 NW Cl.	.00 85 NW Cl.	.00 70 NW Cl.	.00 83 W Cl.	.00 73 S Cl.
Friday.....	.00 69 NW Cl.	.00 92 N Cl.	.00 86 NW Cl.	.00 74 NW Cl.	.00 93 W Cl.	.00 77 NW Cl.
Saturday.....	.00 72 NW Cl.	.00 88 E Cl.	.00 90 S Cl.	.00 69 SW Fr.	.00 96 NW Cl.	.00 78 NW Cl.
Sunday.....	.00 68 NW Cl.	.00 87 NE Fr.	.00 87 NW Cy.	.00 85 SW Fr.	.00 37 SW Cl.	.00 74 NW Cl.
Monday.....	.00 70 NW Cl.	.00 81 S Cl.	.00 75 S Cy.	.00 60 W Cy.	.00 84 SW Fr.	.00 74 W Cl.
Tuesday.....	.00 70 NW Cl.	.00 86 NE Hy.	.00 87 W Cl.	.00 59 W Cy.	.00 73 W Cl.	.00 71 NW Cl.
Wednesday.....	.00 73 NW Cl.	.00 74 S Cl.	.00 74 S Fr.	.00 62 SE Cy.	.00 75 W Cl.	.00 70 W Cl.
Totals.....	.00.....	.00.....	.00.....	.00.....	.00.....	.00.....

EXPLANATION.—Cl for clear; Cy, cloudy; Fr, fair; Hy, foggy; — indicates too small to measure. Temperature and wind at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 17.	WEEK ENDING Sept. 24.	WEEK ENDING Oct. 1.	WEEK ENDING Oct. 8.
Alphas.....	.70	.55	.70	.70
Alta.....	.25	.35	.25	.15
Andes.....	.10	.05	.05	.05
Benton.....	1.00	.50	1.35	1.00
Belcher.....	1.60	1.85	1.60	1.35
Best & Belcher.....	.40	.45	.40	.35
Bonanza King.....	.10	.10	.10	.10
Belle Isle.....	.10	.10	.10	.10
Bodie Con.....	1.60	1.70	1.65	1.65
Beaton.....	.10	.10	.10	.10
Bodie Tunnel.....	.35	.35	.35	.35
Bulwer.....	.15	.15	.15	.15
California.....	1.55	1.75	1.55	1.30
Challenge.....	.15	.15	.15	.15
Champion.....	1.15	1.75	1.60	1.15
Chollar.....	1.00	1.15	.80	.75
Confidence.....	1.00	1.15	.80	.75
Con. Imperial.....	1.55	1.75	1.55	1.30
Con. Virginia.....	1.55	1.75	1.55	1.30
Con. Potosi.....	1.15	1.05	1.10	1.05
Crown Point.....	1.15	1.05	1.10	1.05
Day.....	4.50	4.75	4.95	4.00
Eureka Con.....	.10	.05	.05	.05
Eureka Tunnel.....	.10	.05	.05	.05
Eschequer.....	1.10	1.30	1.00	.75
Grand Prize.....	1.10	1.30	1.00	.75
Gould & Curry.....	1.10	1.30	1.00	.75
Goodshaw.....	4.40	5.75	6.00	4.30
Hale & Norcross.....	.40	.45	.40	.35
Holmes.....	.15	.15	.15	.15
Independence.....	.15	.15	.15	.15
Justice.....	.15	.15	.15	.15
Martin White.....	1.15	1.65	1.45	1.30
Mayflower.....	.30	.35	.25	.20
Mono.....	.60	.70	.55	.50
Mexican.....	.80	.85	.60	.35
Mt. Diablo.....	2.50	.10	.10	.10
Northern Belle.....	.65	.80	.75	.60
Navajo.....	.65	.80	.75	.60
North Belle Isle.....	.10	.10	.10	.10
Occidental.....	1.05	1.25	1.05	.90
Ophir.....	.30	.35	.25	.20
Overman.....	.60	.70	.55	.50
Pinal Con.....	2.00	2.50	1.85	1.65
Sage.....	1.10	1.40	1.10	.95
Seg. Belcher.....	.10	.10	.10	.10
Sierra Nevada.....	1.10	1.40	1.10	.95
Silver Hill.....	.10	.10	.10	.10
Silver King.....	.10	.10	.10	.10
Scorpion.....	.10	.10	.10	.10
Syndicate.....	.10	.10	.10	.10
Tyrolum.....	.55	.70	.55	.40
Union Con.....	.60	.75	.60	.45
Utah.....	1.00	1.95	1.90	1.75
Yellow Jacket.....	1.00	1.95	1.90	1.75

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 8.	400 Navajo.....	55¢@60¢
20 Andes.....	30¢ Mono.....	3.30
100 Alta.....	200 Ophir.....	30¢@35¢
450 B. & Belcher.....	1400 Potosi.....	20¢
270 Bodie Con.....	1500 Silver King.....	1.50
300 Con Va & Cal.....	1450 Silver King.....	6.25
400 Chollar.....	1100 Sierra Nevada.....	1.10
150 Gould & Curry.....	800 Union.....	3.50
520 Hale & Nor.....	400 Yellow Jacket.....	2.00

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes, whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucibles; Scarcification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A New Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc. Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Partic Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromite; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

The are 160 12mo. pages, with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F.

These are much needed books for miners and other practical men, by an intelligent miner, assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Redwood.—Cargo prices are at present as follows: Rough, merchantable, \$8 M ft., \$13.00; Rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 Rustic, No. 1, \$22.00; 1x6, tongued and grooved, \$21.00; 1x4, tongued and grooved, headed, \$23.00; 1x1x8, Battsens (cubic measure), \$30.00; Shingles, \$M, \$1.65.

Pine.—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 60 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T and O Flooring, 1x6, \$26.00; do do 1x6, \$28.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain T and O Flooring, 1x6, \$30.00; do do do 1x6, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., \$3.

Lumber at Retail.

Pine, Rough..... \$16.00
" " No. 2..... 13.00
" " 2 in lengths..... 13.00
" " 40 to 60 feet lengths..... 16.00
" " 50 " 60 "..... 17.00
T. & G. Flooring 1 x 6..... 26.00
" " 1 1/2 x 6..... 28.00
" " 1 x 8..... 28.00
" " No. 2..... 21.00
Vertical Grain T. & G. Flooring, 1 x 6..... 30.00
Stepping, 1 1/2 x 4..... 37.50
Furring, 1 x 2, per lineal foot..... 3
Redwood, Rough..... 17.00
" " No. 2..... 13.00
" " Surfaced..... 30.00
" " 1 x 8..... 28.00
" " T & G, 6 in, 12 ft. and over..... 28.00
" " 7 to 12 ft..... 26.00
" " under 7 ft..... 20.00
" " Rustic..... 30.00
" " No. 2..... 26.00
" " T & G, Beaded 12 ft. and over..... 30.00
" " 7 to 11 ft..... 25.00
" " under 7 ft..... 20.00
Siding, 3 in..... 26.00
Pickets, Fancy..... 15.00
" " Rough Poisted..... 14.00
" " Square..... 14.00
Battsens, 1 x 3 per lineal ft..... 02
Shingles..... 2.00
Laths, 1 1/2..... 3.25
" 1..... 3.75
Dunnage Boards less 5% delivered..... 16.00
Price subject to change without notice.

Nails.

We give the price list of the Pacific Iron and Nail Company.
Net Cash Prices, Sept. 25th.
Lots of 250 kegs or over..... \$2.75
Lots of 100 kegs or over..... 3.80
Less quantities..... 2.85

NAILS.		SLATING.	
10d to 60d.....	\$	5d.....	\$1 00
8d to 9d.....	26	4d.....	1 "
6d to 7d.....	60	3d.....	1 "
4d to 6d.....	75	2d.....	3 00
3d.....	1 60	FINISHING.	
2d.....	2 60	2d, 1 inch.....	\$0 00
BARRELS.		3d, 1 1/2.....	4 00
1 1/2 inch.....	\$0 76	4d, 1 1/2 to 1 1/2.....	1 75
1 1/2 inch.....	1 00	6d, 2 inch.....	1 50
1 1/2 inch.....	1 00	8d, 2 1/2.....	1 25
1 1/2 inch.....	1 75	10d, 3 inch and over.....	1 00
1 inch.....	2 60	CASINO AND BOX.	
1 inch.....	4 50	10d to 30d.....	\$0 75
1/2 inch.....	6 00	8d.....	1 00
BOAT NAILS.		6d.....	1 25
1/2 inch.....	\$8 00	4d.....	1 50
3/4 inch.....	6 00	3d.....	2 50

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 29, 1885.

- 327,056.—CHECK REIN AND POST HOOK.—C. L. Bard, San Buenaventura, Cal.
 327,057.—CHECK REIN AND POST HOOK.—C. L. Bard, San Buenaventura, Cal.
 327,058.—CHECK REIN AND POST HOOK.—C. L. Bard, San Buenaventura, Cal.
 326,947.—APPARATUS FOR BURNING FUEL.—R. E. Burns, S. F.
 327,139.—BRIDLE BIT.—H. M. Clemens, Va. City, Nev.
 327,076.—FOLDING BED.—B. F. Farrar, S. F.
 327,077.—FOLDING BED.—B. F. Farrar, S. F.
 327,156.—COIN CHANGER'S BOX.—D. R. Ford, S. F.
 326,969.—GANG PLOW.—Jas. R. Gill, Bellota, Cal.
 327,083.—CABLE RAILWAY.—E. D. Haven, S. F.
 326,980.—STEAM BOILER FURNACE.—Henderson & Berglund, Stockton, Cal.
 327,089.—GAS LAMP.—L. Julig, S. F.
 327,186.—WIND MOTOR.—F. S. McKibben, Tacoma, W. T.
 327,299.—RAILWAY SIGNAL.—A. A. Morrill, Burnt Woods, Or.
 327,303.—OPERATING VERTICAL RECIPROCATING SAWS.—C. W. Page, Cathlamet, W. T.
 327,319.—BALL AND SOCKET HINGE.—A. G. Rockwell, Ashland, Or.
 327,023.—PRESERVATIVE FOR MILK.—S. Sabin, S. F.
 327,302.—BED AND BEDSTEAD.—Smith & Albers, Sellwood, Or.
 327,203.—SURGICAL INSTRUMENT.—Jas. Somers, Mono, Or.
 327,036.—TWO-WHEELED VEHICLE.—L. St. Ores, Guadalupe, Cal.
 327,351.—AZIMUTH ATTACHMENT TO COMPASSES.—W. S. Thaxter, Oakland, Cal.
 327,205.—WATER ELEVATOR.—J. W. Thorp, Dayton, W. T.
 327,121.—WINE PRESS.—J. B. Tupper, Jr., Petaluma, Cal.
 327,048.—SAFETY ATTACHMENT FOR ELEVATORS, ETC.—F. Whiram, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MOWER.—Wm. S. Halsey, assignor to Judson Manufacturing Co., Oakland. No. 326,643. Dated Sept. 22, 1885. This invention is in that class of mowers in which the sickle or knife is driven by power derived from the wheels and transmitted through suitable shafts and gears; and the invention consists in a sleeve loosely mounted on the counter-shaft, which carries the bevel gear, said sleeve having at one end a collar, against which the heel of said gear bears, and at its other end a set screw, which is seated in the yoke mounted on the counter-shaft, and which carries the shaft which bears the pinion engaging with the gear. The arrangement is such that no matter how strong the thrust may be, it but throws both gear and pinion in the same direction, and to the same distance, whereby their engagement is not broken.

SAW-GUMMER AND SHARPENER.—Squire J. Randall, Moodyville, B. C. No. 326,243. Dated Sept. 15, 1885. This grinder or sharpener consists in a table or stand, a swinging bracket pivoted thereto and carrying the driving arbor with grinding wheels; peculiarly adjustable holders for long and circular saws, and adjustable supports for the blades of the saws. It consists, further, in the combinations of these devices, in their peculiar and particular arrangement, and in various details relating to their adjustments.

CHECK-REIN AND POST HOOK.—C. L. Bard, San Buenaventura. No. 327,058. Dated Sept. 29, 1885. This is a check-rein attached in front to the usual head gear, and at its rear end to the driving lines at a point behind the plane of the pad and provided with a hook, and in a peculiar post on the pad through which the check-rein passes, and with which the hook on said rein engages.

CABLE RAILWAY.—Egbert D. Haven, S. F. No. 327,083. Dated Sept. 29, 1885. The object of this improvement is to provide a device by which the gripman can drop and pick up the cable and pass over switches and crossings without the aid of switchmen and without any dips in the grade of the streets or hands in the cables. It would be difficult to give an intelligent description of the device without the aid of suitable engravings.

TWO-WHEELED VEHICLE.—Lewis St. Ores, Guadalupe, Santa Barbara county, Cal. No. 327,036. Dated Sept. 29, 1885. This invention in carts consists in a peculiarly divided sectional shaft, and in details of construction relating to the adjustment or control, the limitation and the guiding of the joint formed between the section. The object is to do away with the unpleasant rocking motion which the body receives from the shafts, and which is occasioned by the joggling of the horse.

FOLDING BED.—B. F. Farrar, S. F. No. 327,077. Dated Sept. 29, 1885. The invention consists in the particular arrangement and construction of guide straps by which the legs and leg-frames of the bed are kept in an upright position, and in the stops by which these guide straps are limited in their movement, to enable the legs of the frame to come to their proper position. It consists, further, in certain details of construction pertaining to the limitation of the mattress and the general cabinet structure of the bed.

Inducements to Subscribers.

To favor subscribers to this paper, and to induce new patrons to try our publication, we offer the following advantages to all new subscribers who pay one year in advance, or present subscribers who will pay their subscriptions up to a date fully one year in advance of the present time. We will furnish the following articles (while this notice continues), at the reduced rates named, viz.:

- | | REGULAR PRICE. |
|--|-----------------------------|
| 2.—World's Encyclopedia, 794 pages, with 1,200 illustrations, worth \$1.75. | Postpaid for 50 cts. |
| 3.—Patent Binder (cloth cover) with name of this paper in gilt. | Postpaid for 50 cts. \$1.00 |
| 6.—To New Subscribers, 12 select hack Nos. of the MINING AND SCIENTIFIC PRESS. Free | .75 |
| 7.—Any of Harper's first-class periodicals, 15 per cent less than regular rates. | |
| 8.—Frank Leslie's and most other U. S. periodicals, 15 per cent discount from regular rates. | |
| 9.—Pacific Coast and Eastern Dailies, Books and Periodicals, except special publications, we can usually give 10 to 15 per cent less than advertised retail rates. | |
| 10.—Pictorial Arizona, 350 pages, in cloth and gilt. | Postpaid for 25 cts. 1.25 |
| 11.—California, 100 pages, Magazine, 1880 to 1882 (3 Vols.) single Nos. | Postpaid for 3 cts. .35 |
| Per volume, unbound, 5 Vols. | Postpaid for 20 cts. 2.00 |
| Per volume, bound, cloth back and stiff paper sides. | Postpaid for 40 cts. 2.50 |
| 13.—Picturesque California Homes (40 building plans and estimates). | Postpaid for \$1 3.50 |
| 14.—Dewey's Patent Newspaper File Holder (18 to 36 inch). | 25 cts. .50 |

NOTE.—The cash must accompany all orders. If too much is sent for any article or publication, the balance will be returned immediately. Address this office, No. 252 Market St., S. F.
 P. S.—No. 11 is really a valuable premium to newcomers and others who appreciate the better class of stories and a good standard of California literature. Webster's Dictionary, 634 pages, with 1,500 illustrations. 50 cts. 1.50
 Grant Lithograph, size 24x12. 50 cts. .50
 Cleveland Fine Steel Plate, size 12x16. 10 cts. .50
 Orant Steel Plate, cabinet size. 5 cts. .25
 De Groot's History of Mining in California. 5 cts. .25
 Beautiful Poetic Review, a handsome, entertaining and instructive souvenir of real merit. 25 cts. .50
 Send for any further information desired. Readers will please inform their new neighbors and others concerning our paper and these offerings. On application, sample copies of this paper will be mailed free to the address of any persons thought likely to subscribe.

Very Acceptable Present.

Stereoscopic and Cabinet Views.

We are Sole Agents for the Pacific Coast for the views of the Continent Stereoscopic Company, consisting of a most complete series of photographic views of all popular localities west of the Rocky Mountains. They represent all the principal localities of the Pacific Coast, including views in

California, Oregon, Alaska, Arizona, New Mexico, Colorado, Mexico, Columbia River, City of San Francisco, Washington Territory, Union Pacific Railroad, Nevada and the Northwest, And Types of Indians of all Races.

Send for a sample hundred of our views, which will give you an idea of the quality of our goods. New subjects from all sections are constantly being added.

Price \$8 per hundred. Liberal discount to the Trade.

We want to particularly inform those heretofore using these goods that the line has just been revised, with new Subjects, both Cabinet and Stereoscopic. We respectfully solicit your patronage.

CUBERY & CO.,

Printers and Dealers in Cards for all Societies.

415 MARKET ST., below First, SAN FRANCISCO.

ASSESSMENT NOTICE.

Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley, Nevada county, Cal.

NOTICE is hereby given, that at a meeting of the Directors, held on the 17th day of September, 1885, an Assessment (No. 12) of Five (5) Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 334 and 936 Mission street, San Francisco, Cal. Any stock upon which this Assessment shall remain unpaid on the second day of November, 1885, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday the twenty-third day of November, 1885, to pay the Delinquent Assessment, together with costs of advertising and expenses of sale.

GEO. P. THURSTON, Secretary.
 OFFICE—334 and 936 Mission St., San Francisco, Cal.

DEWEY & CO
PATENT
SOLICITORS.
 252 MARKET ST. S. F.
 ELEVATOR 12 FRONT ST. S. F.



RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day gives universal satisfaction. Price, from \$2 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, cor. Third, San Francisco.

HEALD'S BUSINESS COLLEGE,
 24 Post St. S. F.
 Send for Circular.

The most Complete Compound manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid and Alkali-Proof.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
 No. 310 California Street, San Francisco.



DEALERS IN

Mining Machinery

Can Increase Their Trade

IN NEVADA COUNTY

By Advertising in

THE "TIDINGS"

(Daily and Weekly.)

Published at Grass Valley, Nevada Co., Cal

THE "TIDINGS" has a large circulation in the best gold mining region on the Pacific Coast.
 Write for terms and sample copies.

H. S. SPALDING, Publisher.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]

The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.

PACIFIC Business College,
 320 POST ST.
 SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN & ROBINSON, Prop's.

SAN FRANCISCO CREMATION CO.

[INCORPORATED SEPT. 5, 1885.]

CAPITAL STOCK, \$25,000, divided into 500 shares of the par value of \$50 each.

217 Shares Have Been Taken.

The remaining shares are now offered for sale and may be subscribed for at the office of GENERAL H. A. COSS, 321 Montgomery St., where further particulars may be obtained; also at the office of the Secretary, 100 Battery St. By order of the Board of Directors.

MAX LEVY, Secretary.

Property Owners are interested personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.



DOW STEAM PUMP WORKS.

DOW'S IMPROVED
 STEAM PUMPS

—AND—

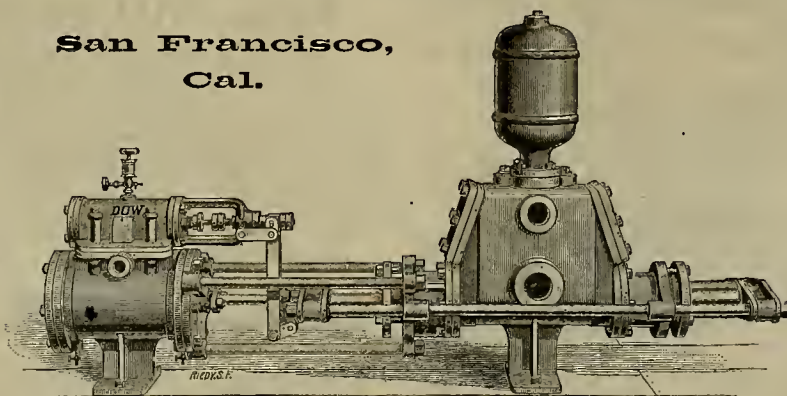
Pumping Machinery

—FOR—

EVERY POSSIBLE DUTY.

Correspondence Solicited.

San Francisco,
 Cal.



COMPOUND PUMPING
 ENGINES,

Condensing and Non-Condensing,

—FOR—

WATERWORKS,

MINING PURPOSES,

IRRIGATION, Etc.

WORKS: 114 and 116 BEALE ST.

Call or Send for Catalogue.

Iron and Machine Works.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. *FORNERS SOLICITED.*

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry.

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam-
boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-
plings and Connections of all sizes and patterns, furnished
with dispatch. *PRICES MODERATE.*

J. H. WEED.

V. KINGWELL.

HOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

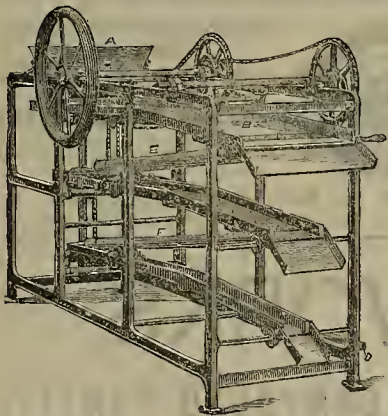
129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY

NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken
apart; packs in small compass; may be run by hand or
horse power. Capacity, two tons an hour. No blower
or oil fans, or quicksilver used. Frame all malleable
iron. Will save a higher percentage of gold than other
machines. TATUM & BOWEN, San Francisco
and Portland, Agents.

Now on exhibition at Mechanics' Fair,
San Francisco, where it may be seen in operation.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of
all kinds of
Chemical Stoneware

— FOR —
Manufacturing

Chemists.

Also Chemical Brick
for Glover Tower.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting
that of "Hood's Foundry Coke."

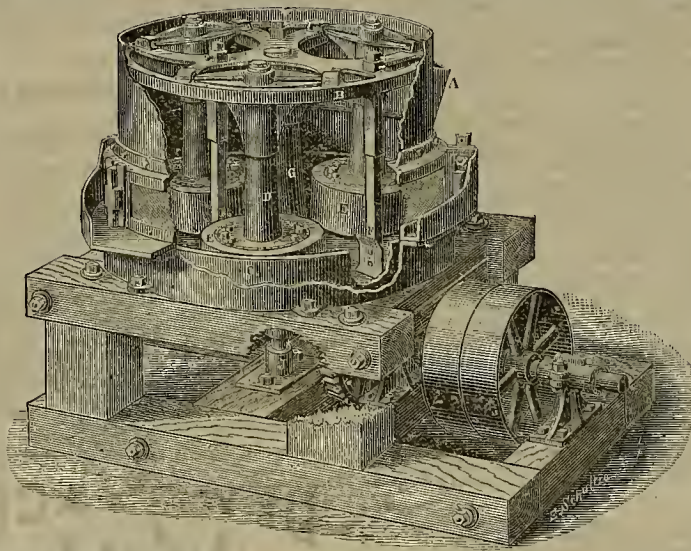
This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-
ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy
in Saving Gold. Economy in Transportation of Machinery.

Economy in Cost of Erection of Mill at Mine. Econo-
my in Time Required to Establish Plant
(one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of
continuous use at a number of mines in California has enabled the inventor to perfect and im-
prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

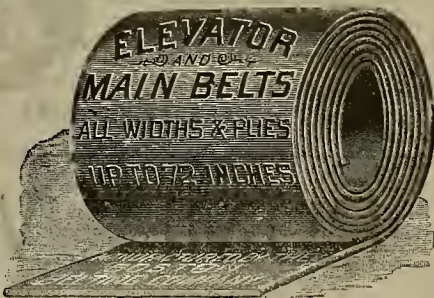
.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ills.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.

THE JENKINS STANDARD PACKING

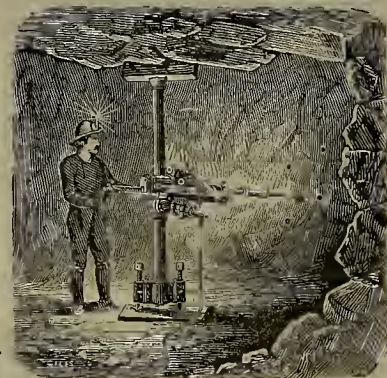


IS ACKNOWLEDGED BY USERS AS THE BEST in the
world. Unlike all other Packings, the Jenkins Standard
Packing can be made any thickness desired in a joint by
placing two or as many thicknesses together as desired, and
following up joint, it vulcanizes in place and becomes a
metal of itself (it is frequently called Jenkins Metal), and
will last for years, as it does not rot or burn out. Avoid all
imitations, as a good article is always subject to cheap imi-
tations. The genuine has stamped on every sheet "Jen-
kins Standard Packing," and is for sale by the Trade
generally.

Manufactured only by

For Sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal. | JENKINS BROS., 71 John St., New York.

DEWEY & CO., { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.



INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
Ports, will do 20 per cent more work than
the Old Ingersoll.

MINING MACHINERY.

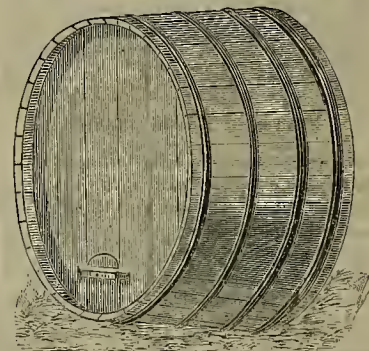
For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

MECHANICS' MILLS.



Water Tanks. Wine Tanks.

Our well-known TANKS are made by machinery,
from the best of materials, and shipped to all parts of
the country. Each piece numbered. No skill required
in setting up.

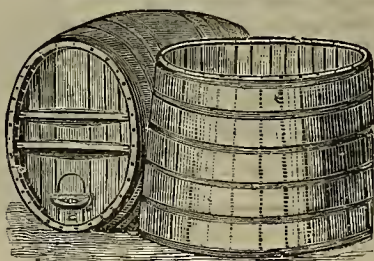
WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!

CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

— FOR —

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

— 1883 —

For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

22 Fremont Street,
SAN FRANCISCO.

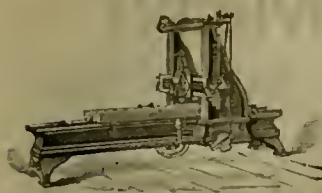


DEWEY & CO.'S SCIENTIFIC PRESS PATENT
AGENCY is the oldest estab-
lished and most successful on the Pacific Coast. No. 252
Market St., Elevator 12 Front St., S. F.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



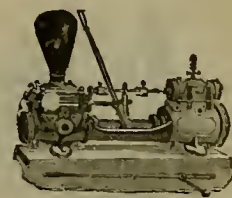
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.



Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery

ENGINES and BOILERS.

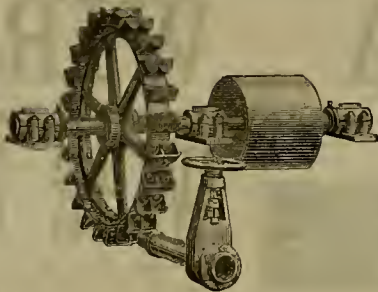
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



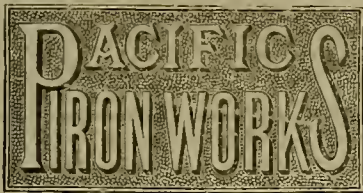
Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON

HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Sturtevant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



1850. 1885.

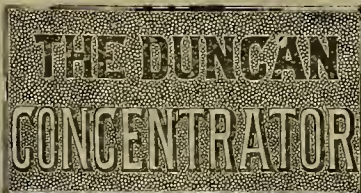
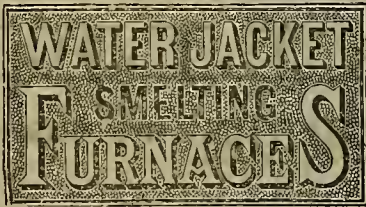
RANKIN, BRAYTON & CO.,
BUILDERS OF
MINING MACHINERY.

San Francisco: Chicago: New York:
100 N. Clinton. 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
embracing machinery of LATEST DESIGN and
IMPROVED construction. We offer our cus-
tomers the BEST RESULTS OF 35 YEARS' EX-
PERIENCE in this SPECIAL LINE of work, and
COMPARED to furnish from SAN FRAN-
CISCO, the MOST APPROVED
character of MINING AND REDUCTION MA-
CHINERY, adapted to all grades of ore and su-
PERIOR to that of any other make, at the LOWEST
POSSIBLE PRICES.
We are also prepared to CONSTRUCT and DE-
LIVER in COMPLETE RUNNING ORDER,
in any locality, MILLS, CONCENTRATION
WORKS, WATER JACKET SMELTING
FURNACES, HOISTING WORKS, PUM-
PING MACHINERY, ETC., ETC., of any DE-
SIRE CAPACITY.

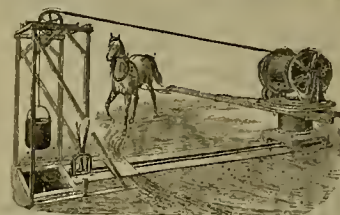
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
ores of NEW and ORIGINAL DESIGNS, covered
by LETTERS PATENT. No other Furnace CAN
COMPARE with these for DURABILITY, and in
CAPACITY for uninterrupted work. MORE
THAN 150 of them are now RUNNING in various
parts of THIS COUNTRY, as well as many in
FOREIGN COUNTRIES, giving results NEVER
BEFORE ATTAINED as regards CONTINUOUS
running, ECONOMY of fuel, AMOUNT and QUAL-
ITY of BULLION produced. These CLAIMS have
been PROVEN BY RESULTS in ANY NUM-
BER of INSTANCES, and the GREAT SUPE-
RIORITY of this SYSTEM of smelting ores DE-
MONSTRATED BEYOND QUESTION. COM-
PLETE PLANTS furnished to order of any CA-
PACITY, with ALL IMPROVEMENTS that ex-
perience has DEMONSTRATED as VALUABLE
in this class of work.



Beyond question the cheapest and
most effective machine of the kind
now in use adapted to all grades and
classes of ores.

This machine has been THOROUGHLY TESTED
for the past TWO YEARS, under a GREAT VA-
RIETY of CONDITIONS, giving most EXTRA-
ORDINARY results FAR IN ADVANCE of
anything EVER BEFORE REALIZED. A re-
cent COMPETITIVE TEST at the Carlisle Mine in
Mexico, showed an ADVANTAGE OF OVER 30
PER CENT in favor of THE DUNCAN. The
amount SAVED OVER THE TRUE being suffi-
cient to PAY THE ENTIRE COST of the ma-
chines EVERY MONTH OF THE YEAR. One
of its MOST VALUABLE features is as an AMAL-
GAMATOR. It saves ALL THE AMALGAM GOLD
AND SILVER that ESCAPES the BATTERIES,
PANS or SETTLERS, making the machine worth
MORE than ITS COST for THIS PURPOSE
ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist,
and affording means for the continuous operation of a
Pump or Blower, without interfering with a hoisting ap-
paratus. It is made entirely of iron, no piece weighs
over 300 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

HOMOGENEOUS STEEL, SOFT and DUCTILE,

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 3 inch. Angles, Tees, Channels and other shapes
Steel Wagon, Buggy, and Truck Tires, Flow Steel; Machinery and Special Shape Steel to size and lengths.
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

Geo. W. Prescott, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

CHICAGO PLATING COMPANY, 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St, San Francisco, Cal.

CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.

WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized. Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH. Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

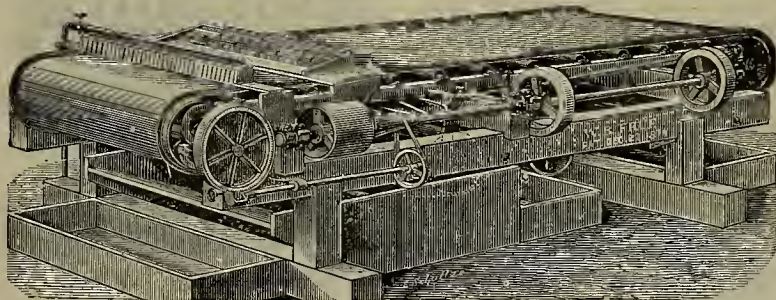
WROUGHT IRON

Railing, Fencing, Crestings, Entrances Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

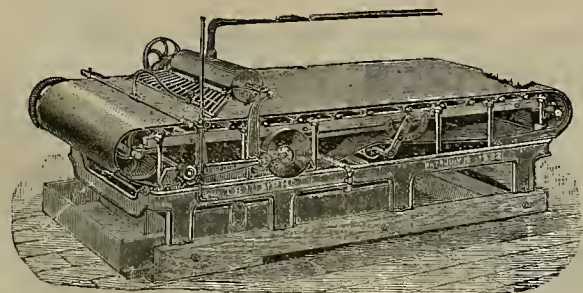
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED!

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.

THE "TRIUMPH" TRIUMPHANT!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$3.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners. This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 17, 1885.

VOLUME LI
Number 16.

The Davey Safety Engine.

The Davey safety engine, or vacuum motor, of which we present an engraving, is an invention of Henry Davey, Esq., the well-known English mechanical engineer, the inventor also of the differential pumping engine. The motor possesses some remarkable features especially adapting it to such branches of industry as require a small, cheap and positively safe power.

The Davey safety engine differs from an ordinary steam engine in the fact that while a small quantity of steam is made in the generator, which is a part of the machine, steam is not the motive power employed to do the work, and only as much is made in the smaller sizes as would be generated in a large teakettle, and this at only atmospheric pressure; that is, at the same pressure at which it would flow from the spout of a teakettle, or escape from under a pot lid; the only function of the steam being to create, by condensation, a vacuum, which is the motive power. The engine is double-acting, a vacuum being created alternately at each end of the cylinder. There is absolutely no pressure in the generator, and consequently can be no danger of explosion, under any circumstances whatever.

The condensation of the low pressure steam, by which a vacuum is created, is effected by means of a surface condenser, which is kept cool by water. Where the engine is to be used in a city or town having a public water service, the condenser is placed in the upright iron pocket shown at the back of the engine, and a small stream of water, one-eighth inch pipe (the smallest size iron pipe made) for the one-horse power; for the two-horse power, one-fourth inch; for the four-horse power, one-half inch pipe furnishes an abundant water supply to keep the condenser cool. The water is admitted at the bottom and rises to the top, and passes off through an overflow pipe.

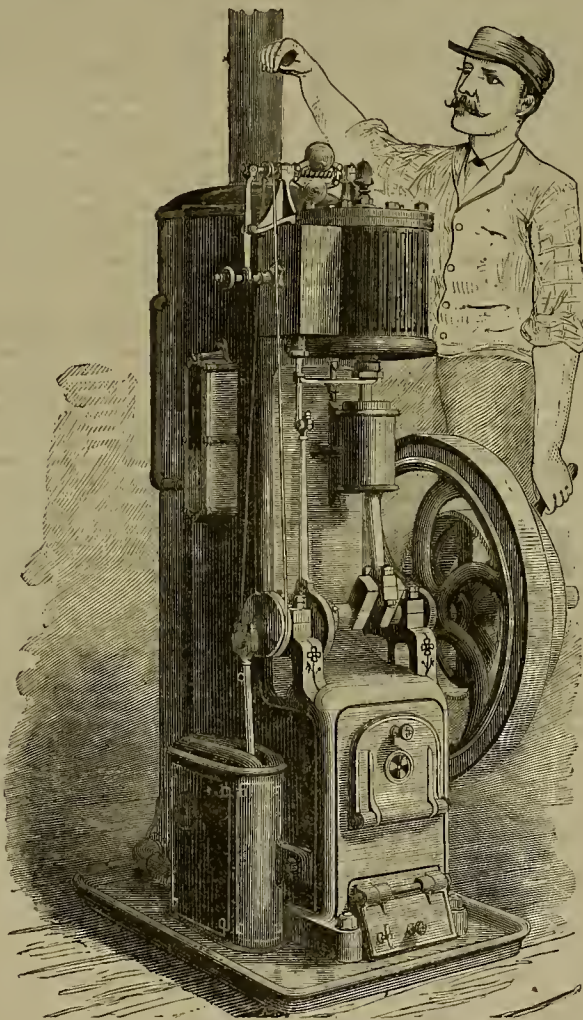
Where it is desired to use the engine in localities having no running water, the condenser is placed in a wooden tank located in any convenient place within a few feet of the engine, and connections made with the engine by means of pipes. This tank being once filled, there is no consumption of water except the amount that flows out of it to support the generator. The quantity actually consumed in this way is very small, only a trifle over three gallons per horse-power per hour, which is evaporated in the generator, and is condensed and discharged in the form of distilled water from a little pipe at the side of the engine. If it is desirable to save this water, it may be allowed to stand until cool, and then returned to the tank to be used over and over again. When arranged in this way there is no actual consumption of water, and the tank, once filled, will last for months without the addition of a gallon.

The cylinder, unlike that of an ordinary engine, does not require oiling or lubrication, being made of bronze, with bronze piston-head and piston-rod. The low steam used being very moist is a sufficient lubricant. Another advantage of the use of a bronze cylinder is that if the engine stands for months without being used it suffers no deterioration from rust. The quantity of fuel needed is much less than would be used in the ordinary engine, as the amount of water to be evaporated is less than half that consumed by the ordinary slide valve engine of same power, and the water is raised to only 212

degrees, instead of 300 to 340, as in an ordinary boiler. The small amount of water necessary to be evaporated, and the low degrees of temperature to which it is necessary to raise it, accounts for the economy of fuel in these motors, and there is but little precipitation of lime in the generator, as the water is not raised to a sufficient degree of temperature to produce it.

Unlike an ordinary boiler and engine, in which the water level in the boiler is a matter

into the fire box; either soft or hard coal, wood-coke, or cobs. Petroleum, naphtha, or common gas can be used by a proper arrangement of pipes in the fire box. The quantity of fuel needed is surprisingly small, as the amount of water to be evaporated is quite limited, and if hard or soft coal or coke, the cost, it is claimed, will not exceed one cent per horse power per hour. There is no boiler tubes to burn out and leak, and no scaling of the boiler. It requires no watching, does not increase the rate of in-



THE DAVEY SAFETY VACUUM ENGINE.

of vital importance, and any failure of the water supply fraught with more or less danger, the water level of the Safety Engine is constant and unvarying, the feeding arrangement being automatic, and the quantity of water actually consumed so small as to remove all difficulty of keeping up a supply.

Aside from the question of danger attending the use of the ordinary steam boiler under careless management, there is probably no one thing which will commend this motor more strongly to the public than the fact that it requires no attention beyond simply keeping up the fire, and giving the wheel two or three turns when ready to begin operations. There is no safety valve, no exhaust, no steam gauge, no gauge cocks, no boiler feed pump or injector, or any of these adjuncts of an ordinary steam engine.

Anything may be used for fuel which will go

surance, as the risk of fire is no greater than that from an ordinary house stove, and can be arranged by a person having no knowledge of steam engines. Owing to the fact that there is no pressure to deal with, the generator is made entirely of cast-iron, so it cannot be burned out and made to leak, even if perfectly dry with a fire burning in the furnace.

The manufacturers claim it to be superior to the hot-air or gas engine. It is practically noiseless, has no exhaust, and there is no odor. There is no steam pressure, no explosion possible, and no engine required. The motor can be started in from 10 to 20 minutes after lighting the fire. The engine is controlled by an ordinary fireman. The working parts are as durable as those of any well-constructed steam engine. Tatum & Bowen are sole agents for the Pacific Coast.

Fluxes and Fuel for Smelting.

At Leadville, where the numerous smelting establishments produce annually about \$15,000,000 worth of argentiferous lead bullion, metallurgists have acquired an unusual amount of practical experience in the conduct of the operations of smelting and the business connected with it. The fluxes used at Leadville are limestones and hematite. The limestone mainly used was formerly the blue dolomitic limestone in which the Leadville ores occur, taken either from the open quarries or from deadwork of some of the mines. In the latter case it often carried a small percentage of silver. Experiments showed that dolomite was a less favorable flux than pure carbonate of lime, and since the advent of the railroad limestone has been obtained from the beds of the Colorado cretaceous formation at Carson City, 117 miles distant, or from Robinson, 16 miles distant. Red hematite iron ore was at first used exclusively as a flux. More recently it has been the practice in many smelters to use the limonite which had collected on the dumps of various mines. In many cases the ores themselves carry so much iron that but little additional is required.

The fuels used are coke and charcoal. Before the railroad was built charcoal was more largely used than at present. This is furnished by the forests of spruce covering the neighboring mountain slopes. The pit charcoal is said to contain 2.5 per cent of ash; a sample of kiln charcoal was found by Mr. Guyard to contain 1.62 per cent of ash. Mr. S. F. Emmons, who collected this data, states that the coals used are brought from El Moro, in the southern part of Colorado, by rail, and also from Como, in the South Park. These coals are made from the coals of the lignitic or upper cretaceous formation, and contain, according to determinations made at the smelting works of Messrs. Billings & Eilers, 22 per cent of ash for the El Moro and 9½ per cent for the South Park coke. About 40 pounds of coke make a bushel.

Aspen, Colorado.

The attention of mining people in Colorado is now being strongly directed toward Aspen, the booming camp of Pitkin county, by reason of the rich mineral discoveries recently made in that vicinity. Outside of Leadville the daily output of the camp is greater than any other in the State, and were it not for some unfortunate litigation that a few of the principal properties have got into, the shipments would be much larger and the influx into the town much greater. Even as things are, the product of Aspen for the present year will run well into the millions. Denver is the best point from which to reach Aspen and the Union Pacific Railroad is running its trains so as to make the trip as convenient as possible. Leaving Denver at 7 o'clock in the evening St. Elmo is reached at 6 the following morning, from which point a stage ride of 12 hours brings a person to Aspen. The scenic beauties of the ride are an ample compensation for the expenses of the trip. A splendid line of Concord coaches runs each way daily from St. Elmo to Aspen. Each of these vehicles is capable of carrying 11 passengers besides a ton of baggage without overcrowding the conveyance. These coaches are a model of ease and elegance for riding in, and it is worth the fare to make the trip if a person has never ridden in a Concord coach.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Grass Valley.

Its Past History, Present Outlook and Future Prospects.

[Written for the Press.]

Grass Valley is the largest and most prosperous gold quartz mining district in the State of California. It is situated in Nevada county, about the center of the great gold belt traversing the foothills of the western slope of the Sierra Nevada mountains. It is distant from San Francisco some 160 miles by rail, taking the Central Pacific railroad from San Francisco to Colfax, a distance of some 144 miles, and the Nevada county narrow gauge, 16 miles from Colfax to Grass Valley, occupying in all some twelve hours' travel from San Francisco to Grass Valley, and is about the only camp in the State directly connected by rail with San Francisco and the great cities of the East. Its discovery dates back to 1849, and its name of Grass Valley was given to it by the first batch of pioneers that, wearied by a dull trip of nearly 20,000 miles, rested as they had not rested since the passage of the Missouri river. Here they found a verdant valley coursed by a beautiful stream unruffled by the labor of the prospector. Now the town covers the valley and the stream is turged with the tailings of many mills and placers. The first settlement was made on Badger hill, about one half mile east of the present town site. In the spring of 1850 placer mining was carried on with good results at Ohio Flat and Rhode Island and Boston ravines. Quartz, which has made Grass Valley world renowned, was not discovered until June, 1850, some seven or eight months after the opening of the placer mines. The discovery was first made by a man named McKnight, on Gold hill. Following this came the discovery of quartz on Massachusetts hill, in the same neighborhood, and a great quartz excitement prevailed. In 1851 the shallow surface diggings were beginning to show signs of exhaustion, and prospectors were running over the hills in every direction in search of ledges. Now commenced an era of grand success and great profligacy and lawlessness; gambling saloons arose in splendor and magnificence, and were daily and nightly thronged, pistols and knives were worn and drawn, murders were committed and fights were common; Judge Lynch held court, and if his rulings were not always correct or dignified, his promptness was never questioned, varying his sentences from a tight collar to thirty-six lashes on the bare back for stealing a mule, explaining that the punishment was not awarded for stealing that particular quadruped, but "that mules may not be stolen." From the contemplation of that picture we now turn to behold the metamorphosis. A wild and rugged region subjugated from nature, which has yielded more gold than any other spot of like extent on the globe; a town of nigh 7000 inhabitants, a collection of happy homes, containing more children in ratio of its population than any other town in California.

Here in 1853-4 lived the erratic Lola Montez. Her eccentricities and escapades were numerous and varied. Her most notorious adventure was her street attack upon Henry Shipley, editor of the Grass Valley Telegraph. He had published something severe on one of Lola's ballet friends, and the irate actress provided herself with a whip, found Shipley, made a few belligerent passes at him, but was taken away before doing any serious damage to her surprised victim. Like all the mining districts of California, Grass Valley suffered its ups and downs, its early tribulations from fires and floods, but owed its setbacks more to unsystematic and irregular mining than to any other cause. Notwithstanding all these, the output of the mines of Grass Valley and their well-known richness in former times should encourage explorations in depth and extent with every reasonable expectation of an ample reward for the outlay.

Leaving historical and general considerations, let us turn our attention to a limited number of mines and their output which will best illustrate the productiveness and great richness of the veins of this district, appending a list of mines which have all produced in the plural number of millions:

Eureka	over	\$7,000,000
Idaho	.....	7,000,000
Empire	.....	7,000,000
Allison Ranch	.....	4,700,000
Rocky Bar	.....	4,500,000
Gold Hill	.....	4,000,000
North Star	.....	3,000,000
New York Hill	.....	3,000,000
Scadden's Flat	.....	2,000,000
New Rocky Bar	.....	2,000,000

I could tabulate scores of others that have produced over a million of dollars. It is an astonishing showing, and the more so if we take into our calculations what is currently believed here that fully as much more gold as above credited was carried off by the early miners by way of stealing specimens in their boots, lunch buckets and by divers other contrivances, and as these were mostly chunks of almost pure gold it is not at all improbable that the above figures may be nearly doubled in gross product of the mines. A story is told of a miner who went to work on a Monday morning in a new mine, quitting on a Friday of the same week, having in the mean time accumulated a large fortune.

Professor Benjamin Silliman, in his notes on the Grass Valley district, says: "This place has obtained a well-earned celebrity as the most prosperous of all the gold quartz mining districts in California."

Wm. Ashburner, Esq., in his remarks on the gold mining interests of California in J. Ross Brown's Report on the Resources of the States and Territories west of the Rocky mountains, speaks of the Grass Valley region (page 46) thus: "When we consider the richness of the veins, the length of time some of the mines have been worked, and the amount of gold annually produced, the most important quartz mining region of California is, without any doubt, that of Grass Valley in Nevada county." I quote the above distinguished authorities in support of my testimony as to the permanence, prosperity and richness of this district.

Another important feature in connection with these veins is the fact of their increasing in extent and richness as depth is attained; in this respect they resemble the silver mines of Spain and the tin mines of Cornwall. I find at this time the "Idaho" working on its 1600-foot level, paying monthly dividends without a single interruption in years, and aggregating in the immediate neighborhood of \$4,000,000, working its lowest levels entirely, from which portion of the mine rich specimens are being extracted daily; in the company's mill there is a complete outfit of machinery for the treatment of these specimens by a separate process. The Empire is also working on its 1600-foot level on a chute of ore over 2000 feet in width. This is a private corporation, and but little is known on the outside of its actual resources further than that it is paying largely, and by many here it is believed to be at this time the richest mine in Nevada county, if not in the State of California.

The North Star is working its 1400 foot level, and the New York Hill its 1300 foot level; this is certain proof of the permanence of these veins and their continued richness from grass roots down. Notwithstanding the foregoing showing of undisputed facts, it is a most astonishing circumstance that many of the mines of this district are now lying idle and neglected, many having so remained for the past 20 years; and for no other reason that I can perceive than the simple fact that they have been worked from the surface and all along their surface, down to water level, a depth of some sixty feet. The lack of energy and capital to place upon them suitable pumping and hoisting machinery, is the only cause of their being at the present standstill, for they are still rich in the bottom, and the millions extracted from the deep worked mines here lie hidden and expectant of the stroke of the pick that shall open their prison door. This is the more reprehensible, inasmuch as these dormant mines were not "disastrous failures," nor were they the cause of any loss whatever to their owners; on the contrary, they had yielded immense amounts of money to their workers. True, they have been coyoted and gouged out of all mining shape, worked on shares, on tribute, on leases, on bonds, each party so working living from hand to mouth, and some more lucky ones striking rich pockets, which were either riotously spent, hawked or invested: but never a cent returned to the mine for intelligent opening, and this system is too much in vogue here, even at the present day.

I have followed little rat hole drifts, at the end of which the ledge had been picked like a series of gimlet holes, and then abandoned by the tributaries for a warmer place and looser ground. I know of a large number of these mines that paid very profitably at a time when mining labor was \$5 per day, and at that no one knew how to open a mine, no one knew how to amalgamate properly, saving sulphurets was not thought of, and the mill was a rattle-trap concern that failed of crushing the rock; these very mines at the present day with our mining and milling facilities, improved gold saving apparatus, and cheapened labor would turn out a fortune to their owners. The suspended activity of these mines is certainly due to causes quite unconnected with their intrinsic values. Of late, however, I note renewed activity—a new awakening dawning over and pervading the whole district. Some six or seven of these quiescent mines are being rapidly equipped with powerful machinery capable of sinking to great depths, and this principally with local enterprise and capital. Of these I shall write more fully in future communications. I shall also treat upon the general geological character of the district, the structure of the gold-bearing veins, the average tenor of the gold, the value of the sulphurets and their treatment, length and depth of productive ore ground, extent of explorations, etc. At the present time I find some 10 quartz mills in active operation, aggregating 150 stamps, and giving employment to fully 1500 men in both mines and mills.

In concluding this letter I would state that Grass Valley of to day is one of the pleasantest spots of earth to live in, trees, plants, and delicious fruit luxuriate, the town and residences hidden in umbrageous foliage, having more the appearance of a tropical forest than the usual rugged and arid mining camp. The climate is warm, mild and balmy, and outside its mineral industry and wealth, this section of country would form a grand sanitarium for the invalids of the world.

H. E.

THE Coral, which arrived Monday from the Arctic, is the first of the whaling fleet to return. Her cargo consists of 1600 pounds of bone and 1600 barrels of oil, representing a catch of 12 whales.

Humburg Mining District.

[Written for the Press.]

This district lies midway between Prescott and Phoenix and on the southern spur of the Bradshaw range of mountains, Arizona. There is an open country on the south with good roads from the Southern Pacific R. R., via Phoenix, to within eight miles of the center of the district.

Supplies for this district and the output of the mines are from and to the S. P. R. R.; the distance is 75 miles. The expense for transportation of ores from Humburg district to the S. P. R. R. is \$27.50 per ton; from Maricopa to Pueblo, Colorado, is \$12.50 per ton; for milling the ore at Pueblo is \$11 per ton.

This district has abundance of water all the year round for reduction of its ores. The Cottonwood, Humburg, Boulder and Tully creeks are its sources of water supply. There is good pine timber within nine miles and of easy access by wagon road, being down bill most of the way to the mines. This district has produced more bullion than any other district in Yavapai county; it is to-day the best poor man's camp in the Territory, as good wages can be made on any of the mining properties. Mine owners are paying \$3.50 to \$4 per day wages.

New life seems infused into this camp through the commendable enterprise of Wager Bros., merchants at Tip Top. These parties are buying all ores offered, and paying 90 per cent of assay value of the same.

The effect of this has been to set many owners of small means at work on properties that have lain idle for the past two years, and this camp is again becoming quite lively. Several mines, by recent development, have shown up rich ore bodies that have created new interest in the camp and interested several parties of Eastern capitalists in three different properties here, that in a few weeks will employ a large number of men in their new development. The formation here is micaceous granite, the veins are well defined and regular, with sulphide, sulphurets, chlorides and carbonates.

A Good Smelter

Located at the mouth of Tully creek for custom work, with an expenditure of a few thousand dollars on a road from the smelter into Tip Top gulch, would save three-fourths of the expense now paid for transportation, and prove a big fortune to its owners, and be the means of making this camp the liveliest in the Southwest.

Already a good wagon road has been built from Beechum's Wells, a point 11 miles from Phoenix, to the mouth of Tully and Humburg creeks.

At present only the higher grades of ore are shipped from this district to the smelters at Benson and other points. With one of the best of climates in the world and with superior water, this district offers advantages second to none other in Arizona, and with capital judiciously expended here this district would soon attract the attention of the entire mining world to its wonderful rich mineral deposits.

The Celebrated Tip Top Mine

Lies in this district, from which over \$2,000,000 worth of ore has been milled, and this mine that lay idle for nearly two years, has within the past eight months been worked by its new owners with great success, and with economical management it bids fair to make very soon its present fortunate owners rich men.

The mother ledge of this district is about two and a half miles west of the old Tip Top mine.

This ledge can be traced for seven miles north and south; it crops out boldly and is located all the way. Some of the most promising mines of central Arizona are being developed on this ledge and the spurs of the same.

Nearly all of these properties are owned by residents of this district whose capital for development has been secured from their mines here.

The first mines at the north end of this ledge are the Chicago and Missing Link, the properties of Messrs. Trotter, Coover & Co. In one shaft, when down 80 feet, ore was struck that averaged assay over \$800 per ton, and a recent shipment realized nearly \$300 to the ton. These mines have now a good body of ore in sight and the owners having capital intend to soon make new developments of this property, having great faith in its future.

The Silver Museum.

The second important developed property on this ledge is the Silver Museum of John Smithline, and the extension of the Silver Museum of Frank Smithline & Co.

The Silver Museum has a tunnel of 150 feet (now in good ore assaying over \$200), a shaft down 150 feet, with hoisting works on the same; at 85 feet there is one level of 76 feet in rich chloride ore, which assayed 280 ozs. silver per ton.

A second level at 135 feet, running in 156 feet, and now in 21 feet of good ore, composed of sulphurets, ruby and chloride silver.

A recent shipment of 10 tons of ore to Pueblo realized over \$400 per ton; another shipment to be made this week, it is expected will exceed \$500 per ton. There are now over 100 tons of ore on the dump, that, by assays carefully made, show it to run \$90 to the ton.

Jno. Smithline, the owner of this mine, four years ago, with difficulty, procured credit for provisions while working on this mine. Overcoming all difficulties he pegged away, and two years ago struck good paying ore, since

which he has taken out over \$50,000, is to-day out of debt and with a good bank account, with a mine only fairly opened, but with prospects of being equal to the old Tip Top in its most prosperous days.

East Extension of Silver Museum

Mine is owned by Frank Smithline & Co. Has a shaft of 80 feet with a 100-foot drift at bottom of shaft, and two 30 foot drifts, all showing good paying ore bodies.

One of the paying ore bodies of the Silver Museum pitches into this mine.

Next south of the Silver Museum are the

Camp Cale and Argus Mines

Owned by Harry Colson. The Camp Cale mine has a 115 foot shaft with a level at 60 feet. In 100 feet; good ore is being struck at 75 feet, which averaged 300 ounces, 25 tons of which have been shipped to Benson.

The Argus mine has a 40 foot shaft, with ledge matter $\frac{3}{4}$ feet wide. A good amount of ore from this mine will average 35 ounces.

The El Dorado Mine

Owned by Ozark Mining Company has three shafts. The first is 93 feet; second, 110 feet; third, 115 feet, with 325 feet of drifts. The shafts No. 2 and No. 3 are being connected by drifts, with the latest improved hoisting works being used. Recent shipments of ore from this mine to Benson run 367 ounces silver.

The ore taken from this mine has paid the entire expense of its development from the beginning to the present time, and netted the company a handsome sum, with a present prospect of soon becoming a much richer and larger body of ore than found yet. One body of ore from this mine assayed upwards of \$1700 to the ton.

Vein is 3 to 12 feet; pay streak 0 to 12 inches. The character of this ore is similar to that in the Tip Top, and the owners of this property are firm in the belief that their mine will prove by future development as good as the old Tip Top.

The Contraband Mine

Lies next, east of the El Dorado, and between it and the Tip Top, and is owned by A. A. Ensign and Chas. Akers; has a 180-foot shaft. The owners intend pushing the development 50 feet farther this year; \$15,000 have been taken out of this mine already, and the owners feel sanguine of soon striking better ore than ever. There are 15 or 20 tons of ore now being prepared for shipment from this mine.

Across the Divide

But still on the mother or crosscut ledge, as some call it, and on Tully creek, is the Great Basin mine, owned by E. J. Cook and George Merwine. This mine has one shaft of 100 feet, and not far from it one of 44 feet. On the latter ore has been struck that assays from 15 to 460 ounces, and 20 tons averaged 110 ounces per ton. Some distance from those two shafts is a third one of 75 feet, with ore of a similar character, but all shafts, being close to the creek, are waiting for new pumps and hoisting work before prosecuting work on this valuable property.

There is no doubt, by the surface indications and developments made already on this mine, that it will prove one of the biggest and best bodies of ore ever found in Yavapai county.

The owners of this property have assurance of Eastern parties taking hold of it, and investing considerable capital for its development.

Next south of the Great Basin mine is the Horu Silver mine of Louis Johnson, who has run a 100-foot tunnel and struck a two to six-inch pay streak of very rich ore; has three tons of ore on the dump, the average assay of which is 250 ounces.

Near this property is the Virginia No. 2, owned by Fred Suhr, Jos. Rodenberg and F. Kuhne. This mine has a 110-foot shaft, a 60-foot tunnel and a 40 foot drift. Several tons of ore from this mine averaged nearly \$1400 per ton. A shipment has recently been made from this mine to Socorro and good returns are expected from the same.

The Marlow mine is three miles south of the Great Basin, and lies at the mouth of Tully creek; has a 50-foot tunnel, and found gold and silver assaying \$45. Commenced a shaft in the bed of a creek and struck a body of ore that runs 80 per cent galena, and 45 ounces silver. The immense exposure of galena is truly wonderful.

The last mine on this ledge is the Pearl, and lies close to the Marlow mine; is owned by Ed. Wiggins & Co.; has a tunnel of 120 feet, a shaft of 100 feet, and one of 110 feet. There is a large body of ore on the dump, and the owners are pushing work on the mine, sanguine of soon coming out to a rich body of ore. A shipment made from this mine milled \$600 to the ton.

I.

Tanned Fish Skin.

EDITORS PRESS:—The report of La Perouse's voyage at page 69, volume 3, of the French edition, giving an account of observations at Castrie's bay, in Asia, says:

"The costume of the women is somewhat different; they wrap themselves in large robes of nankin or skin of salmon, which they tan perfectly, rendering it very supple."

This statement is surprising for the reasons that the skin of the salmon does not seem strong enough to be worth the trouble of tanning, and that no other traveler known to me mentions tanned salmon skin. That the salmon can be skinned is asserted at page 64, for

thers we read the people at Castrie's bay take off the hids with much skill, and then eat it raw as a delicacy.

If the skin of the salmon is of value for tanning, are not the stronger coverings of the sturgeon, the skate, the flounder, the halibut, the shark, the dogfish, the porpoise, the black-fish and the whale more serviceable? It would be interesting to have a report of a series of experiments in tanning the skins of all the large fish of our coast by different processes, with the strength of the product in every case.

While upon this subject of salmon tanning let me call the attention of your readers to a statement by Samuel W. Baker in his "Nils Tributaries" (page 181, Philadelphia edition 1897) that oxides are tanned with milk on the Sudan, so as to be perfectly water proof. Parkyn, in his book on Abyssinia (Vol. 2, page 15) says hides are tanned with clotted milk, flax-seed and flour, but does not speak of the water proof quality. J. G. Wood, in his "Natural History of Man" (Vol. 1, page 20) says that in a few hours the Kallirs tan a skin from the animal, so that it can be used with comfort for a covering, and he briefly describes the process.

JOHN S. HITTLE.

GRAVELLY RANGE.—On the top of the range at the head of Confederates gulch is an extensive bed of gravel, similar in appearance to the old river bed in California that has produced so much gold in the last 20 years. It is supposed that Confederate gulch derived its wealth of gold dust from this source, and efforts have been made to sink to bedrock for the purpose of prospecting the ground, but this has never been accomplished on account of water. But enough has been done to determine the extent and comparative richness of the old river bed. It is from 12 to 15 miles in length, but deep and not easily accessible to water. The shafts that have been sunk never reached a greater depth than 80 feet, where dark blue gravel was encountered prospecting well, but the inflow of water was so great that it was impossible to sink lower. In some instances the water raised to the top of the shaft and overflowed like an artesian well. This water is of a dark muddy color, and emits a strong smell, as if it had been pent up in this old channel for many centuries.

The greater portion of this great placer claim was patented in 1872 and 1873, and nothing of any consequence has been done of late years toward developing it, but it is now stated that a company is to be organized for the purpose of opening up the channel by means of a tunnel. This tunnel is to be 3000 feet long, and will be run through solid slate the entire distance. Mr. Muir, of Mullon tunnel fame, is said to be interested in the enterprise, and if it is prosecuted to a successful conclusion the mine will no doubt prove one of the richest and most extensive in the world.

If this old channel is really the source of all the gold taken from Confederate, it is reasonable to suppose that there must be many millions remaining in the old gravel deposit on the top of the range. We hope the country will be thoroughly prospected, and that it may prove fully as rich as expected.—*Helena Independent.*

NEW GOLD SAVING MACHINE.—A newly invented gold-washing machine is now being used at some of the placers along the Arkansas river, between Granits and Salida, which is said to produce phenomenal success. The machine is described as follows by the *Denver Journal of Commerce*: The machine is composed of three sections, about eight feet in length, overlaying each other at the lower end, 16 inches wide and 10 inches in depth. There are three gratings, one at the head of each section, made of three-eighths inch half-round iron, beveled at almost a point at the top, and with 25 of one-sixteenth inch openings in width, through which the water carries the sand into pockets underneath and following the gratings. There are 12 pockets in each section, with openings or plugs, which allow the withdrawal of any or all of the different pockets. These pockets are of light sheet iron, 15 inches long, placed almost on a level with the bottom of the section, with an opening of an inch or more, and the double flange that creates a rotating current of water, carrying off the surplus sand and leaving the gold within an inside pocket, or at its bottom. The sand is carried by the water to the top of the next grate into the following 12 pockets of the second and third sections. The process is so perfect and the fine gold so surely saved that it is very seldom that they clean up the pockets of the last section. They claim that the first four or five pockets of the first section will save at least 90 per cent of the gold. The cleaning up is done by a miniature machine of the same description, containing six pockets, and without use of quicksilver, it being placed within the flume at any point."

CONSIDERABLE excitement exists over the rich discoveries in the Sabinal mountains, Mexico, 230 miles south of Deming, N. M. Parties are outfitting for these mines daily, and specimens pure silver and ores are being daily brought in. One piece weighing a few hundred pounds and valued at \$3000 has been taken out. Deming being the nearest point to the mines, a stage line will be put on soon.

AN artesian well has been bored in Sierra valley and a good flow of water struck at a depth of 280 feet. Others will now be sunk.

Chrome Mining.

An Important Resource of San Luis Obispo.

A few days since, in company with Mr. Charles Froudo, a reporter of the *San Luis Obispo Tribune*, made a brief excursion to the summit of the Santa Lucia Range, inspecting the deposits and mines of chromic iron, the copper prospects, the possibilities of the soil, and enjoying the beauty and grandeur of the scenery.

The Pick and Shovel Mine.

The prime object was to visit the Pick and Shovel mine. For months we have seen the teams passing the *Tribune* office, hauling many tons of this handsome ore, and we desired to see the locality whence it came. Leaving town by the Cambria road, we branch from it near Chorro creek, and by a well graded road ascend into the Sierra to the terminus at the dump of the mine. Several fine ranches are passed en route, and in the canyons of the mountain are cabins that remind one of the miners' cabins of the Sierra Nevada in early days. These, we presume, are occupied by miners and wood choppers, as we could see no other resources. Some small patches of garden and grain were cultivated, and numerous slight excavations showed where digging had been done for "float" chrome. There appears to be a large quantity of this mineral intermixed with the gravel soil throughout a wide extent of country, and the gathering of it furnishes a precarious livelihood for a number of people. Ascending the mountain to an altitude of about 2000 feet, we came to the Pick and Shovel mine, and there found Mr. William Copland ready to show us through the works. Lighting candles at the entrances to the tunnel, we followed our guide into the mountain side. Mr. Copland discovered this mine seven years ago, and has been working it ever since, taking out several thousand tons of ore.

The present owners are Wm. Copland, Jacob Wilson and John C. Cloud. Several tunnels have been run. We followed the main tunnel in a distance of 600 feet. Numerous branches and chambers have been excavated in the search and taking out of ore, some sinking down below the level, and other rising and winding about above. No regular ledge is found, but the ore appears in branches or small streaks, sometimes of a few hundred pounds, and sometimes in deposits of 40 or 50 tons. In the largest deposit a single blast, a few days before our visit, brought down about 20 tons of high grade ore. The rock of the mountain is serpentine, much broken, easily excavated but rather difficult to support in mining, requiring many and long timbers to brace it up. These timbers are usually of cedar, and quite easily obtained on the mountain near by the mine. The ore is run out on a car, and carried to a convenient dump where it is loaded on wagons for transportation to the railroad depot in San Luis. Ore of 45 per cent and upward assay is taken, the price at the mine being \$6.50 per ton. The teams take about four tons to each load, receiving \$2 per ton for hauling. The freight from the depot to San Francisco is \$4.50 per ton, loading on the cars 20 cents per ton, handling at San Francisco 6 cents per ton, freight to New York nominal, it being desirable ballast, but with insurance, commissions, weighing, hauling, transporting to Philadelphia, etc., with an allowance of 2 per cent shortage, aggregating \$12, making the ultimate cost \$26 per ton. The ore is purchased by the Kelion Chemical Company, of Philadelphia, through the agency of R. E. Jack, Esq., of this city. About 600 tons have been sent during the past year, more than half of which was from the Pick and Shovel mine. The balance of the shipments come from other mines in the vicinity and the collections of prospectors and gambosino work. Employed miners receive \$1 per day and their board. The Sierra Santa Lucia and other mountains of the coast contain an indefinite amount of chromic iron ore. This, although in broken bodies, affords a perpetual mining resource, capable of giving employment to a large number of men, with possible fortunes to some. Some of the deposits have been worked quite extensively and many thousands of tons have been shipped from our port.

The Uses of Chrome.

This great resource appears now but very crudely utilized. The mineral is very useful and by manipulation is increased in valuation many hundred times. Could not reduction or converting works be established here, giving employment to capital and labor and making a business that would add greatly to the prosperity and importance of the place? Its manufactures are varied. The name, chrome, is a Greek word meaning color, and was given it because of its tendency to impart beautiful colors to its compounds. Various combinations make different colors, all brilliant of their kind. With oxygen in different proportions it makes different tints of green. The emerald owes its color to chrome. With tin and alkali it makes the beautiful pink used in coloring porcelain. With lead it makes yellow, with iron, purple, and with magnesia a lighter shade of the same color; with copper a bluish brown; with zinc, a golden brown, and other tints and colors with other combinations. Immense quantities are used by calico printers, in giving and fixing color to their fabrics. Would not the establishing of converting works here lead to the establishing of other manufacturing works here in California. As so little is now realized from so valuable a raw material we

think that enterprise and capital should engage in developing the resource. Chrome is valuable chiefly by its combinations, and the substances with which it is combined for utilization are minerals. Perhaps all of these minerals are in our county or in the State, and the development of one leads to the development of others.

The Santa Lucia

Is rich in other minerals than chrome. We all know of the wealth of quicksilver, copper, salt, lime, sulphur, asphaltum, iron, onyx, silicates, and other substances, all of which will be brought into requisition when such a chemical laboratory is established as chrome converting works. To one looking upon the Santa Lucia from a distance it appears a precipitous mountain ridge covered with a dark chaparral, and uninviting in its neglect. So sharply is it defined against the sky, and so distinctly do all its lines show to the vision that one is deceived in its distance and magnitude. A closer inspection shows the greater part of the chaparral to be a forest of pine, cedar, spruce, and oak of sufficient size for building timber, posts, and fire-wood. Also that the mountain is not so steep but that it can be easily ascended, and that the soil is of a very fertile character. Water flows in many streams from springs near the summit. Our companion in this ascent is a well-known and capable nurseryman, always observant of the soil, its productions and possibilities wherever he goes. He pointed out many places very suitable for orchards, vineyards and gardens, fully as good and with as favorable conditions as lands at Los Gatos, Montecito, and in the Santa Cruz mountains and other localities with which he is familiar, for which \$100 per acre is paid. The soil is a light red loam intermixed with small fragments of rock, and usually of several feet in depth. The dense growth of chaparral, maguey, yucca, and forest trees prove its fertility. The success of those who have planted anything on the mountain side, even in the rocky chaparral, substantiate the evidences of nature. Several of the chrome miners have gardens and small fields high up on the mountain which produce well. These miners, while securing a livelihood gathering chrome, may also clear a plot of ground and, planting it with vines and fruit trees, make for themselves comfortable and self-supporting homes for the future.

A Proposed Tunnel.

The Butte (M. T.) *Miner* says: We were informed yesterday by a prominent business man of this city that a party of miners residing in Butte have under consideration one of the most elaborate mining schemes ever considered in this district. It is as follows: It is a well known fact that between the depot and Walkerville there are several ledges carrying gold, silver and copper. A great many of these ledges have been and are at present being prospected at depths varying from 20 to 800 feet. Although many veins have been discovered in the ground lying between the depot and Walkerville and many of them are being worked to great advantage, yet there are doubtless many more in that space that have not yet been found, and the object of the gentlemen above alluded to is to run a tunnel right up through the city of Butte for the purpose of testing those ledges already discovered at a greater depth than they are at present worked, and to fully determine the number and value of the ledges that are concealed in the bowels of the earth in the country through which the tunnel is to be run. It might be argued against this scheme that all the ground through which it is intended to run the tunnel, is already located and owned by parties, and that a great deal of it is covered by United States patents. This, said, our informant, will not deter us from proceeding with our object, for it is the intention to get all persons owning this ground interested in the matter and have their consent to run through their ground. It is intimated that the proposed tunnel would tap the ledges of the Parrot and other mines in that vicinity several hundred feet deeper than they are at present worked; when the Alice and other Walkerville mines are reached the tunnel will have attained a vertical depth of nearly 2000 feet. Who can estimate the good that would result from an enterprise of this kind? The larger mining companies of this camp would doubtless be glad to do anything in a reasonable manner to assist this scheme. This tunnel would not only test their ledges at a far greater depth than they can possibly hope to attain at the present rate of sinking for several years to come, but with a little judicious crosscutting would tend to drain their mines of water. The cost of running this tunnel is to be met by a stock company, and in return they will ask of the owners of the mines through which they run, the privilege of extracting a certain quantity of ore from their mine, and when the tunnel is in its entire distance, if the mine owners wish to work their mines through it, a royalty will be paid the stockholders of the tunnel for that privilege. It is to be hoped that the persons having this matter under consideration will receive the co-operation of the mining men of this district and all those interested in the advancement of our mining industry.

THE discovery of gold near the boundary line between Alaska and British Columbia has renewed the desire for a fixed boundary. At present miners are in doubt whether they are in British Columbia or in the United States.

Cable Roads in New York.

The New York *Tribune* in a recent editorial strongly opposes a horse road on Fifth avenue, where an attempt is now being made to place one. The *Tribune* thinks "New York has gone trundling along in the old ruts, using horsepower, with all its manifest disadvantages," long enough, and now advocates the cable system which "worked admirably in San Francisco and Chicago." The editor of the *Tribune*, who, while he was spending the summer in this city, frequently expressed admiration for the cable roads in this city, and said that it was a great mistake that it was not adopted on Broadway in New York.

Continuing, the *Tribune* says on this subject: "This related effort to use cable roads is coincident with a most encouraging experience with electric motors in Baltimore. Ten years ago the surface corporations ought to have been alive to the necessity of substituting cables for horses. They are now languidly considering the possibility of doing here what has been successfully accomplished for a long time in Western cities. Ten years hence, when electric motors are in constant use in Baltimore, Boston and Philadelphia, they may be pluming themselves upon the completion of a cable system for New York."

"It must be evident to every thinking man that the horse railway system is inevitably doomed. Possibly cables at first and sooner or later electric motors, with the aid of elevated railways, are to take the place of the present clumsy, inconvenient and demoralizing methods of tramway transit. The entire system of surface roads is in a transition stage, and the coming generation has the assurance of permanent relief from the countless annoyance and discomforts now experienced. What folly, then, it is to talk of putting an old-fashioned horse railway in the finest avenue of the city—the only roadway that remains unobstructed! If Fifth avenue must be surrendered to some greedy corporation whose soul beats time to the jingling music of the bell punch, let there be at least some modern system of surface transit—some method less brutal and barbarous to man and beast than the old-fashioned horse railway."

ORE AT DENVER.—The *Tribune-Republican* says: A great deal of ore is daily arriving in Denver consigned to the Omaha and Grant Smelting Company. Two miles more of railway tracks will soon be put in to facilitate the vast business done at these works. All the furnaces are in active operation, and yet the reserves are constantly increasing. A few days ago a *Tribune-Republican* reporter visited these works, and was surprised to see such an accumulation of ore. Besides thousands of tons in beds and dumps, there were nearly 5000 tons in cars on the various tracks. This company, through its smelting and refining works, handles annually nearly 25 per cent of the silver and lead product of this country. Everything about the works suggest to the visitor, most forcibly, that skillful management and a thorough understanding of all details connected with the business of smelting are possessed by the proprietors and their subordinates. This is the more effective when it is understood that for many months not a pound of Leadville carbonates has been purchased, and hence no dependence has been placed upon the desirable smelting ores of Lake county, but just as favorable combinations have been made and smelting carried on without interruption.

MULE WOOD TRAINS.—The *Truckee Republican* says: Photographs have been taken of the camps and railroad at Incline, showing the huge dumps of wood at the end of the flume, the powerful little engine and the train of woodcars. The strangest picture of them all is that of the mule trains, which convey the wood from the places where it is cut to the flume. Each mule is provided with a sort of saddle or covering, and at about the place where the stirrups should be, hooks project on either side. On these hooks and over the mule's back the four-foot wood is piled, almost hiding the animal from view. Four mules can carry a cord. When the flume is reached the wood is not unloaded piece by piece; the driver simply lifts up the front of the load and the wood slips back over the mule, sometimes falling about his legs and sides so that he is hardly able to crawl out. The patient animals never seem to object, however, and day after day the long trains of mules can be seen winding down the mountain sides, carrying their burden of wood over places that would be inaccessible to wagons.

IN the minds of some, our quartz mill prospects do not look as bright as they did a short time since. If Mr. Brown, of Portland, is not in earnest he should not have said what he did, and our citizens would have carried out their project for getting a mill by popular subscription. The case is not hopeless yet, however, and we expect Mr. Brown still to do all he promised to.—*Oregon Sentinel.*

IT is reported that Senator Fair is endeavoring to gain control of the Consolidated California and Virginia mines, and has been quietly buying up the stock for months past. An election of the corporation will be held next Monday. The present management is bunting for proxies.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

Advertising Rates.	1 week.	1 month.	3 mos.	12 mos.
Per line (agate).....	25	80	\$2.20	\$5.00
Half line (1 square).....	\$1.50	\$4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are ruled in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 17, 1885.

TABLE OF CONTENTS.

EDITORIALS.—The Davey Safety Engine; Fluxes and Fuel for Smelting; Aspen, Colorado, 257. Passing Events; The Mint Director's Report; Old Mines; Improved Architecture; Nevada Nickel; Tuolumne Mines, 260. A New and Better Gaslight; Centrifugal Pumping Machinery; What is Lawful Mining; Honey-Stone Coral, 261.

ILLUSTRATIONS.—The Davey Safety Vacuum Engine, 257. Webber's Centrifugal Pump; Honey-Stone Coral, 261.

CORRESPONDENCE.—Grass Valley; Humboldt Mining District; Tamed Fish Skin, 258.

MECHANICAL PROGRESS.—Progress in Boiler Construction; Blacksmiths' Hammer Signals; The Practical Mechanic; Treating Steel Ingots, 262.

SCIENTIFIC PROGRESS.—The Porcelain of Saturn; Official Experiment; A New Application; Electric Measuring Apparatus; The Telitopometer; Production of Pure Glycerine; A Poor Storm Glass, 252.

USEFUL INFORMATION.—Laundry Lessons; Invention of the Power Loom; Substitute for Ordinary Floor Coverings; Steel Railway Sleepers; A Shoe Black Plant; A Convenient Pocket Knife; Don't Pool with a Buzz Saw; Prospective Engineering Contracts in England; A New Brake-Shoe; Tempering Copper, 263.

GOOD HEALTH.—Lemons and their Use; The Tooth Evil; Infectious Diseases; Plith and Longevity, 263.

MISCELLANEOUS.—Chrome Mining; A Proposed Tunnel, 259. What Railway Trains Can be Run For; The Smoky Region, 263.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 264-65.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 268.

Business Announcements.

Perforated Metals—Fraser & Chalmers, Chicago.
Mica Mine—G. W. Spaworth, Lang Station, Cal.
Mining Engineer—Robert F. Letts, S. F.

See Advertising Columns.

Passing Events.

This week we have had the first rain of the season. It was not very heavy, it is true, but enough to signify that our rainy season has commenced. A good many miners are anxious for the streams and ditches to get full again so that mills can work once more.

Down about Hawthorne, in southeast Nevada, they are having quite a little mining boom, and a good many men in that region are hopeful of making a rich strike.

Attention is again being drawn to the beach mines of Northern California and Southern Oregon. Some claims have lately changed hands at good prices. Another one process has come to the front, and this is one reason of the revival. There are large tracts of this auriferous sand, extending several miles inland, which can all be worked if means for doing so economically are provided.

Northern California counties continue to attract considerable attention from mining men. Some of the mines up that way are doing very well, and there are many prospectors in the hills looking for others.

It is said that \$100,000 has been refused for the Stonewall mine, in Julian district, San Diego. The editor of this paper, who worked in a claim near the mine in 1871, remembers when a good deal smaller figure would have taken it. The mine paid well on the surface, but when a little depth was attained the character of ore changed and the mine was given up. It laid idle a long time, but is again being worked.

The Mint Director's Report.

The annual report of the Director of the mint upon the production of the precious metals in the United States during the calendar year 1884 has just been issued from the Government printing office. Among other things, the Director has traced the bullion known to have been converted into coin or manufactured into bars and exported, or used in the arts, back to the district or mining region from which it was derived. This work necessitated the accumulation of statistics as full as possible of the treatment, movement and final disposition of the bullion from its extraction from the earth in the form of ore or native metal, to its delivery to the Government for coinage, or to private parties for export or other use. These statistics are supplemented with direct information as to the actual yield of the more important mines, and with reports from correspondents and mint officers with regard to the condition and progress of mining for gold and silver in the principal localities of the United States. The States and Territories are considered by counties and districts, and much useful information has been compiled.

In addition to the descriptive matter and the statistics there are several miscellaneous articles: "Gold and Silver Mining in California, Past, Present and Prospective," by Walter A. Skidmore; "Practical Hydraulics as Applied to the Measurement of Water in Motion, to Mining and other industries," by P. M. Randall; "The Various Forms in which Gold Occurs," by Wm. P. Blake; "The Separation of Silver and Gold from Black Copper at Oke," by T. Egleston.

In this connection it may be well to call attention to the fact that Mint Director Eureka has been severely criticised by a portion of the press of this State for statements never made by him at all. The miscellaneous articles are contributions which have the names of their authors appended. Instead of crediting the authors with the statements, they have been credited to Mr. Burchard himself. Quotations have been made from these articles, as the opinions of a Government official, when they are simply the statements of individuals who have contributed to the report and whose names appear. We shall, from time to time, make extracts of interest from the report.

Old Mines.

Those who have had occasion of late to travel through the old mining sections of this State have observed one notable feature of great promise. That is the reopening of many old claims and mines that were abandoned twenty years or so ago. In those days ore had to be rich to pay; transportation, lumber, provisions, tools and everything else was high. We ran our mines on a high pressure system. The managers were paid large sums for little work, and the "top heavy" plan was almost universal. It remained for practical miners to show that this basis was a false one. Force of circumstances compelled them to take up old claims again, and they found that with proper management, under the new condition of affairs, money could be made. People do not look for 25 per cent these days. They do not all expect a big fortune out of a small mine. If they can make a good living and lay something by they are satisfied. They can get along with fewer officials and less extravagance and can make money.

Instances may be cited in every county in the State where old mines, properly worked, have been made to pay, where fortunes were sunk in them in days gone by. Gold mines pay with depth. Some of the deepest gold mines in this State are the best paying ones to-day. People who quit work at a couple of hundred feet left claims that are now valuable. As time goes on more and more of these old mines will start up again, giving employment and profit to both labor and capital. We know much more about quartz mining than we did twenty years ago, though we thought we "knew it all" then. Ore is being worked very cheaply in these days, and the percentage of precious metal saved is much higher than formerly. California is to-day the best gold mining field in the world, notwithstanding our hydraulic mines are closed down.

A MANUFACTURING company of Pittsburg has placed \$2,000,000 worth of brakes on 43,000 Western cars in 18 months.

Improved Architecture.

No one can have failed to notice that within the past few years a very great improvement has been manifested in the character of the buildings erected in various parts of this State. In the pioneer days buildings were erected for shelter merely, and then as civilization progressed a better class of structures appeared, having more or less architectural pretensions. But what were considered fine buildings in this city ten years ago are now looked upon as third or fourth-class structures. Those put up of late are of brick, stone and iron, with splendid solid foundations, concrete floors, iron girders, substantial sidewalks, and costly modern improvements. The system of lighting, ventilation and sewerage are all improved. The dwelling houses now built are far superior to the old style. Glass enters largely into the structure. Abundant light and sun are secured, and the houses are healthier and pleasanter. For cities like Oakland, San Rafael, San Jose and Sacramento, the dwelling houses now being put up are of elegant design, and of architectural beauty. The old square box, with its few narrow windows, is a thing of the past. It is not only the mansions of the rich that show improvement in these directions, but the more modest cottages as well.

In the suburban towns the small cottages predominate. But all the new ones are of good appearance, and some money is spent in ornamentation and decoration. It gives our towns a more permanent air. People are making their homes there. They have come to stay. They are surrounding themselves with the luxuries of civilization and the nomadic character of the population is fast disappearing.

Throughout the country regions this improvement is also manifest. In Southern California this is particularly noticeable. Many Eastern people have come in and the sheepherder's hut, or cattleman's shanty have given place to the more pretentious residence of the permanent farmer or the orchardist. The newer towns, such as the colonies show, are far more beautiful than those of older date. The surroundings are more artistic and more comfortable. The houses look like homes. The people are growing up with the country, and have no idea of moving away as soon as they make a little money. One will now find elegant residences more like the country houses of the East and England as he travels through the State in these days. All the thickly populated valleys are settling up with a class of people whose tastes and habits call for homes of a more pretentious character than those the old Californians have been in the habit of seeing.

With this improvement in exterior comes also a decided change in interior fittings. The plain, glaring white walls, with no tinge of color or ornamentation are things of the past. Ornamental papers, tints and frescoes have covered their ugliness. The wood-work is beautified and more ornate than formerly. The furnishings are more elaborate and artistic. The old grave-like parlor, dark and dreary, with its marble center-table, and stiffly-placed chairs, is a thing of the past. The fire-places and mantel-pieces are both ornamental and useful. The hangings take off the squareness of construction. Portieres displace the great unhandy doors and give an air of comfort to the interior, which is most pleasing. Decorations of household appliances are common everywhere, and the homes in every way improved in appearances and comfort.

These things are indicative of domestic improvement in all directions. Men and women are making homes for themselves, and the community is growing. Artistic taste is developed among the members of the household, and the stranger among us can no longer wonder at the primitive way we have been living. California is showing her progress as a State in the character of the buildings which are now dotting her soil on every hand.

IN THE new found cave near Murphy's Camp a natural shaft has been discovered. It has been sounded to a depth of 160 feet without sounding bottom. It is supposed that a much larger cave exists beneath the one now discovered and that the shaft leads to it.

It is stated that six black sand claims near Randolph, Oregon, were recently sold for \$540,000. It will take lots of that fine gold to make up that sum.

Nevada Nickel.

Nickel is not an abundant material on this coast, though its ores have a more general geographical distribution than is generally supposed. They occur in moderate quantity, in close association with chrome ores, in the serpentine rocks from Canada to Maryland, and also with the chrome ores of the Pacific Coast, notably in Oregon. Nickel occurs in this State, Oregon, Nevada, and New Mexico, but no active mining for it has been done. The nickel ore in Kern county, in this State, never amounted to much. That found at Piney mountain, Douglas county, Oregon, was discovered in 1881, and created quite a stir for a time. It contained about 23 per cent of nickel oxide, and it was supposed the mine would be opened and worked. The owner demanded a large price for the mine, and, we believe, went to England to dispose of the property, failing to do so here. At all events the mine has not been worked.

A nickel mine found in 1880 in Churchill county, Nevada, has been worked since, but mainly in order to develop it and see what it really contained. Several other mines were said to have been found, but only the one owned by Charles and William Bell and John Mason, has proved of value. This mine has been worked by the Nevada Nickel Co. We see now, by the Reno Gazette, that the mine has been sold to Eastern capitalists, who intend to erect furnaces and fully develop the mine. The owners have proved the existence of a large body of ore assaying from four to as high, in some instances, as 60 per cent in metallic nickel. The ore at times carries a considerable percentage of cobalt. The ore has also proved to be very easily worked, Mr. Bell producing small bars of nickel in an ordinary crucible with a small furnace without a blast. The fact that the principal nickel mine in the United States, situated at Lancaster Gap, Pa., produces ore containing but 1 1/2 per cent of nickel, points to the Nevada mines as one of the main sources of future supply of this valuable metal. It appears that the ores of the other mines of the world all carry a much lower percentage of nickel than these, and are all more or less rebellious. The terms of the sale have not been made public, but the price paid is said to be a very handsome one.

Tuolumne Mines.

We had a conversation this week with B. G. Davies, who has been for some months engaged on a mine about six miles from Sonora, and three from Columbia. The owner has been, like others in that region, compelled to shut down for lack of water. The water has given out this season about two months before the usual time, as there is no snow in the mountains.

The Tuolumne ditch whence the supply of water is obtained, takes the water from the south fork of the Tuolumne. It is 42 miles long and is a very old one, having been originally built in 1852. It is now utilized by both miners and farmers. It furnishes water to the mills for five cents an inch for 12 hours. As the water is so low many of the mills have had to stop, and will not be able to resume work until November or December.

Mr. Davies considers that there are many good mines in Tuolumne, but most of them are held at very high figures. He has been in many gold mining regions on this coast and in Australia, but never before saw a region where the veins are so spotted. The gold is either in chutes, pockets or chimneys.

In some cases this is a decided advantage, though it has doubtless kept capitalists from investing largely. An instance of it's advantage, cited by Mr. Davies, is that of the Arnold mine, a few miles from Columbia. At one time the owner was down to "bedrock" financially. In a despondent mood one day, wandering over the hills he stumbled and fell. On turning back to see what he had tripped on he found some quartz croppings, and next day pounded out \$500 from the rock. He sank 25 feet and took \$8000 from a pocket. The mine has made him independent. He has no mill, but uses a spring-pole and mortar to crush the rock. The mine is superficial, but rich, and there are other mines of similar character.

It is about 35 or 40 miles from Milto, the terminus of the railroad, to Sonora, and the road is rough, so capitalists do not seem to care to go into the section referred to for investment.

A New and Better Gaslight.

An effort was made last year to organize a new gaslight company in this city to introduce the new process under the patents owned by the United States Equitable Gas Company, of New York. As the new company which had in the course of construction very extensive gas works in New York, were delayed somewhat in getting their works in operation, it was feared that the new process might be a failure, consequently the time expired for which the patents were bonded, and the parties here lost control.

The new company in New York has been in successful operation for over six months, and the success of the system has been far beyond the expectations of the promoters of the new company, the patronage of which has been unprecedented, and it comes entirely upon merit; the pure and brilliant gas giving the greatest satisfaction to the already large and increasing number of consumers.

Now, a few words as to the origin of the new process. The pressure of the varied forms of electrical light has for some time past urged scientists to look for a superior illuminating gas not containing the impurities known to exist in all gas heretofore manufactured by any of the, so-called, water gas processes, and of much higher candle power. The late Tessie du Motay, aided by his former pupil, Barou Jerzmanowski, discovered that essentially pure hydrogen could be produced by passing a current of steam and liquid carbon through a body of quick-lime. This is then carbureted in the usual way, and gas produced very rapidly and at low cost. It does not contain any carbonic acid, and not exceeding 5 per cent of carbonic oxide; can be brought to any desired candle power, always giving a perfectly white and brilliant light.

The following is the official test of the Gas Inspector of New York City, one burner consuming five feet per hour at one inch pressure:

Equitable gas	29	candle power
Low gas	22	"
Coal gas	18	"

Eighteen patents cover the processes by which this gas is manufactured, which are owned by the United States Equitable Gas Company.

These patents have been secured by a syndicate in this city, and steps are being taken to introduce the new process in San Francisco, so that from present indications our citizens will soon be furnished with this excellent and brilliant light which has become so popular in New York. A company has been organized, and the Equitable gas is soon to be introduced also in Chicago.

As an evidence of the cheapness as well as good quality of the new gas, the company in New York is forbidden by its charter from charging more than \$1.75 for 1000 feet. The charter also compels the company to supply gas to all public buildings for \$1.50 per 1000 feet and to all street lamps at the rate of \$12 each instead of \$17, as charged by the other companies, being also bound to furnish gas not less than twenty-five candle power.

At Coeur d'Alene there is a water ditch nearing completion, which will supply the claims on Trail, Potosi and American gulches, many of which contain rich deposits of gold, but it is now so late in the season that claim holders will do but little mining until next spring. The miners there consider there is no question in regard to there being an abundance of gold in the Coeur d'Alene mines, and now that men who own the mines have facilities for extracting it, it is expected that next summer will show large and lively camps on Pritchard creek and Trail, Potosi and American gulches.

THE COL. SELLERS MINING CO., at Leadville, Colorado, having used a couple of Triumph Concentrating tables for sometime successfully, are now putting in two more of the same kind. The machinery of the Joshua Hendy Co. is deservedly popular in Colorado, and their representative there is also popular.

CHARLES DURNING, for nine years in charge of the Manhattan mill, at Austin, and a very old resident of Nevada, has been selected to take charge of the milling of the ore at Belleville.

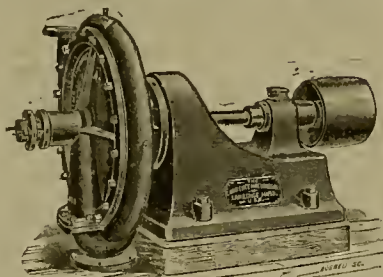
THE owners of the Lapanta, Nev., are consulting together as to the best place for erecting a new mill to work Lake District rock.

Centrifugal Pumping Machinery.

Our illustrations on this page represent two of Webber's centrifugal pumps, manufactured by the Lawrence Machine Shop, Lawrence, Massachusetts. When centrifugal pumps were introduced, they met with every form of opposition. They had to contend against prejudices on all sides, and ridicule and abuse were often showered upon them. Very few engineers then would adopt or use centrifugal pumps, and the public were afraid to do so, taking it for granted that what engineers, mechanics and scientific men said must be true. Even engineers who were constructing centrifugal pumps declared them unsuitable for anything but the lowest lifts, and limited their application to one or two uses. The progress made in their introduction was therefore very small; but perseverance, aided by careful and accurate experiments, has proved their value and efficiency.

The Lawrence Machine Shop builds several different varieties of these pumps, they being especially constructed for the high to lift and

FIG. 1.



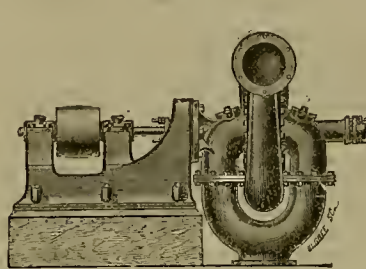
WEBBER'S CENTRIFUGAL PUMPS.

the work to be done. It is absurd to think that the same pump will do equally good work on high and low lifts.

Some makers, to save themselves trouble and expense, make one class of pumps do all sorts of work, and pride themselves on the fact. The result can only be loss to the purchaser; buyers of such are naturally disappointed with them; get disgusted, and abandon the use of centri-

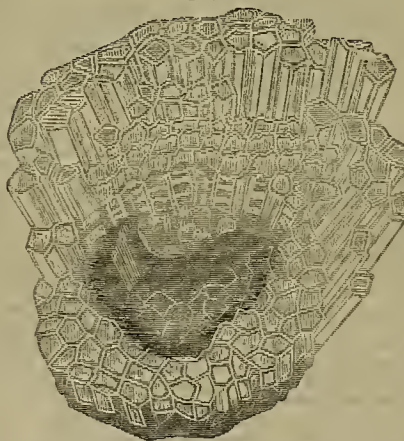
The accompanying engravings show material about which there is quite a general misapprehension among those who have given little attention to matters of natural science. Many readers will recognize in the engravings what they have usually called "petrified honey-comb." The misapprehension is so widespread that Prof. Cook has introduced a true statement about the curious material in his "Bee-keeper's Manual," from which we take the engravings. These specimens are fossil coral, which the paleontologist places in the genus Favosites; favosus being a common species in Michigan. They are very abundant in the lime rock in Northern Michigan, and are very properly denominated honey-stone coral. The animals of which these were once the skeletons, so to speak, are not insects at all, though often called so by men of considerable information. They are really coral polyps. The species of the genus Favosites first appeared in the Upper Silurian rocks, culminated in the Devonian, and disap-

FIG. 2.



peared in the early Carboniferous. No insects appeared till the Devonian age, and no Hymenoptera—bees, wasps, etc.—till after the Carboniferous. So the old-time Favosites reared its limestone columns and helped to build islands and continents untold ages—millions upon millions of years—before any flower bloomed, or any bee sipped the precious nectar. In some specimens of this honey-stone coral (Fig. 2)

FIG. 2.



HONEY-STONE CORAL.

fugal pumping machinery, thinking that all sorts of centrifugal pumping machinery are alike.

Fig. No. 1 represents the class "A" pump, which is used exclusively for pumping to heights above 35 feet. Fig. No. 2 represents the class "C" pump, which is used for drainage and irrigating purposes, or for lifts to 15 feet in height.

There is still another style manufactured, class "B," which is used for lifts from 15 to 35 feet. These pumps are coming into very rapid use on this coast for irrigating and drainage purposes. The Webber pump has proved itself to be of the highest economical efficiency, and as far as its details go, it is the extreme of simplicity. Any further information desired regarding the Webber pump will be furnished by Messrs. H. P. Gregory & Co., Pacific Coast agents.

CONSOLIDATED CALIFORNIA AND VIRGINIA.—At the annual meeting this week there were 181,691 shares represented. There was no contest in the election and the old management was retained, 169,402 shares of stock being voted in their behalf. The following officers were elected: President, Charles H. Fish; Vice-President, R. H. Pollis; Trustees, A. B. Hull, Cornelius O'Connor, George Frier; Secretary, A. W. Havens.

Honey-Stone Coral.

What is Lawful Mining?

The solution of the debris question will, in a great measure, depend upon the report of U. S. Circuit Court Commissioner Houghton, and the subsequent action thereon by Judge Sawyer in the matter of the so-called North Bloomfield contempt case. We have heretofore refrained from commenting on the matter at issue, as we think it improper for a newspaper to pre-judge a case on trial where the testimony was taken in secret session, and we now allude to it only because we are informed that the Commissioner will make his report about the time we go to press. Though the testimony was taken in private, enough has leaked out through the correspondents of interior papers to enable us to present the status of the case. The complainants—the Anti-debris Association—allege that the Bloomfield company on one or more occasions violated the injunction by piping against their hydraulic bank. The defendant company allege that they were engaged in prospecting their ground to ascertain whether it would pay to work by the drifting or any other method hitherto considered lawful, and in so doing they used no more water than was necessary to clear the mouth of their tunnel, when the bank caved—as it did on one occasion—and that they had not pursued hydraulic mining in any sense.

As to the merits of the case, we can pronounce no opinion until the Commissioner renders his report, but we hope the report will be sufficiently comprehensive to enable Judge Sawyer to define explicitly what is lawful mining, for his decree in the case of the Woodruff vs. N. Bloomfield leaves a doubt whether any mining which soils water is lawful. Our auriferous territory is very extensive, and in many localities favored with an abundance of water gravel may be washed by the elevator process, often described in our columns, and the debris retained in the old pits, where the water will settle to nearly a pure condition. Should this process not fall under the ban of the Woodruff decree many mines now either enjoined or in terror of interference may be worked. We shall await Judge Sawyer's decision with interest.

Caves and Ore Bodies.

Caves are found in many places in limestone regions, and are of frequent occurrence in connection with ore bodies; in fact, in Eureka District, Nev., Mr. J. S. Curtis, of the U. S. Geological Survey, states in his monograph on the "Silver Lead Deposits of Eureka," that no large ore bodies have ever been found there which had no caves over them; but caves are, by no means, always accompanied by ore bodies. They resemble all caves found in limestone, and have been produced in part, at any rate, by the solvent action of water carrying carbonic acid.

These waters passed through fissures and cracks, enlarging them, and dissolved the limestone, especially where it was crushed and broken. The finely crushed limestone was dissolved first, and the large fragments and boulders settled down, and were finally either completely dissolved or remained in the bottom of the caves. This action was naturally most considerable at those points where the best opportunity was afforded for the free circulation of the water, and as the limestone was not uniformly shattered, and as the different varieties of rock did not offer equal resistance, the openings formed were of very irregular character. The roof and sides of the caves are sometimes entirely bare, and only show the characteristic surface which results from the action of a solvent. Deposition of calcium carbonate however, as well as its solution, has taken place on a large scale, and is still going on. The roof and sides of most of these caves are covered by aragonite crystals, and in some of them crystals of this mineral are still forming.

ACTING under imperative orders from President Diaz, the Governor who dispossessed the American miners from Las Cruces silver mines, has been compelled to surrender the mines to their American owners. This is done through the intervention of Secretary Bayard.

SOME Salt Lake men are at Neibart with a view to arranging for moving a smelter, now situated at Salt Lake, to the new Meagher county camp,

there are to be seen banks of cells, much resembling the paper cells of some of our wasps. This might be called wasp-stone coral, except that both styles were wrought by the self-same animals.

A CORRESPONDENT of the Coos Bay, Or., News writes from Bandon City, on the Coquille, as follows: Some time ago we let our black sand beach mines to a couple of Chinamen for \$25. They took out \$1500. According to the new process they would take out \$45,000. From every quarter we learn that the new process is a decided success, and we see no reason whatsoever to doubt it.

THE black sand mines on the coast of Southern Oregon are attracting much attention at present. Some more "new processes" have been discovered for separating the gold from the sand. Everybody knows that the sand has "millions in it," if it can only be got out.

AMERICA, the chief silver-producing country of the world, has to telegraph to England (which produces no silver) every morning to learn the market price of the metal.

SAMUEL I. SILVERMAN, of Helena, M. T., has perfected all necessary arrangements for providing that town with additional sampling works.

MECHANICAL PROGRESS.

Progress in Boiler Construction.

At the meeting of the Master Mechanics' Association in June, a very interesting report was read on "Progress in Boiler Construction," from which we extract as follows:

Steel was reluctantly used in 1869, but 200 boilers of steel are reported in 1875, and it was recommended in that year, exclusively recommended in 1877, and the committee was unanimous in 1878. In 1870 an opinion from a French engineer was quoted, being steel plate for boiler use should be capable of hardening; presumably he was using the metal in barrel plates, and to reduce their thickness and weight, required a metal of high tensile, which he would secure in a steel that tempered by immersion; but in 1871 the complaint was that it was manufactured too hard, and in 1875 steel that would not harden was recommended, more especially for fire-box services. The steel we now easily procure and should use for both sheets and furnace, has but a small percentage of carbon—say from 0.15 to 0.20 per cent, and therefore, if fairly free from silicon, phosphorus, etc., will not harden. It is mild and ductile, working under the hammer, even when cold, most freely; has a breaking resistance of from 62,000 to 65,000 lbs. per square inch of section, with an extension of 24 to 25 per cent in a length of ten inches. A good shop test—in addition to bending over at a point in test piece where it has been punched either cold or after it has been heated and dipped in water—is to take a narrow strip through which a hole one-fifth its width is punched and then enlarge the hole with a drift and flagging hammer to fully three times its original punched diameter without splitting the strip.

It may be said that there is now no practical limit to the size that steel sheets of desirable quality and thickness can be procured. The Central Pacific are making the straight portion of wagon-top boilers in one plate, and receive sheets 14 feet 3 inches by 8 feet by 7-16 inches, and last year, at Erie, Pa., 3-inch plates 16 feet long were bent cold in rolls to a curve of 30 inches radius, so that the two sheets made one boiler 16 feet long and 60 inches diameter, with but two longitudinal joints in barrel. Mr. Webb has rolled from ingot and used 7-16-inch steel plate 11 feet 3 inches wide by 12 feet 9 inches long in one barrel ring. This practice is in line with the strong recommendation of the committee in 1871; but, as they point out, it requires special rolls to be built for bending the plate. Welded seams, when iron plate and coke fire are used, give at least but an ultimate tension of 14 long tons and 6½ per cent extension for 22-ton iron, therefore it is not a matter of surprise that such a form of joint was seldom used; but now 22-ton mild steel and common gas flame for beating the scarf secures a weld having an ultimate tension of 21 tons and an elongation of 8½ per cent in a 10 inch length—that is, an increase of 50 per cent in strength and 30 per cent in ductility, although it should be noted that this excellent result is but one-third the ductility of the unwelded steel plate.

Some careful experiments show that very mild steel, after annealing, loses somewhat in resistance to ultimate tension, and in ultimate percentage of extension; or, in other words, annealing does not necessarily improve the natural plate. Nevertheless, if holes are punched in the plate, or it has been flanged or set when warm, mild steel must be annealed, the annealing furnace temperature not being carried too high—a blood or cherry red is quite sufficient—the time in furnace not prolonged beyond the point that will secure thorough and equal temperature, and the cooling not too much hurried by contact with damp earth or a current of wind at low temperature. Neither should there be any attempt to "soften off" by cooling in a bed of sawdust or ashes.

If the flanging, setting or any other distortion, such as bending in the rolls, can be done cold, there is no necessity for annealing either plates or bars, but all such setting is preferably done under the steady pressure of hydraulic tools.

In the course of the discussion on this paper, the use of steel was freely endorsed for boilers and fire-boxes, but not for rivets. Preference was given to drilling out holes rather than punching, as a general rule, but with a very ductile metal punching might be allowable. One member, however, declared that notwithstanding what was said 99 per cent of the members would continue the practice of punching, on account of the less expense.

The objection to the use of steel rivets was mainly due to the obscure matter of galvanic action and its influence on corrosion. Were it not for that uncertainty steel rivets would be preferred. Machine-riveting by a single square was not approved of, but the steam piston riveter giving several strokes was. The hydraulic piston was approved of, which has the merits of the single close squeeze, and the adjustability of the steam piston, producing work of unequalled solidity, and dispensing with the necessity for calking, as boilers are now turned out tight under test pressures of 160 pounds. A large amount of boiler patching, and almost the whole of the work on new tender tanks in position can be done by the portable hydraulic tool.

In calking one source of danger in boiler manufacture is excessive joint calking (both inside and out) with a sharp-nosed tool so close to inner edge of plate as to indent and in many

cases actually cut through the skin of the lower plate. The old style of calking that put a positive strain upon rivets, thus commencing distortion and putting excessive stress upon rivets (already in high tension) before the boiler commenced work, is becoming a thing of the past. With a proper proportion of diameter and pitch of rivet to suit steel, all that is required is the use of a light fuller which does not force the joint. There is but little need for calking if means are taken to secure a clean metal-to-metal face at the joint. A clean metallic joint can be secured by passing over the two surfaces waste wet with a weak solution of sal-ammoniac and hot water, an operation certainly cheap enough, both as to materials and labor required.

The result of such practice is that the riveted joint can be allowed a wider margin beyond outer edge of rivet, permitting the rivets themselves to have the larger diameter, which mild steel absolutely required; and the rivets can be pitched correspondingly farther apart, as the pitch has often heretofore been controlled more by the resistance required to meet the heavy use of the old calking tool than settled by an investigation into the best proportion to secure the utmost strength for given thicknesses of the good material that is now almost exclusively used in locomotive boilers.

Blacksmiths' Hammer Signals.

When the blacksmith gives the anvil quick, light blows, it is a signal to the helper to use the sledge, or to strike quicker.

The force of the blow given by the blacksmith's hammer indicates the force of blow it is required to give with the sledge.

The blacksmith's helper is supposed to strike the work in the middle of the width of the anvil, and when this requires to be varied, the blacksmith indicates where the sledge-blows are to fall by touching the required spot with his hand-hammer.

If the sledge is required to have a lateral motion while descending, the blacksmith indicates the same to the helper by delivering hand-hammer blows in which the hand-hammer moves in the direction required for the sledge to move.

If the blacksmith delivers a heavy blow upon the work and an intermediate light blow on the anvil, it denotes that heavy sledge blows are required.

If there are two or more helpers the blacksmith strikes a blow between each helper's sledge-hammer blow, the object being to merely denote where the sledge blows are to fall.

When the blacksmith desires the sledge blows to cease he lets the hand-hammer head fall upon the anvil and continue its rebound upon the same until it ceases.

Thus the movement of the hand-hammer constitute signals to the helper, and what appear to be desultory blows to the common observer constitute the method of communication between the blacksmith and his helper.—*Blacksmith and Wheelwright.*

THE PRACTICAL MECHANIC.—A correspondent of the *Scientific American* writes to that journal as follows: In one of the most prominent establishments for the manufacture of machinery, machine tools and hand tools in the country the apprentices are subject to novitiates atest of their capabilities and their leaning in the different departments of work in the vast establishment. After a judicious trial of the cleaning of castings, the rough vise work, planing, turning at the lathe, and possibly boring, the apprentice takes a hand at pattern making as a helper, then he goes to the draughting-room, if he inclines that way. He graduates, finally, to his proper "posib," and is draughtsman, pattern maker, forger, molder, floor finisher, lathe man, planer man or fine vise worker. With such a four years' chances the apprentice will come out a competent mechanic—if there is any competency in him. After all, the old time job shop was about as reasonable a school as the embryo mechanic could desire. The superintendent of one of the best known establishments in the country recently died. In conversation some time ago he stated that his intimate knowledge of the different departments of the work was got from his experience in a "job shop," where he had a chance at everything, from building a steam engine to repairing a hoisting winch; he worked at the vise, the lathe, the planer, sometimes at the forge, and always tempered his tools. He made his own drawings (sketches), and frequently made his own patterns. The amateur accomplishments must have been crude, but they gave him the idea of how a job should be done, as well as what was to be accomplished. He was an example of one sort of a practical mechanic, of which there should be more.

TREATING STEEL INGOTS.—J. Giers, of Middlesboro', England, has procured a patent for a new method of treating steel ingots. The ingots are placed in pits or cells built in a mass of brickwork, which, acting as a heat absorber, receives and radiates heat back to the ingots. A comparatively small gas flue passes over the pits without impinging upon them. The flue radiates a part of the heat to the top of the ingot, and keeps the brickwork hot at the point where it is most likely to lose heat. The gas is only kept burning when necessary—that is, when the ingot tops are deficient in heat—or it may be kept burning when there is any cessation of work or when preparing the pits for work.

SCIENTIFIC PROGRESS.

The Perihelion of Saturn.

Nearly a whole generation will pass away, says the *Call*, before the planet Saturn will again be seen under conditions as favorable as he presents to the astronomers this month. He reaches perihelion or his nearest point to the sun on the 21st inst. at 7 A. M. It is twenty-nine and a half years since the sun and the planet which is second in size to him approached so near to each other. Meantime Saturn has traveled more than five thousand million miles in making his vast circuit around the sun, and now looks the great luminary in the face from a standpoint 100,000,000 miles nearer than when 15 years ago he passed apellion, or his most distant point from the sun. The approaching perihelion of Saturn is an important astronomical event, and has been anticipated for years with eager interest. It will be a field day with astronomers, who will eagerly improve the rare occasion in searching for new satellites, in seeking to find out what Saturn's rings are made of and in tracing the shadowy belts on the planet's disk. When in perihelion Saturn's rings are open to their widest extent. Instead of being dull and murky, he shines with a soft and serene light. The planet rises in the northeast shortly after 9 o'clock, and will rise about four minutes earlier every evening until the end of the month, when his beaming face will be visible soon after 8 o'clock. When it is remembered that a generation of men lives and dies in one Saturnian year, our earth with her one moon appears all the more insignificant in comparison with this magnificent Saturn, with his rings, moons and belts. We may, however, find consolation for our littleness in the thought that the earth is in her perfection of development, while the primeval fires of Saturn still burn. When animate life reigns on Saturn, the earth, according to the law of decay, will be a dead world, cooled down to the condition of the moon, where life and moisture are unknown. But millions of years will be required to effect these changes.

Venus is an evening star this month, and easily wins the second place in the October list of planetary notables. She grows more beautiful all the time as she recedes from the sun, her increasing distance being now plainly perceptible in the longer time she remains above the horizon after her departure. When the month closes she will set two hours and a quarter after sunset. Venus is in aphelion on the 16th inst. at 10 o'clock in the evening.

Mars is an evening star and varies little in his time of rising during the month, which is about half an hour after midnight. He may be found at the close of the month a little way northeast of Regulus, and is visible as a small red star.

Jupiter is a morning star. He is too near the sun to be of much consequence at present, but is making his way rapidly to visibility, and when the month closes he will rise more than three hours before the sun. He is in conjunction with Beta Virginis on the 21st inst. at 2 o'clock in the afternoon.

Neptune is a morning star. He rose on the 1st at 7:30 o'clock in the evening. On the 31st he will rise about 5:30 o'clock.

The October moon falls on the 23d, at 4h. 22m. P. M. There was a very close conjunction, or an appulse, between the moon and Uranus on the 7th, at 6h. 56m. A. M., the moon being only 6' north of the planet. She was in conjunction with Venus on the 11th. On the 25th, at 8h. 58m. A. M., she is at the nearest point to Neptune. She is in conjunction with Saturn a second time on the 28th, and with Mars on the 31st.

The above calculations are based on Washington time.

OPTICAL EXPERIMENT.—A contributor to *Cosmos* suggests a curious optical experiment which may serve to show the principles of the stereoscope. If we cut out of black paper two similar figures—two crosses, for example—and place them, their extremities almost touching, at about three inches from the eyes, before a sheet of white paper, we shall see three crosses, the middle one being dark and completely separate. This phenomenon is explained by the simultaneous vision of the two eyes, and it is easy to show this by looking at the objects successively with one eye. The experiment becomes still more interesting when, instead of black figures, we employ complementary colors—red and green, for example. In this case we must use a dark background, and there will appear a white cross in the middle.

A NEW APPLICATION.—An exchange says that a new application of the incandescent light is reported from Germany, where it is said the light has been applied to the internal illumination of the telescope by a committee of the German army. The lamp is placed in a recess normal to the main lunette of the telescope, and between the eye and cross wires. The light of the lamp passes through a small hole in the wall of the lunette, and illuminates the cross wires. This illuminating of the wires is found to double the distance that the telescope will measure.

ELECTRIC MEASURING APPARATUS.—A correspondent of *Science* writes as follows to that journal: In the *American Journal of Science* for March, Professor Trowbridge describes a form of differential cosine galvanometer, in which the

action on a magnet of a strong current, moving through the fixed vertical circle of a large tangent galvanometer (of one meter radius), is balanced by the opposite effect of a weak current from a Daniell cell moving in a reverse direction through the coil of a cosine galvanometer, the fixed and movable coils having a common center. By moving the coil of the cosine galvanometer about its horizontal axis, it is easy to secure a balance, and thus to determine the magnitude of the strong current. An obvious and simple modification of this apparatus consists in substituting for the cosine galvanometer an ordinary tangent galvanometer, with a coil of small radius having a number of turns of wire in circuit with a battery and rheostat. By varying the resistance in the circuit, a balance can be reached, and the strength of the current found. A mirror galvanometer thus arranged, and in direct circuit with a battery and very high resistance, or in derived circuit with a battery and tangent galvanometer, might sometimes be useful, as in studying slow variations in strong currents. Another instrument, which is likely to prove valuable for measuring strong currents, is a new form of differential cosine galvanometer, recently devised by Mr. R. H. Pierce, while a student at the Massachusetts institute of technology. The current is caused to pass in opposite directions through two concentric circles of nearly the same radius, as in Brackets' differential galvanometer; but the inner of these is capable of moving upon a horizontal axis, as in the ordinary cosine galvanometer, and it is revolved until a convenient deflection is secured. A simple formula then gives the strength of the current.

THE TELETOPOMETER.—A considerable amount of time and much thought have been bestowed upon the development of instruments and means of ascertaining the distances of objects, or, in military parlance, of range finding. In all the methods hitherto devised or employed, we believe it has been and is necessary to lay down a base line, and to have recourse to trigonometrical calculations. All this now appears to have been obviated by Dr. Luigi Cerbotani, a professor of the university of Verona, who has invented an ingenious instrument for ascertaining the distances of accessible and inaccessible points from the observer and from each other. The apparatus consists mainly of a pair of telescopes mounted on a stand, and fixed on a tripod for use. The telescopes are both brought to bear on the object, and a reading is then taken from a graduated scale on the instrument which, compared with a set of printed tables, gives the distance. Distances can be measured between far-off objects, and by means of a sheet of paper fixed on a drawing-board a rough plan of the country under measurement can be sketched. In the same way the distances of ships at sea or of moving objects on land can be determined. The apparatus appears to be well adapted for land surveying, but particularly so for military purposes. In fact, it is stated to have been already adopted in the German army in the latter connection, and it is about to be tried by the authorities of our own War Department. A practical trial was recently made with this instrument on the Thames Embankment by Messrs. A. Vreschner & Co., of 43, London Wall, who are introducing the invention into England, and which demonstrated its varied usefulness.—*Iron.*

PRODUCTION OF PURE GLYCERINE.—The first condition for the production of pure glycerine is the employment of perfectly pure tallow; as otherwise the foreign matter will enter into this glycerine solution, and cannot be eliminated. The tallow has to be cleaned before its saponification, and this is effected through a treatment with weak sulphuric acid or a soda solution. Certain organic matters are thereby destroyed, and dissolve in the alkaline or acid solution; and the molten fats float on top of the liquid, from which they are skimmed off into other vessels, to be decomposed. When this decomposition is completely effected, and the manipulation is properly conducted, we receive a raw glycerine, which need only be properly evaporated to give, after its distillation, a pure concentrated glycerine.—*Essler's Modern High Explosives.*

DR. HEINRICH WINKLER, in his recently published "Uralaltaische volker und sprachen," has made a careful comparison of the Eskimo with the languages of northern and north-eastern Asia. He reaches the result that it is unmistakably close relation to the Kadyak, Tschiglit, and Namollo, of the Asiatic coast, but is in no way connected with the Ural-Altaic tongues. It may have originally proceeded from the same elementary conception of speech; but it has developed a type of its own, differing widely from Asiatic standards, and much more closely approaching the structure typical of the great mass of American tongues, though in many respects presenting features peculiar to itself.

A POOR STORM GLASS.—The camphor barometer, or storm glass, is unequivocally condemned by H. H. Clayton as unreliable, for he finds that the height of the precipitate, in the glass, which gives the forecast of the "fair," "change" or "storm," does not depend upon atmospheric pressure or moisture, but upon temperature alone. Storms unattended by sudden cold pass without affecting the "indications" of the camphor solution, so that the instrument is merely a rude kind of thermometer.

What Railway Trains Can Be Run For.

The following communication from a writer who claims to be fully aware of the facts of which he writes, presents a very interesting account of the way railways are run at a minimum expenditure: On the Pennsylvania Central Railroad in the United States, in 1869, a series of experiments were made, with a view to ascertain the relative value of different coals as fuel for locomotives, which showed such remarkable results that premiums were offered to the engineers and firemen who would use the least fuel per ton per mile moved. The accounts for fuel, mileage and tonnage were so arranged that each engineer could, of his own knowledge, know the weight, character and condition of fuel charged to him. It was his privilege to refuse inferior coal; to compare his record with that of engines and trains like his, and to his pecuniary advantage to keep a close watch that his brother engineers did not get ahead of him in stealing coal from passing trains, or at dumping places. One engineer was so economical as to make several runs without being charged with a pound of coal, so great was his zeal in behalf of his company and his contempt for shippers.

During the first month's operations so many tricks were developed and exposed, so many complaints of unfairness were made, that a fresh start was taken, the engineers having meanwhile seen that the accounts were kept so as to show the weight of train per mile run, grade of the distance, speed, etc., thereby enabling a just distribution of the premiums to be made.

As each engineer thought his engine the best, he proposed to prove that *she* was, and would have no monkeying, no dirty, inferior coal, no short weights, no unnecessary application of brakes; he would have the best lubricators for his engine, and see that the car journals were well oiled; hence, before the expiration of three months, the railroad company found they had in their service the very best coal, oil, waste and tallow experts in the country, a detective force inferior to none, and the most capable of engineers upon the subjects of draft, slide valves, automatic oil cups, and intelligence of firemen.

Each month's statement of locomotive performances showed remarkable reductions; determined, by comparison, the value of different coals and the most economical class of engines. It induced the engineers and firemen to be careful and observant, and gave them unlimited cause for chaffing each other. The premiums distributed semi-annually ranged from \$300 to \$25, and those who received them deserved them and worked hard for them, too, while a saving of ten times the amount was made by the company.

Similar investigations have been made by other companies for many years, and thus the various roads have learned what it costs annually to operate locomotives or to pull trains over any mile of track on their roads, and what it costs to move an average train or single locomotive an average mile, and what it costs to pull one or any number of cars an average mile; and this average cost of operation per mile is being annually reduced for many reasons too numerous to mention in one letter. By finding the average cost on each separate road first, it is not difficult to find the general average cost of operating trains per mile on all roads throughout the United States. Those who make the estimate will find it to be about 17½ cents per train per mile; \$1.75 per ten miles, etc.

The Smoky Region.

No mining region of Idaho nor, in fact, any other in the West, promises more favorably than that of the Little Smoky Mining District. The developments of the season in the various claims and locations have been something remarkable, and but little has been heard or said about it owing to the fact that the interests are held by parties who propose to hold and work for their own benefit, and are not tooting for purposes of sale.

During the past week or two some of our leading citizens and mining operators have been visiting that camp looking after their interests and preparing for vigorous work next year.

In view of the wonderful development and promising future of Little Smoky district and of the fact that the route via Warm Springs creek, from Ketchum only 25 miles, is the most practical for that region, our business community has taken in hand the work of completing a good wagon road there, and a force of men are now at work from the terminus of the present wagon road, which reaches half way. The road will be completed to the base of the dividing ridges between Warm Springs creek and Little Smoky river this fall, and early in the spring it will be finished into the heart of the district, which will facilitate travel and traffic between that region and the railroad and Ketchum, and give us all that trade besides furnishing means of cheaper and greater transportation for their ores to the nearest and best market—the Philadelphia Mining and Smelting Company's works at Ketchum, which pay cash on delivery and highest rates for all ores.—*Ketchum Keystone*.

W. T. GARRATT & Co. have completed a large bell for a fog signal for Point Conception, for the U. S. Government. The bell weighs 31,000 pounds and has a clapper weighing 104 pounds. The clapper will be moved by the waves.

USEFUL INFORMATION.

LAUNDRY LESSONS.—Before beginning to wash, says *Good Housekeeping*, all the bod linen and underclothing should be placed by themselves, the table linen and tea towels put in another pile, the flannels treated similarly, while colored clothes should be laid aside to be washed last. Stains of all kinds on clothes should be washed out before they are laid aside for the regular wash. Spots on table linen usually yield readily to soap and warm water; wine stains should be covered with salt, wet and rinsed out; fruit stains may be removed by pouring boiling water over them before they are wet; coal oil and common baking soda mixed in equal parts will have the same effect. To remove inkstains dip the part in hot tallow or wash in new milk. If clothes are iron moulded, use oxalic acid, which will also remove mildew. Paint can be washed from any article by rubbing with lard and then washing.

Merino, woolen and silk underclothes and stockings are very easily spoiled in washing. Nons but the best soap should be used, and it should be dissolved in hot water. Do not rub the woolen clothes, but cleanse them by drawing them through the hands in and out of the suds. Rubbing shrinks and injures them. When clean, wring from the suds and rinse in warm, soapy blue water, stretch into shape and hang out immediately. Woolen and silk goods should never be washed on a stormy or cloudy day.

INVENTION OF THE POWER-LOOM.—The power-loom is the invention of a farmer's boy who had never seen or heard of such a thing. He whittled out one with his jack-knife, and after he had it all done, with great enthusiasm he showed it to his father, who at once kicked it to pieces, saying that he would have no boy about him that would spend his time on such foolish things. The boy was sent to a blacksmith to learn a trade, and his master took a lively interest in him. He made a loom of what was left of the one his father had broken up, and showed it to his master. The blacksmith saw that he had no common boy as an apprentice, and that the invention was a valuable one. He had a loom constructed under the supervision of the boy. It worked to their perfect satisfaction, and the blacksmith furnished the means to manufacture the looms, and the boy received half the profits. In about a year the blacksmith wrote to the boy's father that he should bring home with him a wealthy gentleman, who was the inventor of the celebrated power-loom. You may be able to judge the astonishment at the old home when his son was presented to him as the inventor, who told him that the loom was the same as the mode that he had kicked to pieces but a year before.

SUBSTITUTE FOR ORDINARY FLOOR COVERINGS.—The new paper-mache covering for floors is pronounced a successful substitute for matting, carpets, etc., and the process is comparatively simple. On the floor being made thoroughly clean, the holes and cracks are filled with paper putty, made by soaking newspaper in a paste made of wheat flour, water and ground alum—a tablespoonful of the latter to one pound of flour and three quarts of water, the whole completely compounded. The floor is coated with this paste and a thickness of Manila or hardware paper placed on this, a second covering of the paper being employed if two layers are desired. On this becoming dry, the paper is covered with paste, and a layer of wall paper of any desired style or design preferred is put on. On this becoming dry there are applied two or more coats of sizing, made by dissolving one-half pound of white glue in two quarts of hot water. The final treatment consists in giving the surface a coating of hard oil finish varnish.

STEEL RAILWAY SLEEPERS.—The Northeast railway company, Belgium, has invited tenders for 2000 tons of steel sleepers. This step has been taken probably because experiments made with metallic sleepers in Holland have shown that the renewals required amounted to less than 20 per cent in twelve years. The value of a metallic sleeper condemned as past service is also much more than that of an old wooden one. Steel sleepers will, of course, be found more durable than iron ones, and may possibly exert an important influence upon the future maintenance of permanent way.

A SHOE BLACK PLANT.—There is a tree which grows some 20 or 30 feet in height in India which is known as the "shoe black plant." It produces most beautiful flowers, which contain a quantity of astringent juice, and which, when bruised, turn black or to a deep purple. This liquid is used in Java and some other portions of the Orient, as a substitute for shoe blacking—a very poor one however. The tree would flourish in this State, and would be very ornamental for its flowers.

A CONVENIENT POCKET KNIFE.—Somebody has put a convenient device upon an ordinary pocket knife, which consists in etching a two-inch measure divided into eighths upon the blade. With this a man always has a handy rule by him and just when he needs it.

DON'T FOOL WITH A BUZZ SAW.—There is nothing gained by shaking hands with a buzz saw, or in making the acquaintance with an invisible edge that surrounds the outer portion of a circular saw where the teeth are found, for

there is a tooth to present in every point of the compass, and no introduction generally proves that the saw is most too enthusiastic in the line of friendship for the average individual.

PROSPECTIVE ENGINEERING CONTRACTS IN ENGLAND.—According to the *Engineering News* out of 161 bills passed by the late Parliament, 70 were for railway projects, 45 of them including the construction of 230 miles of new railway and other work at an estimated cost of \$67,005,000. Twelve of the authorized bills are for the building of 114 miles of railway just incorporated.

Among the other bills are, 12 tramways, 20 gas and water bills, 10 in connection with docks, harbors and rivers, and 14 town improvement bills. The most important bill passed was the Manchester ship canal bill, involving the construction of a canal 36 miles long at an ultimate estimated cost of \$50,000,000.

A NEW BRAKE-SHOE, consisting of alternate layers of compressed paper and wood one-quarter inch in thickness, is being tried on the Third Avenue line of the New York elevated railroad. Shoes of this construction have been used for 13 weeks, and made a total run of 9271 miles against eight weeks and 6000 miles of the ordinary metal shoes. This would equal 200,000 miles on an ordinary road, where the stops are only one-twentieth as many. There is much less wear on the wheel-tread, and it requires less time to stop the train.

THE BOILER that carries out water with its steam may show a large apparent evaporation, but the steam, being wet, is of much less value in the engine. A boiler should give dry steam in all cases.

TEMPERING COPPER.—The hardening and tempering of copper is supposed to be one of the lost arts, but a Boston inventor has shaved himself for years with a copper razor.

A PREVENTIVE.—To prevent the disagreeable odor of cooking cabbage, put a small piece of red pepper in with the cabbage and there will be no smell.

GOOD HEALTH.

Lemons and Their Uses.

As a healthgiving fruit the lemon is greatly undervalued. Its frequent use, especially in the warm season, is preventive of the malaria, that comparatively new and now fashionable disease. The juice of two lemons taken in half a glass of water before each meal is a powerful remedy for rheumatism, and it is also considered almost a specific for intermittent fever. The juice of one lemon taken three times a day in a cup of clear, strong coffee, will often cure chills and fever, when the disease is stubborn and unyielding to all other remedies. Lemon juice is cooling and purifying to the blood and a valuable regulator for many of the ailments peculiar to spring. For its good medicinal effects it should be taken without sugar, but always somewhat diluted; if clear its powerful acid has injurious effect upon the coatings of the stomach and the teeth. We know of a physician who used lemon juice in a case of smallpox, the only liquid given, and no other remedies. In 36 hours the disease was under complete control, and in one week was entirely cured.

Hot lemonade, with flaxseed simmered in it for half an hour, then strained and sweetened, is excellent for a cold, but, as it produces perspiration, it should be taken only upon retiring. The white of an egg beaten to a stiff froth and whipped up with the juice of a lemon, relieves hoarseness and soreness of the chest at once, taken by the teaspoonful half hourly.

The pulp of a lemon, hound on for three successive nights, is said to cure corns, and a few pearl shirt-buttons dissolved in the juice of one lemon forms a thick, creamy ointment that will almost surely cure them. So we find the medicinal properties of the lemon are many and varied; their value in culinary art is also great. The rind, thinly pared off, is an agreeable flavoring for custards, creams and blanc mange. It should be cooked in the milk and removed before the other ingredients are added. The yellow rind only is fit for use—the white part is always bitter. The juice of a lemon added to an apple pie, when the apples are not tart, or when they have become insipid in spring, is a great improvement. The grated rind, also, imparts a pleasant flavor, other flavorings being omitted. Used in cookery we find this acid fruit makes many delicious desserts and relishes, pies, puddings, jellies, pickles, candies, etc.—*American Cultivator*.

THE TOOTH EVIL.—American youth is getting more and more into a bad plight with defective eyesight and defective teeth, two important factors generally confessed in the physical sum total of good looks and health. Children of twelve wear spectacles, because parents have abused their eyesight by reading by an imperfect light, or while jolting in cars; their teeth are rarely sound, a writer in the *Bazar* affirming that the modern child often has hundreds of dollars worth of gold in its mouth before that age, and that children of sixteen often wear complete sets of false teeth. Not all the advanced science of modern dentistry can save teeth that are decayed before they are fairly

cut through a baby's gums. The mischief is beyond repair while the pearly little tooth lies hidden in the tiny jaw, and it is caused by the innutritious food the parents, particularly the mother, have eaten, the sweets, the sauces, the hot and ice cold drinks, the highly spiced diet which produces dyspepsia, and thins and disorders the blood. According to the dentist, the American tooth will eventually be as obsolete as the dodo. It is rapidly ceasing to exist, in spite of the care that is bestowed by those who have the means to pay dentists' bills, and, what is worse, in spite of human vanity. Fine teeth, white, wholesome teeth, are a priceless treasure, and if reformers would attack the dietary system of the "society" home as well as the clothing of modern women, they might accomplish a greater good than they are at present doing.

Infectious Diseases.

In reviewing a new German work on the above subject, by Dr. C. Liebermeister, *Science* states that he defines and classifies the different varieties of infectious diseases in a very clear manner. He first divides those diseases into the miasmatic and the contagious. By miasmatic, he designates those diseases whose germs are primarily generated outside of, and independently of, any diseased body. Contagious diseases are those whose specific germs arise only in organisms suffering the special diseases. Contagious germs can be transferred from a sick man directly to a well man by simple contact, and they may then produce the same disease in this second person. Miasmatic germs, however, are bred in special localities—in the soil and water—and they attack those who come to these localities, but are not transferable from person to person. The contagious diseases, therefore, are *epidemic*; the miasmatic, *endemic*. A third group of these diseases includes a number whose germs appear to require two stages of development—first in the body, and then outside of it—before they become qualified to infect a new body. Thus cholera is not directly transferable from person to person, and men are also attacked who never saw another sick with cholera. On the other hand, it is equally certain that cholera never arises in any place outside of the East Indies, except it is brought to that place by human agency. Professor Liebermeister's explanation of these apparently contradictory facts is very logical and satisfactory. He assumes that cholera germs, when first expelled from a diseased body, are innocuous; but, falling upon suitable conditions of temperature and moisture, they develop the fatal properties which render them deadly to those who come in contact with them. Typhoid fever exhibits similar contradictions as regards its method of transmission, but such contradictions become clear and harmonious in the light of this theory. The excrement of one typhoid patient in Pennsylvania, thrown out upon the hillside to ripen its deadly poison, killed hundreds of people in the town of Plymouth a few weeks later. The necessity for the instantaneous disinfection of all the excreta of these diseases should be one of the fundamental principles of sanitation taught to every child in every school in the land. Grown-up people do not go to school, and they learn slowly. Children at the right age should be taught such matters in the proper way.

FILTH AND LONGEVITY.—While the principle that cleanliness is an essential to health and longevity is an established fact of human life, now and then an exception is found that astonishes the physiologists. For instance, at Howdon, a dirty, desolate village on Tyneside, England, a boy was born who, at the time of his birth, had the following extraordinary number of grandparents and great-grandparents alive. The grandfather and grandmother on his father's side were hearty and well, and so were both parents of the grandfather and the mother of the grandmother of the grandmother. The grandfather and grandmother on his mother's side were active and strong, and so were both parents of the grandmother. The boy thus had four grandparents and five great-grandparents alive, each of whom was in active work earning his or her own livelihood. Yet this village where these hale and hearty grandsires and grand dams live and flourish is one of the most unsanitary in England. Open sewers run down the center of some of the streets. Until a few years ago the water supply was from one well. Houses have been condemned, wholesale, as unfit for human habitation, to the intense disgust of the people. Yet, notwithstanding all these adverse conditions, these families live and thrive.—*Phrenological Journal*.

COCAINE, which has proved a useful remedy for such a variety of ills, is now claimed as a preventive of seasickness by a Russian physician, M. Manassein, in St. Petersburg. Having had occasion to make several journeys this summer, he took with him some cocaine. He did not have a sufficient quantity to make his experiments on a large scale, but on all those to whom it was given it had an almost magical effect. One couple who had always suffered extremely from seasickness took some of the cocaine, and for the first time in their lives remained well, even during 48 hours of stormy weather. A girl of 18 who had been very ill for 24 hours received six spoonfuls, when her appetite returned and she was completely restored. Dr. Manassein has also discovered in cocaine an effective remedy for cholera nostras; and it seems probable that this new drug may prove useful in Asiatic cholera.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ANOTHER BIG STRIKE IN THE MAMMOTH.—*Dispatch*, Oct. 10: A lot of very rich ore was struck in the big tunnel at the Mammoth mine at Middle Bar a few days ago. The strike is considered as of great importance because it reveals the fact that the ledge extends down to so great a depth that the question of its permanency is settled. The point where the ledge was struck is about 800 feet below the surface of the ground, which of course proves conclusively that it extends at least to that depth, and possibly deeper. The strike will undoubtedly inspire renewed confidence on the part of parties who are developing other mines in that vicinity. The extent or thickness of the ledge at this depth is not yet known, as the progress of the tunnel is necessarily very slow on account of its immense size, and further developments are awaited with great interest, not only by those who are interested in mining but by the public generally.

ANOTHER MINE SOLD NEAR MIDDLE BAR.—We understand that Mr. Paul Ciama, of James Bar, just across the river from Middle Bar, sold his quartz mine a few days ago to Drs. Donnell and Lloyd, of Oakland, who will commence work on the mine as soon as they can make the necessary arrangements. They also intend putting up a fine mill some time in the near future, if the mine should prove to be as good as anticipated, or as good as the other mines in that vicinity. The price paid for the mine we understand was \$12,000, one half of which amount was paid in cash when the sale was consummated. This mine is located on the Calaveras side of the river, and is near, or joins, the celebrated Gwinn mine. It is also just across the river from the well known Mammoth mine, and there can be but little doubt that it will prove a valuable piece of property.

THE KENNEDY MINE.—We are informed that the parties who came up here last week for the purpose of resuming work on the old Kennedy mine, have ordered the lumber, machinery, etc., necessary to put up the hoisting works, and that the work of hoisting water and retimbering the old shafts will be commenced as soon as the necessary machinery can be got in working order. The new machinery will be run by water power, and when they get the old shafts re timbered they expect to sink down several hundred feet, and thoroughly prospect the mine before putting up a new mill.

STRIKE.—Amador *Sentinel*, Oct. 7: A strike that may be of some importance was made at the Moore mine this week. The rock taken out was of a very good character, but we did not learn the extent. J. Boomershire, of San Francisco, came up Tuesday, and in company with Ed. Bowers, will re-open the old Belding mine, between Dennis Kelly's place and the Mokelumne river. The St. Julian commences with H. T. Tripp as contractor, a 300-foot extension of the tunnel recently run to get under the old tunnel, and make connection with winze where Matson, Price and Chatham found the big strike last spring. A new bonanza has been discovered in the lower level of the Empire mine of Plymouth. What its extent is has not been developed, but it is believed to be something immense. On Saturday a streak of black metal was struck in the face of the drift now being run from the big tunnel at Middle Bar. We understand that this strike is made just about where the lead of the Mammoth mine might be expected to be found. We are pleased to announce this week that work will be commenced on the Kennedy mine as soon as it can be done. A large contract was entered into with the Pioneer Saw Mill, to furnish the necessary timbers and lumber, which positive action makes the commencement of work a certainty. The first work will be the repairing of the shaft, and if the body of ore is found as represented, then a 40-stamp mill will be erected. The Kennedy rock is low grade, but there is said to be plenty of it, and now-a-days rock that pays only four or five dollars per ton can be profitably worked.

COLLAPSED.—Amador *Ledger*, Oct. 10: Work on the Kitteridge claim, 2½ miles west of Jackson, has collapsed. Forty tons of ore was put through the mill, and the gold obtained therefrom sold for \$29.50. When the full extent of this flattering output dawned upon those who have been diving into their pockets to keep things moving, they concluded that the wisest thing to do was to pocket their loss, and quit in disgust, which they did. To get this 330 crushing, they have gone to an outlay bordering on \$3000. The ditch which they have constructed to convey water to the claim will no doubt be taken off their hands at its original cost by the Amador Canal Company. Some of the parties to this disastrous mining venture vow that they will never again touch a quartz claim west of the main belt. It may be that good pay ore exists in paying quantities west of the mother lode; but all experiments to develop a mine in that quarter have so far proved ruinous failures; and this ought to be sufficient to cause capitalists to go slow in expending money where experience teaches there is but a slim prospect of reaping any adequate returns. At the Moore mine some ore has been met with in the sinking operations which has yielded as high as \$20 per ton. The two-stamp mill on the Kitteridge claim has been sold to all parties working the Dunning claim, and is kept running on ore from that mine. The plates look well, and indicate a yield of at least from \$6 to \$7 per ton. Work on the Kennedy is to be started at once. Knight & Co. are engaged to put up new machinery at the mine.

Calaveras.

MINE SOLD.—Calaveras *Chronicle*, Oct. 10: We understand that Col. Robinson has sold the Bryan mine to Dr. E. Donnelly, of San Francisco. Dr. Donnelly will immediately put on a force of men and take out ore. He will lease 10 stamps at the Boston mill. The mine is looking exceedingly well, and we have no doubt but that the doctor has secured a valuable property. There are many good properties in this camp that could be made productive if developments were pushed. The signs of the times indicate that there is a growing activity in quartz mining throughout the State. We feel confident that "Old Calaveras" will lead the procession,

for within her borders are some of the best mines to be found anywhere. The "Oneto mine" near Middle Bar, and on the Calaveras side of the river, lying between the great Nevill Bonanza and the Gwinn mine, was sold yesterday, we are informed, to New York parties. The price paid we did not learn, but we suppose it was a goodly sum as the mine is understood to be very extensive in low-grade ore besides rich streaks of black metal such as the Nevill contains. Mr. Joseph Lefoy of this town has the honor of promoting the sale of this valuable property. A number of mining men have visited our town this week, giving evidence that our county has attractive features in her mines.

Inyo.

BASTO'S CLAIM.—Inyo *Independent*, Oct. 10: From a new mine at Cerro Gordo John Basto is getting out some good ore. Four samples assayed by J. A. McKenzie gave the following results: No. 1, 71 per cent lead, 69.25 ozs. silver, total per ton, \$89.52. No. 2, 53½ per cent lead, 42.52 ozs. silver, total per ton, \$54.97. No. 3, 75 per cent lead, 82.62 ozs. silver, total per ton, \$106.81. No. 4, 50.30 ozs. silver, total value per ton, \$659.77. Mr. Basto has sold out his interest in the lease of the Union mine to his late partners, and will devote the whole of his time to the development of this new claim.

SAN CARLOS.—This virtually new mine, but really old location, is showing up remarkably well of late. Mr. Densmore reports a 2½-foot vein now opened in the mine, getting wider as the drift is advanced. Samples of the ore recently assayed contained 170 ounces silver per ton, \$5 to \$12 gold, 88 per cent copper and 40 per cent lead. Mr. Densmore has sent some of the ore to the Nevada State Fair at Reno, where it is sure to attract the attention of mining men. A shipment of ore from the San Carlos will be made to San Francisco in a few days.

GOOD ORE.—Recently Jack Wilson and Jerry Fitzgerald shipped a lot of ore from Lee district, east of Keeler, that netted them over \$200 per ton, after all expenses, including hauling and freight, were paid. A small lot of ore went as high as \$600 a ton.

PANAMINT.—A letter received from Mr. N. G. Fairman states that the work of building the road to Panamint is progressing more rapidly than was expected.

UNION MINE.—A change has been made in the Union mine, Cerro Gordo. Pat Clinton and others have bought out the lease of Morrison, Casey, Basto and Lockett. Pat had intended to make a trip to Europe this fall but this engagement has forced him to give it up. The ore body now in sight in the mine is very encouraging to the new lessees, and there is every chance that they will do well. The other partners are Thomas Boland and David Holland.

Mono.

STANDARD CON.—Bodie *Free Press*, Oct. 12: The retimbering of shaft progresses very satisfactorily; the ore bodies hold well with promises of improvement. Oreshipped to mill 315 tons. Bullion shipped Tuesday, 6th, \$7558.

Nevada.

DIVIDEND.—North San Juan *Times*, Oct. 10: On October 1st the Delhi mine paid its second dividend of \$70,000. This makes \$20,000 this company has paid out in dividends since the mill has been put in operation. As the mill is a small one, running only eight stamps, and the mine only just developed those figures are remarkable. The tunnel now being run on the 200-foot level is about 300 feet, and although the ledge has not yet been tapped, the workmen now expect to strike it daily. The company is very well satisfied with the prospect of future developments.

ORLEANS MINING COMPANY.—Grass Valley *Union*, Oct. 10: The Orleans Mining Company will receive bids up to and including to-morrow to sink the shaft of their Prescott Hill mine 100 feet deeper than at present. The mine has an old shaft down to the drain and working tunnel 165 feet below the surface, and 100 feet of the shaft has heretofore been sunk below the tunnel level. The new work is to put this down 100 feet deeper in order to give plenty of backs. At the bottom of the shaft, which was sunk several years ago, rock of good quality was found, but the ledge was small, and the superintendent was not authorized to sink deeper. The company has finally concluded to go deeper, as there is encouragement to believe that 100 feet will give plenty of good backs, and bring the walls nearer together than they have been found above. The mine has steam hoisting and pumping works upon it. Water is not troublesome, being easily handled by pumping it up to the tunnel level. The work of driving the tunnel is going ahead as usual, and quartz is being stopped out, but the backs above that level are to a great extent exhausted. The company has been going slowly with its work for some years, seeming not disposed to contend with the water by pumping, but from an assessment recently put upon the stock it looks as if the work of more extensive development is now to be entered upon. The stock is well held, and by those who are well able to put the mine in the best shape for regular working in the future.

Placer.

FOREST HILL AND VICINITY.—*Argus*, Oct. 8: The Baker Divide Mining Company have let a contract to the Phoenix Iron Works, of San Francisco, to run 2000 feet of bedrock tunnel in about one year's time, by means of rock drills, operated by compressed air, which will be forced into the tunnel by steam power. It is expected the machinery will be shipped this week and the engines built convenient to wood and water on the brow of the hill, overlooking Shirt Tail canyon and about 600 feet above the mouth of the tunnel. The company has already run into a hundred feet of tunnel and built a boarding house, office and other buildings. They expect to get into the same channel that the Mayflower Company are working on, at a distance of about 2600 feet from the mouth of the tunnel. The mine at Damascus is working on what is supposed to be the same channel. They have a breast opened out about 400 feet long and 20 feet high. For the past month or two they have been taking out on an average of 500 ounces per week. The Excelsior mine has struck some nice looking gravel, which seems to improve the further they get into it. Messrs. Breece and Wheeler, also at Bath, state that the raise-up has brought them into good gravel again. Part of the Hazard Company's machinery has arrived and is being put up as fast as possible. Thus the mining boom keeps increasing, and we

have lots of ground undeveloped yet, awaiting capital to open it out. Mr. A. R. Morrison, late of North Bloomfield, is now assistant superintendent at the Mayflower mine.

THE HAZARD MINE.—Placer *Herald*, Oct. 10: We learn from Supervisor Keown, superintendent of the Hazard mine, near Michigan Bluff, that he is working about 20 men all told, and expects, with good luck, to have everything in readiness for putting on steam by the first of next week.

BIG NUGGETS.—We received a pleasant call from J. B. Hobson, of Iowa Hill, while at Auburn last Tuesday on business. He has three men at work, on the old Independence mine close to Iowa Hill, drifting, and the results are proving very satisfactory. For lack of water they wash the dirt with a rocker, and thus far one rocker has washed out from 12 to 20 ounces a week. Mr. Hobson showed us two pieces taken out recently, the larger of which weighed about 15 ounces. The old Independence has paid well with a hydraulic mine, but Mr. Hobson is so well satisfied with his drifting experience that he has about concluded not to fit up for hydraulicking any more, but to depend entirely on drifting.

Shaota.

IRON MOUNTAIN.—Republican *Free Press*, Oct. 10: A party who was at Iron Mountain, Thursday, informs us that there are about 120 men employed, most of whom are laborers. The work of leveling up a site for the saw and quartz mill is progressing rapidly. The superintendent says that more men would be employed had he the necessary accommodations. As it is, the men are obliged to sleep anywhere that they can find a soft spot.

Siskiyou.

HAMBURG BAR.—Cor. Yieka *Union*, Oct. 9: There are only three river claims working here this season, viz., Mapleson's, Kittewood & Co.'s and that of Martin Andrews. As far as we can glean the former is not paying very well, but may yet come out before the end of the season. At the Kittewood claim 218 ozs. were taken out at one clean up, and the company are ahead on the season. They expect large returns for this season's work. Martin Andrews has been making more than expenses so far this season. He has just finished moving the derrick and expects to make a big clean up before high water closes him out.

SCOTT BAR.—There are less than the usual number of claims running here this season, the operations being confined to drifting claims and one or two hill claims, which are being run by water from the San Jose ditch, now the property of Mr. G. A. Hicks. All of the claims being worked, so far as we can learn, are paying well. The oldest inhabitants have never seen Scott river so low as at present, but if a good supply of water is had next season mines now idle will be operated next summer. During the summer past there have been many quartz prospectors here from various parts and all seem to be pleased with the country and the outlook, and are of the opinion that, at no distant day, quartz mining will be the predominating feature of the whole section, but time alone will tell.

OAK BAR.—I visited Barton & Perkins' claim, where I found Chas. Parker busily engaged in preparing a face to start a new tunnel, some 200 yards down the river from the old tunnel. Mr. Parker escorted me through the old tunnel. This is one of the most extensive and valuable mines on the Klamath river and pays the owners very handsomely for their extensive outlay. Mr. Parker informs me that two men, in one day, took out from this claim over \$400, but of course such strikes are not made every day, but good wages are obtained daily nevertheless. Over 800 feet of tunnel have been run, including crosscuts, etc. The tunnel pierces the channel some 200 feet, but still no back wall has been reached, and the indications are that they have more rich ground than 50 men can drift out in the same number of years. They have also a ditch over a mile in length taken out of the river, which is a valuable piece of property. The ditch continues to the point where the new tunnel is being started, and the water which it carries is used to wash the gravel taken from the mine. This ditch can also be utilized for mining and irrigating purposes further down the river, and the privilege will eventually command a large price. On the same evening I paid Jackson & McCleary's mine a visit, which I was informed is paying well. While at Oak Bar last Thursday I met Mr. Sen. Mott on his way from Virginia Bar to Hamburg. He informed me that on the day previous he got nearly two ounces from less than a pan of dirt at the Centennial claim.

San Diego.

POORMAN'S DISTRICT.—Cor. San Diego *Star*, Oct. 9: The Paymaster Mining Company are the owners of some valuable prospects which are as yet only partially developed in Poorman's mining district. The above named district is located in San Diego county, 22 miles northeast of Cactus, a telegraph station and siding on the Southern Pacific Railroad, 23 miles west of Yuma. A 10-stamp mill has lately been erected and is now in full blast upon rock which averages \$72 per ton, and as there is at least 10,000 tons in sight, some idea can be borrowed of the value of this, San Diego's latest "bonanza." Water is forced to the mine by hydraulic ram, from a point on the Colorado river, eight miles distant, at which place there is also an abundance of wood for fuel. The above items may be of interest to some of your readers in view of the fact that it is proposed to resuscitate the old and now defunct Colorado Road district for the purpose of improving the roads which must of necessity be traveled by teams in the employ of the above company. The road from Cactus to the mine, runs through a level stretch of sand, and in my humble opinion, cannot be improved short of planking the whole distance. Between the mill and the river there are a few places where the judicious expenditure of, say \$50 would benefit the road, for which purpose a Deputy Roadmaster could be temporarily appointed.

JULIAN AND BANNER MINES.—Cor. Calico *Print*, Oct. 10: Well, our mines are on the produce and making quite a stir in mining circles by the steady stream of golden bars that is being put out. The most promising mine in the district is doubtless, the Stonevall. The mine is situated on a spur of the Cuyamaca mountains about 10 miles from Julian City and is owned by James Fulton & Co., who are working on an immense body of fair grade ore. The Ready Relief mine is still producing enough ore to keep their ro-stamps pounding. The mine looks well enough to induce some old mining men to at-

tempt a purchase, they are sparring around trying to buy it and the Redman and Hubbard, but the present owners do not seem inclined to sell. The old San Diego mine has recently been sold to the company that is working the Owens. They have put several men at work and expect to develop a rich thing. The Owens is being worked by some Nevada men and they may strike it rich as there was some very rich ore taken from this claim in bygone days. Sandeman and Hanson, two old Julian boys, just returned from Arizona, are at work on the Big Blue with good prospects. Gardner is getting out another crushing of \$750 rock from the Blue. Crays and Mallock still hang to their old works in the Blue Hill and will soon have a ro-ton crushing of ore. New faces are seen on the streets of Julian every day and the camp is quite lively to what it has been for the last ten years. Levi & Co., think the camp is lively enough to justify them in putting up a brick building for their increasing business.

Sierra.

PROSPECTING QUARTZ.—*Tribune*, Oct. 10: B. F. Littlejohn and another party have for some time past been prospecting the old Arastra ledge, at Middletown. A number of years ago a man by the name of Cook worked on the vein to the depth of about 25 feet, and crushed the ore in arastras, which he built. That was 20 years ago, but it is handed down that Cook made the rock pay. Mr. Littlejohn and partner have started a tunnel 125 feet below surface and expect to tap the lead with it by running 150 feet. They now have the tunnel in 25 feet. We hope they will succeed in getting the tunnel into the vein, and there find something rich.

GOOD RETURNS.—*Alt. Messenger*, Oct. 10: The cheering news comes down the ridge that the Ruby drift mine is yielding very good returns. But a small force is at present being worked.

Tuolumne.

GROVELAND ITEMS.—Cor. Tuolumne *Independent*: David James, of Big Creek, has a promising quartz vein on the Tuolumne river near the mouth of Humburg creek. The rock shows free gold, and if it continues to develop will prove a rich find. Messrs. Hubbard & Co. are reported to be doing well in their river claim, and if they are not troubled by freshets this month they will have a handsome lot of gold to show for their energy and perseverance. The Santa Maria mine has been shut down again, and we think the mine has not proved a success lately.

Trinity.

LIVELY CAMP.—*Journal*, Oct. 10: Deadwood, Trinity county, is the liveliest quartz mining camp in California, more work being done there and in French Gulch district, and more money being taken out than elsewhere. In passing through Deadwood this week all was found activity and business. The camp is fast building up, a number of new buildings having been erected since our last visit only a few weeks ago. Lack of time prevented a visit to any of the mines, but reports continue to be most favorable, and the tooting of steam whistles at the several mills gave notice that they were at work adding to the bullion yield of the Golden State.

NEVADA.

Washoe District.

HALE & NORCROSS.—*Enterprise*, Oct. 10: The main south lateral drift connection on the 3000 level was completed last Monday morning, uniting that portion running from the bottom of the deep winze with the portion coming north to meet it from the Combination west drift. So accurate was the survey and the conducting of the work that the two drifts came together fairly and squarely with no appreciable deviation or discrepancy. The only difference was in the floor of the drifts, that from the Chollar side being run on a slight upgrade for drainage, while that from the Norcross deep winze was not kept quite down to the grade for fear of cutting below the trines at the outcome. As it was it came out just 18 inches above, which was far better than three inches below. This slight discrepancy is being graded down properly and drain boxes put in. Next week, or when the track floor of this drain is properly graded and everything in correct trim, the work of crosscutting west will be commenced at various eligible points. This main lateral drift north and south having been run along the east or hanging wall of the ore vein, the proposed crosscutting west necessarily constitutes a very important move, as practically demonstrating the value of the 3000 level. Being well prepared with a water drain, and the big hydraulic pump at the Combination being nearly ready to take an unlimited amount of inflow of water, these crosscuts can be pushed west without fear and regardless of the known existence of strong flows of water, which has been demonstrated by crosscuts heretofore which had to be abandoned or suspended. Yet the very existence of this water is an important point, as an almost sure indication of a main heavy ore vein lying next to the west or foot wall of the old Comstock lode, a deposit to which the veins of ore heretofore found in the lower levels may be merely feeders.

CHOLLAR.—The connection with the Hale and Norcross on the 3000 level being completed, development work in this mine is resumed. It will be borne in mind that the west drift from the Combination shaft is run in the Chollar ground on this 3000 level 60 feet south of the Norcross line, and that the lateral drift north to join the Norcross drift branched off from this drift at a point 120 feet west from the Combination shaft. At this point, or "switch," a drift to the southward was started day before yesterday to explore the mine in that direction. This drift, commenced in the east side of the ore vein, is in about 20 feet, swinging around to the left and is all in firm white quartz, carrying small streaks and spots of ore giving low assays. It is proposed to run this drift in a southwesterly direction, which will carry it diagonally across to strike the west wall in going 150 feet. Thus it will be seen that this will be both a lateral drift and a crosscut, exploring the vein to the best possible advantage, the more especially as it starts in the solid quartz of the main vein, which shows a very strong degree of mineralization in that direction. The pressure pipe for the new or duplicate section of the big hydraulic pump in the Combination shaft, has all arrived and is being rapidly placed in position. The whole will be in full operating position in a week or ten days, ready for any water that the lower levels can furnish.

CON. CALIFORNIA AND VIRGINIA.—From the 1750 level about 110 tons per day continues to be the daily yield, extracted on company account. This is reduced at the Morgan mill on Carson river, and averages about \$20 per ton. The lower portion of the old Consolidated Virginia shaft from the 1550 to the 1200 level is now being repaired. Above that the shaft is all right, allowing the double deck cages to pass with perfect facility. A small force of miners are working in the Jones lease section, tributary to this shaft, opening up drifts and preparing to take out plenty of ore when the Carson river shall furnish the requisite motive power for the mills.

STERRA NEVADA.—The west crosscut from the north lateral drift on the 520 level, 1000 feet north of the shaft, was advanced 40 feet during the past week, making a total length of 409 feet. It is now running in heavy vein porphyry and clay, with streaks of quartz, and quite a seepage of water, indicating proximity to an ore vein.

CROWN POINT.—About 100 men have been put on this week in Crown Point and Belcher, putting both mines in good order for active ore extraction. Some ore is being extracted now, but as soon as the Carson river will furnish motive power to the mills a full force of miners will tumble the ore out lively.

OPHIR.—The old Mexican shaft has been put in complete order for ore hoisting work. The drift west from the shaft on the 300 level is now in the old Ophir ore section, and the prospect for a plentiful supply of ore of a remunerative milling grade, is good. This drift will be continued through to the west wall.

ANDRES.—Good progress is being made in the crosscuts west on the 175 and 375 levels, both running in favorable vein matter and quartz giving low assays. That in the lower level shows the best.

YELLOW JACKET.—The regular daily yield of 160 or 170 tons continues on the old workings on the 1300 level and above, keeping the Brunswick mill running steadily.

KENTUCK.—Still running along regularly, keeping the Rock Point mill steadily running on ore from the old upper workings.

ALTA.—Good progress continues to be made in the west drift on the 700 level. The rock is hard blasting, but works well.

GOULD & CURRY.—The west crosscut on the 1000 level near the Savage line is now in about 150 feet. Material drift vein porphyry.

BEST & BELCHER.—On the 1000 level west crosscut No. 2 is in about 280 feet. Face in vein porphyry, with streaks of quartz and clay.

UNION CONSOLIDATED.—West crosscut on 500 level in about 100 feet. Material soft vein porphyry, quartz and clay.

MEXICAN.—Middle crosscut east still in wet vein porphyry, quartz and clay.

MONTA CRISTO.—New shaft down 165 feet, with bottom in hard blasting rock.

Columbus District.

MOUNT DIABLO.—Candelaria True Fissure, Oct. 10: The incline has been sunk 17 feet during the week, and the west drift on the sixth level has been advanced 12 feet in the meantime, and has followed a small streak of low-grade ore for that distance. The east drift, on the sixth level, is in 130 feet, and the east drift, on the fifth level, is in 202 feet. A winze has been started from the east drift on the fourth level to connect with the drift on the level above. The west drift from the winze, connecting the fifth and sixth levels, is in 26 feet and shows some low-grade ore. The east drift from this winze is in 41 feet and shows a small streak of good ore. The raise, between the fourth and fifth levels, has advanced eight feet and is showing a foot of ore of good grade. A little ore is being taken from the east drift on the second level. A drift has been started from the south crosscut from the Mount Diablo adit.

Eureka District.

ORE SHIPMENTS.—Sentinel, Oct. 10: During the week ending yesterday, ore shipments were made as follows to the twin reduction works in town: To the Richmond works—Dunderberg mine, 16 tons; Silver Lick, 77; Lone Pine, 21; Hamburg, 70; Mariposa, 1; Bay State, 30; Home Ticket, 22; Irish Imbasinder, 15; Potter, 7; Geddes and Bertrand, 3; and White Pine, 5. To the Eureka Con. works, Hon. George Ernst shipped in from his properties in Nye county, 9 tons of ore of good quality. From the Battery mine one of "Boss" Saddle's properties, 8½ tons were shipped.

Granite District.

CLEAN-UP.—Cor. White Pine News, Oct. 6: Wilson Carey, who has been at work at Granite mining district, about 25 miles south of here, came to town on Sunday last, after making his clean-up on the lease he had on the property of Fred Gotchett. He has sent his bullion to the mint at San Francisco, and as soon as he gets his returns he intends to go back again and work until snow flies. George Judson, who is also working at the same place on a mine of his own, has made a mill clean-up. Tommy Kinney and Judge Doolin are also in town from Granite. They have made their clean-up on the mine they had leased from Fred Gotchett. They are going to get a new lease and intend to work all winter.

Indian-American District.

NEW MINES.—Silver State, Oct. 12: L. F. Dunn is up from the new mines in what was formerly known as American district, but which was subsequently consolidated with Indian district. He says the new mines were discovered by G. B. Dunn and Charley Mackey. The principal leads are called the Governor and the Reed. They are parallel veins, about 300 feet apart. Between them is vein matter, and one appears to be on the hanging wall and the other on the foot wall of an immense fissure lode. There are streaks of ore in both claims that assay as high as \$4000 per ton. The formation is what geologists call transition slate, which crops through limestone capping. The leads crop boldly along their course some 1200 feet, and are situated about four miles from the Lovelock and Bernice stage road. There is a shaft 50 feet deep on the Reed, and the lead looks well and carries several feet of good milling ore.

Star District.

RICH ORE.—Silver State, Oct. 9: Peter Woolcock, of Mill City, returned yesterday from Denver, Colorado, where he went with a carload of ore from

the Sheba mine, in Star district. The ore assayed over 800 ounces of silver to the ton, and yet the Sheba mine which produced it has been lying idle for years, Mr. Woolcock being the only person that would risk what money was necessary to get it in working order. He is, however, an experienced miner, while the old owners of the property were only "stock board" miners.

Sprucemont District.

STARTED UP.—Cor. White Pine News, Oct. 6: The old mining camp of Sprucemont has come to the front once more, and has started up again. There was a great stampede from Jasper to Spruce. George Madelina has got a contract for 70,000 bushels of coal, and I hear that they are going to push things pretty lively before snow flies.

White Pine District.

HAMILTON.—Cor. White Pine News, Oct. 6: Just as I have written you in former letters, the winter troubles here have culminated in shutting down all the operations of the Sweetwater company, and that immediately. The great part of the miners on the hill have been discharged and the ore teams stopped yesterday. The mill will simply run out what ore is on the dump—only a few days' work. To make matters worse, the Manhattan mill closed down for good Saturday night. Nearly all work in the district is to be suspended, which means the taking away from this community of about \$5000 in hard cash per month.

ARIZONA.

SILVER.—Prescott Courier, Oct. 7: Jack McDonald and helpers are taking rich silver ore out of the Blue Dick mine. The ore in the Catocin mine is said to be five feet thick. Vanderbilt & Hudson will very soon ship another carload of silver ore from their mine near the Agua Fria. Good rock is being piled up in Big Bug district, and the mill men are watching the clouds, in hopes of seeing them spill themselves, so that they can take the gold out of the rock. Dry as it is, placer miners of Lynx and Hassayampa creeks are taking enough gold from the gravel, to keep them in spending money. Peck tailings continue to pay. Ditto, Aztlan, Morgan & Co., continue to sack silver nuggets. A great deal of "title" work is now being done in all the districts. The Osborn boys came in to-day from Castle creek and brought with them something over \$1000 in gold bullion, the result of a 20 days' run of their arastras on ores taken from the "Dummy" mine. The "Dummy" was discovered some time since by John Osborn, and while parallel with, is not an extension of Bob Groom's mine, which has yielded so well for several months past.

COLORADO.

ELK MOUNTAIN.—Pilot, Oct. 8: The Pioneer stamp mill in Irwin, owned by Wm. H. Webb, of New York, has been sold through Judge Karr to David Kline and Fred Kreuger, of Denver. The consideration paid is less than \$10,000. It is the intention of the new owners to remodel the mill and put it in operation at once, making a market for the low grade ores of the camp. The Queen of the Gulch mine, which is the same vein of the Augusta, on the Dark canyon side, has been sold by Scott McCulloch, the owner, to a Pennsylvania company for the nice little sum of \$10,000. The new hoister at the Sylvatic mine works like a charm. Work has ceased on the Dutch Girl, on Brush creek, for the winter. Frank Broderick has the extension of Fitzgerald's Little Daisy mine in Redwell basin. He has driven a tunnel 40 feet on the vein; has got the same character of ore as the Daisy, and he intends to ship a carload soon. The Jewett lode, on Treasury mountain, has been worked for this year, and shows a vein of four feet, principally galena.

CRYSTAL CITY.—The Black Queen mine is more than holding up its old reputation, and the finest ore yet taken out is being sacked. A force of men is at work and the mine can be looked upon as a steady producer from now on. The Lead Chief, on White House mountain, is proving up a bonanza, and shows eight feet of the finest kind of lead carbonates. The Governor Tabor is being worked and shows up an immense body of lead carbonates. The work is being done in the cave which is one of the wonders of Rock creek.

IDAHO.

WORK TO BE RESUMED ON THE EUREKA.—Wood River Times, Oct. 7: Yesterday morning Colonel Wall started up work on the Eureka mine, at Pullman. For the present operations will be confined to pumping out the water and cleaning the drifts; but when this shall be done ex-Marshall Shaughnessy will come up to look at the vein and work will then doubtless be resumed for good.

BACK FROM ERA.—E. A. White has returned from Era, in Lava district. He says the formation is very favorable to the existence of mineral-bearing veins—of which there is abundant evidence. The best showing there is, of course, the Horn Silver. On that mine there are five openings within a length of 150 feet, all of which shows rich ore. Day before yesterday it was stated that a face 10 feet in width, of ore that will average 90 ounces, was being exposed, with evidences of there being more beyond. The town of Era is lively, with much building going on; but the owners of the claims in the vicinity being generally poor, it will take some time for the region to "boom."

ORE IN DEPTH.—During the past day or two the face of the prospecting drift or tunnel, on the fifth or lowest present level of the Parker mine, has shown very favorable indications. Bunches and spots of galena have been encountered, and the formation has shown a "kindly" or mineralized appearance which is accepted as an indication of the proximity of an ore-body. This is most encouraging, as the fifth level is opened at a depth of between 700 and 800 feet, and is thus the greatest depth yet attained in any Wood River mine.

MONTANA.

BUTTE OUTLOOK.—Miner, Oct. 7: The report of the work done and developments made in the mines of this district during the past week are of the usual encouraging nature. The work of sinking the shafts of several of the leading mines is progressing favorably and is a source of much comfort to the people of this district and shows the enterprise and faith of

the respective mining companies. The developments made on the lower levels of some of our mines, indicate that the ledges of this camp are good for many hundreds of feet deeper than any mine in this district has yet been sunk. The several mining superintendents seem to appreciate this, and are acting accordingly.

MEN EMPLOYED.—News, Oct. 8: As an evidence of the importance and business of Walkerville, the number of men on the pay rolls of the various mining companies in the immediate vicinity are herewith given: The Alice company employs 300 men, the Lexington 200, the Moulton 150, and the Union Consolidated 200, making a total of 850 for these four companies. Besides this, there are a number of smaller mines, employing at least 200 men, thus making the working force of miners and others employed by mining companies over 1000. These figures must convince all that Walkerville is a busy camp, and contains more of the bone and sinew of the land to the square inch than any town of its size in the country.

THE ALICE.—Everything at the Alice is running along in the usual smooth manner. The new hoisting works is completed and is a very commodious and nicely finished building. The mine never looked better. The north crosscut on the 800-foot level is in good working ground and good progress is being made. This crosscut is now in about 120 feet and has to be carried in 80 feet farther before the ledge is encountered.

MAGNA CHARTA.—The south crosscut on the 700-foot level is now in 100 feet, and the second south ledge will be struck in about 25 feet more. The north crosscut on this level was started a few days ago and fair progress is being made. The recent strike in the northern part of the mine, on the 400-foot level, is improving in value daily. The stopes from every level on the 100 to the bottom are producing well.

THE MOULTON.—Superintendent J. K. Clark is more than pleased at the present good condition and the very flattering future of the Moulton Company's prospects. The mine is looking well in all directions and the immense ore reserves are being increased in number right along by the discovery of other chutes of ore. The recent declaration of a \$30,000 dividend shows that the affairs of the company are in worthy hands.

MONTANA COPPER COMPANY.—The mines owned by the Montana Copper Company are all looking well and are producing the usual quantity of ore.

THE LEXINGTON.—It is said by persons who profess to know, that the Lexington mine looks better than it has for several months. Recent important developments have been made in the upper portion of the mine. Larger hoisting machinery will be procured and erected in as rapid a manner as possible.

THE ANACONDA.—The work of sinking the main shaft of this mine is progressing favorably and the 1000-foot level will be reached in a short time. The work of supplying the large smelter with ore rests, mainly with the St. Lawrence mine, which property is looking grand. The several stopes in this mine are looking well and producing large quantities of ore.

BURLINGTON MINES.—The Burlington mine looks well and sinking is carried on with favorable progress. There has been considerable difficulty experienced of late with the large quantity of water, but recently a large pump has been put in the shaft and the water now coming into the shaft can be easily handled. The Blue Bird large ore bodies on the 300-foot level never produced better than at present. The other portions of the mine are producing well.

MISOR NOTES.—Messrs. Bews & Co. have secured another year's lease of the Wild Bill mine, and predict a grand future for their property. Messrs. Lawry, Combs & Co. are actively engaged on the Pozzer mine. The shaft is now down 165 feet and will be immediately sunk an additional 50 feet. The lessees evidently have a good thing in the Pozzer. The Martin Bros. & Co. are working the east end of the Rock Island mine, with encouraging prospects. They are now sinking the shaft below the 75-foot level. The ledge at the point looks well, and some very good ore is being taken out. The Silver Queen mine is worked on lease by Messrs. Buzza, Penrose & Co., and looks well. The ledge was encountered in the north crosscut of the 95-foot level yesterday, and some very rich ore was found in it. The lessees are very jubilant over their prospects. The Elva Orlu mine continues to look well and the work of erecting the new hoisting engine is progressing favorably. The Goldsmith mine still looks well and the rich ore body on the 135-foot level is opening out in all directions. This is a very valuable property.

NEW MEXICO.

NOTES.—Socorro Bulletin, Oct. 7: Full shifts are accomplishing the 150-foot contract in the Anchor mine. The Magdalena Queen is dumping fine lead ore. McLeish & Leddy are working their Bonaparte claim successfully, and are raising a quantity of pay mineral. The Graphic Mining and Smelting Company are preparing to blow in their plant in this city in a few days. The Jane Bowman continues to be developed, and dumps mineral daily at the Hasse, Ott & Co. concentrator. The last run of the Jane Bowman concentrator, in Water Canyon, has proved exceedingly satisfactory to the owners. The Chloride mine, in the Pueblo district, continues to improve. Jim Barnes has made a remarkable strike of rich galena. The ore body is large, and he is dumping pay mineral in a lively way. A Radcliffe, superintendent of the L. V. & St. L. M. & S. Co., is putting the Ella James in nice trim. This is one of the largest lodes in the range. Alex Bentley, owner of the American Flag mine, and part proprietor of the successfully operated 60-ton Hermosa concentrator, is in Socorro with a shipment of concentrates, now being treated at the Billing works. The late run of the M. M. & M. Co.'s stamp-mill in this city resulted in the production of 15 silver bricks. One fact has been demonstrated by this treatment of the Merritt ore, that it has very materially improved in its silver value.

KINGSTON DISTRICT.—Albuquerque Journal, Oct. 6: One of the best exhibits at the fair was that shown by Mr. Fred Lindner, from the Kingston district. Mr. Vincent Wallace, the Kingston banker, collected the exhibit, and 20 mines were represented. The exhibit contained some of the richest ore ever

seen in the Territory. One specimen from the Kangaroo mine, a recent discovery, assays \$27,000 to the ton, and another from the Lady Franklin is valued at \$600. This mine is one of the richest in New Mexico, having since last December produced \$160,000, with a half million dollars worth of ore in sight. Notwithstanding the Indian troubles, the Kingston district is more prosperous this year than ever before. A dozen mining properties are producing and shipping ores, and with the extermination of the Apaches the camp would enjoy a genuine boom. Mr. Lindner has great faith in the future of Kingston, and is fully convinced that it is the richest mining district in New Mexico.

OREGON.

PROSPECTING.—Jacksonville Times, Oct. 10: Considerable prospecting is still being done in Jackson and Josephine counties. Miners are getting ready for winter, and anticipate a better mining season than usual. Mr. Elliott, of Baker county, arrived here Wednesday, and will prospect for quartz in this section. Ex-Governor Chadwick has been at Galice creek, looking after his interests in the Yank ledge. Work is progressing satisfactorily on the Sterling Co.'s huge reservoir, and it will be completed before long. Will Q. Brown and a mining expert from San Francisco, named Perkins, went down to Galice creek last week. Reub. Jones and J. T. Hays are extensively engaged in mining on Cow creek, Douglas county, and seem to be doing well. Eli Taylor, who returned from Josephine county last week, informs us that some parties from California are prospecting on Williams creek. The season for prospecting is about over, and before long those who have been roaming the mountains will have to come into the camps for the winter. Work continues on the long tunnel at the Yank ledge in Josephine county. The quality of rock taken out is reported as improving as the tunnel progresses. We are informed that some very rich prospects have been struck in quartz near the old Lucy Queen mine in Josephine county. Several claims have already been taken. Jas. G. Birdsey has let a contract for manufacturing 300 feet of hydraulic pipe for his mines on Birdsey creek. A great deal of work will be done there in case of a wet winter. It is rumored that J. Wimer & Sons and John Bolt now control the Sugar Pine quartz ledge on Galice creek, discovered by Green Bros. This is valuable property, and if such is the case it will be thoroughly developed. Arthur Wilson has discovered a bituminous coal mine on his farm near Medford. The vein is over four feet wide and is said to be inexhaustible. It resembles the coal of Toledo, Ohio. He proposes to develop the mine at once. Geo. H. Chick and his engineer are in the valley, and submitted a scheme to the citizens of Medford to put up a quartz mill, which is now in Siskiyou county, at that place, providing they would furnish him the necessary land and also purchase the five-eighths interest in said mill owned in California. A public meeting was held Tuesday evening to consider the matter, and Mr. C. informs us that his proposition was accepted. The mill will be brought over at once.

VIRTUE.—Bedrock Democrat, Oct. 9: Increased activity in mining matters is a harbinger of better times for this section. Capital from all parts of the United States is being brought here for investment, and mining properties that have long been dormant are being developed. Mr. Terry, the agent for Mr. Grayson, the principal owner of the Virtue mine, left this city Sunday, having made all the preliminary preparations for the resumption of work on the once famous and still valuable mining property, the Virtue. S. Ottenheimer, of this city, has taken the contract to deliver 300 cords of wood at the mill for \$5.50 per cord, and Thomas Moore, of the Pleasant valley saw-mill, has contracted to deliver 50,000 feet of lumber at the mill this fall. Mr. Terry contemplates returning in about three weeks, with all the machinery requisite for pumping out the works, and to sink on the old shaft that was abandoned at the time work was suspended a few years ago. The owners of this property are resuming work as though thoroughly confident of the permanency and richness of the ledge, and the valuable returns to be realized when the mine is worked as it should be—for the benefit of the owners, and not for outside individuals. It is not necessary to enumerate the benefits that will accrue to Baker City by reason of the work being renewed on this mine. It was the Virtue mine that nurtured Baker City in her infancy, and made her the town she is to-day, and when the mine again opens up with a large force of men, our sources of revenue will be largely augmented, our population increased and the business outlook will have a brighter future.

GRANITE CREEK.—Bedrock Democrat, Oct. 9: Granite Creek again comes to the front with another fine lot of bullion. Yesterday, in J. W. Virtue's banking house, we were shown 400 ounces of silver from the Caball mine in the Granite district. This is the second shipment this season, and another will follow later. The most favorable reports from the Malheur mine, owned by Wilson and Richardson, continue to come in. Mrs. Mary Richardson, who was in the city this week, enroute to San Francisco, reports the mine richer as it is developed. A large body of ore is in sight that will mill \$40 per ton. She takes to San Francisco some fine specimens showing free gold from the mine, and while there will probably make arrangements for a 10-stamp mill to be erected this fall or early in the spring.

UTAH.

AMERICAN FORK MINES.—Salt Lake Tribune, Oct. 6: The Silver Bell, Borussia and Queen of the West mines have fine ore ready for shipment and commence those shipments this week. The Miller and Pittsburg have been shipping, and are continuing shipments of good ore in fair quantities and profitable to the lessees and owners. The Deer Creek S. M. Co. and the Milk Maid lessees have been at work all summer on a strong vein of good ore and they have ore ready for shipment. Osborn of the American Fork G. & S. M. Co., has several men at work on the Flora and other mines. Mrs. Bredemeyer has good work performed on her mines and may expect something large and good at any day, for the vein on the Knight of Pythias and Oquirrh Encampment is three feet wide, showing well and so does the Queen of the West and several others. In fact the district will yet be again one of the leaders.

THE PACIFIC COAST ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

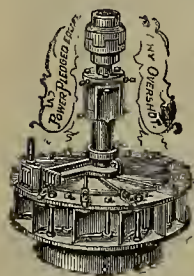
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD,

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.



THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

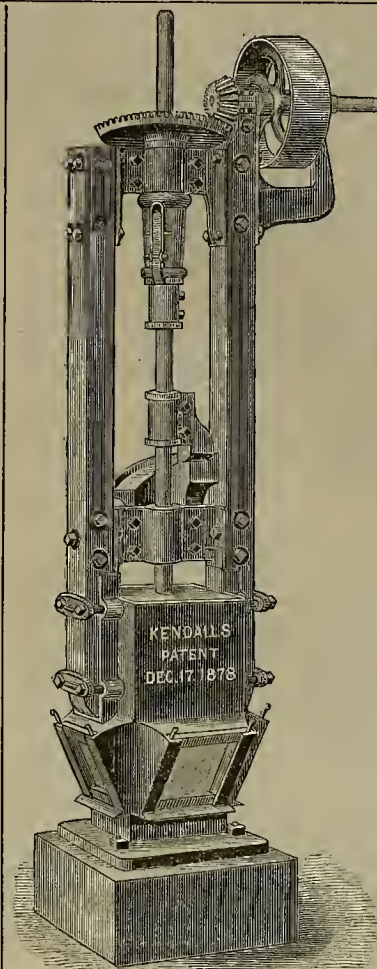
CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

A. T. DEWEY.
W. B. EWER.
GEO. H. STRONG.

Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.



L. C. MARSHUTZ.

T. G. CATNRELL

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound
Engines,

FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT
QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CATNRELL.

Send for Circulars and Price List.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.
WARRANTED.

GIRVIN ANDERSON & CO., 24 California St., San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

The most Complete Compound
manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid
and Alkali-Proof.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.



Property Owners are interested
personally

In seeing that their roofs are painted or
repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing
and Preserving Canvas, Rope, and
Leather.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

SAN FRANCISCO CREMATION CO.

[INCORPORATED SEPT. 5, 1885.]

CAPITAL STOCK, \$25,000, divided into 500
shares of the par value of \$50 each.

217 Shares Have Been Taken.

The remaining shares are now offered for sale and may be subscribed for at the office of GENERAL H. A. COBE, 321 Montgomery St., where further particulars may be obtained; also at the office of the Secretary, 109 Battery St. By order of the Board of Directors.

MAX LEVY, Secretary.

GOLD MEDAL AWARDED

— AT —
Mechanics' Fair, 1883 & 1884

— FOR —
Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

— 1883 —
For Best Hoisting Engine and
Boiler Combined.

W. H. OHMEN,

Machine and

Engine Works

22 Fremont Street,
SAN FRANCISCO.



DEWEY & CO
PATENT
SOLICITORS.
252 MARKET ST. S.F.
ELEVATOR 12 FRONT ST. S.F.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

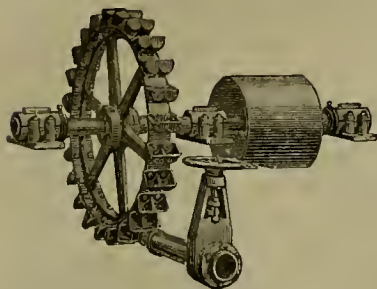
HALLIDIE'S

WIRE ROPE

TRAMWAYS.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

**MACHINE TOOLS,
PRESSES AND DIES,
PUNCHING and SHEARING
MACHINERY.**

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

**N. W. SPAULDING
SAW COMPANY**

Manufacturers of
SPAULDING'S

Inserted Tooth

AND

CHISEL BIT
CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue.
17 and 19 Fremont St., San Francisco.

**L. PETERSON,
INVENTORS. MODEL MAKER,**

255 Market St., S. E. cor Front, up-stairs, S. F. Experimental
machinery and all kinds of models, tin, copper and brass.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven Mfg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainerd Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's
Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

DEWEY & CO.'S

Scientific Press



Patent Agency.

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old
experienced, first-class Agency. We have able and trustworthy Associates and Agents in Wash-
ington and the capital cities of the principal nations of the world. In connection with our edi-
torial, scientific and Patent Law Library, and record of original cases in our office, we have
other advantages far beyond those which can be offered home inventors by other agencies. The
information accumulated through long and careful practice before the Office, and the frequent
examination of Patents already granted, for the purpose of determining the patentability of
inventions brought before us, enables us often to give advice which will save inventors the
expense of applying for Patents upon inventions which are not new. Circulars of advice sent
free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.
A. T. DEWEY, W. B. EWER, GEO. H. STRONG.

Metallurgy and Ores.

**SELBY
SMELTING and LEAD CO.,**
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for
**GOLD, SILVER and LEAD ORES
AND SULPHURETS.**

...MANUFACTURERS OF...

**BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.**

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.
Location of Works: Melrose, Alameda Co., Cal.
Office: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 up-
ward per ton; Jewellers' sweepings and scrapings bought
or worked for the owners at a fixed rate per ton. Rebelli-
ous ores especially solicited. Ores worked and practical
working tests made by any process, to wit: Amalgama-
tion in battery and copperplates for free gold ores.
Amalgamation in pans for silver and gold ores, with or
without roasting. Leaching of silver ores. Chlorination
of gold sulphurets. Assaying, Chemical Analyses of Ores,
Metals and other substances.

**METALLURGICAL WORKS,
STRONG & CO., 10 Stevenson Street, S. F.**
ORES SAMPLED, TESTED, ASSAYED.

**THOMAS PRICE,
Chemical Laboratory, Assay Office,**

**BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.**

JOHN TAYLOR & CO.,
IMPORTERS AND DEALERS IN

**Assayers' Materials,
MINE and MILL SUPPLIES,**

**CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.**

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Searifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

For Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL **H. KUSTEL**
METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my

Process.
Assaying and Analysis of Ores, Minerals and Waters,
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

**WM. D. JOHNSTON,
ASSAYER and ANALYTICAL CHEMIST.**
113 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.
NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.
C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the
most suitable Process for Working Ores.
Special attention paid to Examinations
Mines; Plans and Reports furnished.
C. A. LUCKHARDT & CO.,
(Formerly Hubb & Luckhardt),
Mining Engineers and Metallurgists.

California Manufacturers and Government Contracts.

At a recent meeting of the Board of Directors of the Manufacturers' Association Secretary Hickox reported that he had sent to the Secretaries of the Treasury, Navy, War and Interior departments letters of which the following is a form:

"Under instruction of the Board of Directors I have the honor of addressing you upon the inequality arising from the custom of advertising many of the Government contracts in the East. Removed several days transit from the capital, the people of this coast are thereby at a disadvantage in that the time required in transmitting information here of Government requisitions and returning proposals materially reduces to us the period for making bids, and in some cases has prohibited our competition. It is believed if this disparity is removed by simultaneous publication of such information here with the East that a considerable portion of our products and manufactures will be furnished upon acceptable terms, enlarging the field of competition favorably to the respective departments under your control, while affording more equal conditions to the people of this coast with citizens of other States nearer the seat of Government. Earnestly asking your consideration of the matter and official adoption of such means as will accomplish the purpose, we hope to await your action. Very respectfully,

Geo. C. Hickox, Secretary.

The Replies.

The Secretary stated that he had already received replies from Secretary Manning and Secretary Whitney, and also from the Ordnance Bureau of the Navy Department. The letters evinced a hearty spirit of fairness, and showed that now the subject had been called to the attention of the departments, hereafter California manufacturers and merchants would receive just attention. The letter from Secretary Whitney was as follows:

NAVY DEPARTMENT,

WASHINGTON, September 26, 1885.

Sir:—Your letter of the 4th instant, calling the department's attention to the inequalities existing from the custom of advertising many of the Government contracts only at the East has been received. You are informed, in reply, that the matter has been referred to the bureaus, with instructions that slips showing articles for which proposals may be invited will be sent to the firms comprising your association, so far as found reasonable and judicious. Very respectfully,

W. C. WHITNEY,
Secretary of the Navy.

Treasury Department.

Secretary Manning wrote as follows:

George C. Hickox—Sir:—I have received your letter of the 4th instant, in regard to advertising the needs of the Government on the Pacific Coast. In reply, I have to say that the advertisements of this department soliciting proposals are generally placed in papers published in the locality directly interested. Your letter, however, has been placed on file, and will receive additional consideration. Yours respectfully,

D. MANNING, Secretary.

War Department.

H. L. Muldrew, Acting Secretary of the War Department, replies as follows:

George C. Hickox, Secretary of the Manufacturers' Association.—Sir:—I acknowledge the receipt of your letter of the 5th inst., in which you invite the attention to the disadvantages to the people of the Pacific Coast, arising from the custom of advertising for proposals for supplies for the Government only in newspapers published in the East, and in reply have to state that the matter will receive due attention by this department in ordering such advertisements hereafter as may be deemed to be of interest to the merchants and manufacturers of California. Very respectfully,

H. L. MULDREW,
Acting Secretary.

Ordnance Bureau.

Thad. K. Sailer, of the Ordnance Bureau, wrote the following:

"Please send to this bureau a list of the members of the Manufacturers' Association of California, in order that information may be sent to each firm when occasion arises to purchase articles."

Secretary Hickox is also in receipt of several proposals for bids from the Navy Department, which are to be opened on October 15th. They are at his office in the Merchants' Exchange.

A committee was appointed to secure more favorably situated rooms for the association, the intention being to secure some place centrally located, where members can conveniently drop in at all times.

Bullion Shipments.

Alhambra, October 11, \$16,000; Barber's Mill, 11, \$7,000; King, 11, \$5,500; Calico Hill, 11, \$4,000; Oro Fino, 8, \$21,693; Germania, 6, \$5,505; Hanauer, 6, \$3,300; Queen of the Hills, 6, \$3,000; Germania, 7, \$5,265; Hanauer, 7, \$3,250; Stormont, 7, \$5,100; Queen of the Hills, 7, \$3,300; Hanauer, 8, \$3,000; Crescent, 8, \$5,500; Queen of the Hills, 8, \$4,400; Hanauer, 10, \$3,100; Ontario, 10, \$4,417; Hanauer, \$3,120; Germania, 11, \$4,863.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No. AMT.	LEVIED.	DELINQNT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	27.	25.	Sept 3.	Oct 8.	Oct 28.	B. Burris.
Benton Con M Co.	Nevada.	14.	10.	Aug 25.	Sept 30.	Oct 21.	W. H. Watson.
Blue Bluff M Co.	California.	9.	21.	Aug 21.	Sept 30.	Oct 18.	L. S. Adelt.
Benton Con M Co.	Nevada.	14.	10.	Aug 25.	Sept 30.	Oct 21.	W. H. Watson.
Buchanan M Co.	California.	13.	15.	Aug 24.	Sept 30.	Oct 16.	P. J. Sullivan.
Con Pacific M Co.	California.	7.	15.	Aug 27.	Sept 30.	Oct 24.	S. Gardner.
Entrinche Gravel M Co.	California.	19.	05.	Aug 11.	Sept 23.	Oct 17.	H. Kunz.
Excelsior M Co.	Nevada.	22.	20.	Aug 31.	Sept 23.	Oct 7.	C. E. Elliott.
Excelsior Water & M Co.	California.	8.	1.00.	Sept 23.	Oct 24.	Nov 12.	W. G. Stewart.
Equitable Tunnel M Co.	Utah.	32.	10.	Aug 3.	Oct 15.	Nov 6.	C. J. Collins.
Giant M Co.	New Mexico.	1.	02.	Aug 11.	Sept 18.	Oct 19.	S. P. Middleton.
Golden Fleece M Co.	California.	2.	30.	Aug 31.	Oct 14.	Oct 31.	F. Schumeyer.
Hale & Norcross M Co.	Nevada.	27.	50.	Oct 5.	Nov 12.	Dec 4.	J. F. Lightner.
Holmes M Co.	Nevada.	10.	1.00.	Sept 23.	Oct 24.	Nov 27.	C. T. Bridge.
Johnson Gravel M Co.	California.	2.	05.	Sept 3.	Oct 15.	Nov 20.	G. White.
Mexican G & S M Co.	Nevada.	31.	25.	Sept 21.	Oct 27.	Nov 18.	C. E. Elliott.
Martin White M Co.	Nevada.	20.	25.	Aug 22.	Oct 7.	Nov 4.	J. J. Seville.
Mountain Tunnel G M Co.	California.	1.	10.	Sept 23.	Oct 24.	Nov 20.	B. Paul Jr.
Navajo M Co.	Nevada.	12.	30.	Aug 31.	Oct 5.	Oct 27.	J. W. Pew.
Omni-lah M Co.	Alaska.	3.	10.	Aug 22.	Sept 23.	Oct 24.	C. Robinson.
Potosi M Co.	Nevada.	20.	40.	Sept 28.	Nov 4.	Nov 25.	C. E. Elliott.
Savage M Co.	Nevada.	6.	50.	Oct 5.	Nov 9.	Nov 30.	E. Holmes.
Sierra Nevada S M Co.	Nevada.	23.	25.	Sept 30.	Nov 4.	Nov 24.	E. L. Parker.
Sulphur Bank Q M Co.	California.	4.	50.	Aug 29.	Oct 1.	Dec 3.	T. W. Wintham.
Tuolumne Co.	California.	1.	05.	Sept 19.	Nov 13.	Dec 15.	H. J. Hyland.
Union Con M Co.	Nevada.	2.	25.	Sept 14.	Oct 14.	Nov 9.	J. M. Burlington.
Virginia Creek M Co.	California.	3.	10.	Sept 11.	Oct 16.	Nov 6.	J. M. Quay.
Willow Creek M Co.	Nevada.	2.	1.00.	Oct 12.	Nov 16.	Dec 14.	R. Elton.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Confection Con M Co.	Arizona.	D. C. Bates.	309 Montgomery St.	Annual.	Oct 26
Eureka Con M Co.	Nevada.	E. H. Willson.	328 Montgomery St.	Annual.	Oct 19
Happy Valley Hyd M Co.	California.	D. M. Kent.	330 Pine St.	Annual.	Oct 24
Mayflower Gravel M Co.	California.	J. Morioz.	328 Montgomery St.	Annual.	Oct 19
Silver Lick M Co.	Nevada.	L. J. O'Farrell.	420 California St.	Annual.	Oct 26
Silver West M Co.	Nevada.	F. E. Bunker.	423 Montgomery St.	Annual.	Oct 26
Summers Con M Co.	Nevada.	S. Gardner.	330 Pine St.	Annual.	Oct 27

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Jackson M Co.	California.	D. C. Bates.	309 Montgomery St.	10.	Oct 5
Kosuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	06.	Mar 16
Mannattau S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept 1
Mt Diablo M Co.	Nevada.	R. W. Heath.	318 Pine St.	20.	July 30
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	25.	Feb 13
Plymouth Con G M Co.	California.	W. Van Norden.	23 Nassau St.	25.	Apr 8
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Oct 15
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Sept 8

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..	Rain.....	Temp.....	Wind.....	Weather..
Oct. 7-14																								
Thursday .....	.00	59	SE	Cy.	.00	72	S	Fr.	.00	73	SW	Fr.	.00	64	E	Cy.	.00	73	W	Cl.	.00	71	W	Cl
Friday .....	.17	58	SW	Fr.	.00	70	S	Cl.	.00	63	S	Cy.	—	62	SW	Cy.	.00	75	W	Cl.	.00	70	W	Cl.
Saturday .....	.09	56	N	Fr.	.04	68	N	Cl.	.00	69	NW	Cl.	—	65	NW	Cl.	.00	74	W	Cl.	.00	70	W	Cl.
Sunday .....	.00	61	NE	Cl.	.00	72	NW	Cl.	.00	71	NW	Cl.	.00	64	N	Cl.	.00	79	W	Cl.	.00	69	NW	Cl.
Monday .....	.00	65	E	Cy.	.00	74	S	Fr.	.00	73	NW	Cl.	.00	68	NW	Cy.	.00	86	W	Cl.	.00	70	W	Cl.
Tuesday .....	.00	64	N	Cy.	.00	70	S	Fr.	.00	73	S	Cy.	.03	62	SE	Cy.	.00	78	SW	Cl.	.00	70	W	Cl.
Wednesday .....	.00	61	SE	Cl.	.01	74	NW	Cl.	.01	71	NW	Cy.	.03	68	N	Fr.	.00	77	W	Cl.	.00	69	W	Cl.
Totals.....	.26	.....	.....	.....	.07	.....	.....	.....	.01	.....	.....	.....	.71	.....	.....	.....	.00	.....	.....	.....	.00	.....	.....	.....

EXPLANATION.—Cl, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Mining Share Market.

The long promised bonanza in the middle mines of the Comstock has not yet appeared, although the indications are claimed as good; in fact the Virginia Enterprise states that none of the famous bonanzas which have heretofore been opened in any portion of the Comstock had any better indications than are now shown in the Hale and Norcross and Chollar. The great body and strength of ledge is there, with strong mineralization; the "blossoms" and all other prerequisites are there, and the fruit is now what is wanted. Offshoots and branches from the main ore vein have been more and more plentifully encountered in the progress of development, and the natural sequence sought is the concentration into the grand ore deposit. Quite a number of men have been put to work in Crown Point and Belcher, preparing for taking out plenty of ore when the Carson river will raise up and give the requisite motive power to the mills. Good work is being done opening out the old upper workings of the Ophir at a point where large quantities of ore are known to exist, which were passed by in the early times when expenses were heavier than now, and with the present greatly improved facilities for extraction, transportation and milling, it is expected that these long-neglected ore resources will be made available to good advantage and profit. There was talk of Mr. Fair trying to get control of Con. California and Virginia stock, but he took no part in the election after all.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department of San Francisco.

WIDE AWAKE MINING CO.—Oct. 8th. Location Sierra Co., Cal. Capital stock, \$24,000 or 24,000 shares. Directors—W. Hansen, L. Nessler, F. Busch, H. T. Briggs and Thomas Calless, all of Downieville.

CASCADE OIL CO.—Oct. 8. Capital stock \$1,000,000. Directors—James A. Johnson, R. R. Provines, C. Livingston, Wm. M. Gwin and F. G. Newlands.

CO-OPERATIVE BRICK TILE AND TERRA COTTA ASSOCIATION.—Oct. 8. Capital stock \$25,000. Object: Buying suitable land and erecting machinery for the manufacture of bricks, drain tiles, sewer pipe, terra cotta ware, and all articles of earthenware. Directors—Roderick A. Gilbride, James E. Clashy, Aaron Evans, James J. Martin and James K. Phillips.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 24.	WEEK ENDING Oct. 1.	WEEK ENDING Oct. 8.	WEEK ENDING Oct. 15.
Alpha.....	.55	.70	.27	.15
Alta.....	.25	.30	.15	.27
Andes.....	.05	.05	.05	.05
Argenta.....	.10	.15	.10	.10
Belcher.....	.90	1.35	1.60	1.05
Belcher.....	1.60	1.70	1.35	1.30
Bullion.....	.40	.35	.40	.35
Bonanza King.....	.40	.35	.40	.35
Belle Isle.....	1.05	1.60	1.55	1.70
Bodie Con.....	1.05	1.60	1.55	1.70
Benton.....	.10	.10	.10	.10
Bodie Tunnel.....	.10	.10	.10	.10
Butte.....	.30	.30	.30	.30
California.....	1.55	1.85	1.30	1.50
Challenge.....	.15	.15	.15	.15
Champion.....	1.50	1.60	1.15	1.55
Chollar.....	1.15	.90	.75	.90
Confidence.....	1.15	.90	.75	.90
Con. Imperial.....	1.55	1.85	1.30	1.50
Con. Virginia.....	1.55	1.85	1.30	1.50
Con. Pacific.....	1.05	1.10	1.05	1.55
Crown Point.....	1.05	1.10	1.05	1.55
Day.....	.45	.45	.45	.45
Eureka Con.....	.45	.45	.45	.45
Eureka Tunnel.....	.45	.45	.45	.45
Excelsior.....	.05	.07	.05	.05
Grand Prize.....	1.00	1.10	.80	.75
Gould & Curry.....	1.00	1.10	.80	.75
Goodshaw.....	6.00	5.12	4.50	4.90
Hale & Norcross.....	6.00	5.12	4.50	4.90
Holmes.....	4.50	4.50	4.50	4.50
Independence.....	.10	.10	.10	.10
Julia.....	.15	.15	.15	.15
Justice.....	.15	.15	.15	.15
Martin White.....	1.15	1.15	1.15	1.15
Monoc.....	.65	.35	.60	.35
Mexican.....	.65	.35	.60	.35
Mt Diablo.....	.20	.20	.20	.20
Northern Belle.....	.75	.80	.60	.70
Navajo.....	.75	.80	.60	.70
Northern Belle.....	.75	.80	.60	.70
Occidental.....	.10	.10	.10	.10
Ophir.....	1.05	1.10	.80	.70
Overman.....	.25	.30	.15	.20
Potosi.....	.50	.55	.25	.30
Princeton.....	1.35	2.00	1.65	1.30
Savage.....	1.35	2.00	1.65	1.30
Seg. Belcher.....	1.10	1.30	.75	.65
Sierra Nevada.....	1.10	1.30	.75	.65
Silver King.....	.10	.10	.10	.10
Scorpion.....	.10	.10	.10	.10
Syndicate.....	.30	.30	.30	.30
Tioga.....	.55	.40	.37	.35
Union Con.....	.55	.40	.37	.35
Ute.....	.80	.80	.80	.80
Yellow Jacket.....	1.90	1.75	2.00	1.75

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 15.	110	Hale & Norcross.....	3.90@3.95
150 Andes.....	30c	120 Mexican.....	.40c
100 B. & Belcher.....	1.20	400 Mono.....	2.90c
35 Bodie Con.....	300	100 N. V. P.....	.45c
400 Belcher.....	1.50	150 Ophir.....	.85c
400 Bulwer.....	.50c	30 Potosi.....	.25c
500 Belle Isle.....	.05c	550 Savage.....	1.40c
400 Con Va. & Cal. 1.20@1.25		120 Sydney.....	.75c
700 Chollar.....	.10	50 Sierra Nevada.....	.70c
30 Confidence.....	.90c	535 Union Con.....	.60c
215 Gould & Curry.....	.75c	50 Yellow Jacket.....	1.35c

THE "Sweet Grass Hills," Montana—a new district—has commenced shipping gold dust.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.
Redwood.—Cargo prices are at present as follows: Rough, merchantable, #1 M ft., \$13.00; Rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 V Rustic, No. 1, \$22.00; 1x8, tongued and grooved, \$21.00; 1x4, tongued and grooved, beaded, \$23.00; 1x10, 3x8, Battens (board measure), \$30.00; Shingles, #1 M, \$1.65.

Pine.—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T and G Flooring, 1x6, \$25.00; do do 1x8, \$28.00; do do 1x4, \$23.00; do do No. 2, \$21.00; Vertical Grain T and G Flooring, 1x6, \$30.00; do do do 1x6, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft, 3 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:
Pine, Rough.....\$15 00
" " No. 2....." 12 00
" " 2 in lengths....." 13 00
" " 40 to 50 ft lengths....." 17 00
" " 50 " 60 "....." 16 00
T. & G. Flooring 1 x 6....." 26 00
" " 1 1/2 x 6....." 28 00
" " 1 x 4....." 25 00
" " No. 2....." 21 00
Vertical Grain T. & G. Flooring, 1 x 6....." 30 00
Stepping....." 1 1/2 x 6, 1 x 4....." 37 00
Furring, 1 x 2, per lineal foot....." 3 00

Redwood, Rough....." 17 00
" " No. 2....." 13 00
" " Surfaced....." 30 00
" " 1 x 8....." 28 00
" " 1 x 6....." 28 00
" " T & G 6 in 12 ft. and over....." 28 00
" " " 7 to 12 ft....." 26 00
" " " under 7 ft....." 30 00
" " Rustic....." 25 00
" " No. 2....." 25 00
" " T & G Beaded 12 ft. and over....." 30 00
" " " 7 to 11 ft....." 25 00
" " " under 7 ft....." 20 00
" " Siding, 3 in....." 22 50
Pickets, Fancy....." 25 00
" " Rough Pointed....." 15 00
" " Square....." 14 00
Battens, 1 x 3 per lineal ft....." 03
Shingles....." 2 00
Laths, 1....." 3 25
" 1 1/2....." 3 75
Dunnage Boards less 5% delivered....." 16 00
Price subject to change without notice.

Nails.

We give the price list of the Pacific Iron and Nail Company.
Net Cash Prices, Sept. 25th.
Lots of 250 kegs or over.....\$2 75
Lots of 100 kegs or over....." 2 80
Less quantities....." 2 85

10d to 60d.....\$ 50
8d to 9d....." 25
6d to 7d....." 50
4d to 5d....." 75
3d....." 1 00
2d....." 1 50
1d....." 2 00
1/2 d....." 2 50
1/4 d....." 3 00
1/8 d....." 3 50
1/16 d....." 4 00
1/32 d....." 4 50
1/64 d....." 5 00
1/128 d....." 5 50
1/256 d....." 6 00
1/512 d....." 6 50
1/1024 d....." 7 00
1/2048 d....." 7 50
1/4096 d....." 8 00
1/8192 d....." 8 50
1/16384

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING OF OCTOBER 6, 1885.

- 327,664.—MACHINE FOR CUTTING CORN FROM THE COB.—Benj. Collins, Oakland, Cal.
327,529.—BUCK POLE.—B. F. Cook, Santa Maria, Cal.
327,681.—COTTON CHOPPER ATTACHMENT FOR CULTIVATORS.—H. Hennickson, Duarte, Cal.
327,683.—CULTIVATOR AND WEED CUTTER.—L. B. Hogue, Carpinteria, Cal.
327,690.—ELEVATED ELECTRIC RAILWAY.—Andrew Jackson, S. F.
327,693.—GRAPE STEMMER AND CRUSHER.—Johnson & Smith, S. F.
327,698.—MUSIC LEAF TURNER.—C. H. Lindemann, S. F.
327,724.—TUNE FORMING MACHINE.—J. L. Richter, S. F.
327,707.—APPARATUS FOR MINING RIVER BEDS, ETC.—J. R. Moffitt, Chinese Camp, Cal.
327,708.—WET ORE CONCENTRATOR.—J. R. Moffitt, Chinese Camp, Cal.
327,709.—RETORT AND CRUCIBLE FURNACE.—J. R. Moffitt, Chinese Camp, Cal.
327,710.—HEEL-STIFFENER MACHINE.—J. R. Moffitt, Chinese Camp, Cal.
327,735.—SEPARATOR.—Linus Stewart, S. F.
327,742.—MACHINE FOR MAKING NUTS.—S. Uren, Sacramento, Cal.
327,743.—UTILIZING SCRAP FOR NUTS, ETC.—S. Uren, Sacramento, Cal.
327,640.—SULKY PLOW.—J. T. Ziegler, Santa Cruz, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FOLDING BED.—B. F. Farrar, S. F. No. 327,076. Dated Sept. 29, 1885. This folding bed consists of a sectional mattress or bed, the sections of which are hinged together, of movable supporting frames or legs, to which the sections of the mattress are pivoted, of a hinged head board, of certain braces, stops, latches and fastenings, and of a suitable cover for the whole.

CHECK REIN AND POST HOOK.—C. L. Bard, San Buenaventura, No. 327,057, dated Sept. 29, 1885. The invention consists in a slotted check-rein attached in front to the head-gear, which may be the overdraw or gag-check, and having a rear extension attached to the driving lines at a point behind the plane of the pad, and a post upon the pad through which the check-rein passes, said post having a fixed hook adapted to engage the slot of the check-rein.

SULKY PLOW.—John T. Ziegler, Santa Cruz, No. 327,640. Dated Oct. 6, 1885. This sully plow consists of two or more plows upon opposite sides of a beam, a means by which said beam may be rotated and held with either of the plows or sets of plows in action, and a means by which the wheel axle can be rotated so as to throw either wheel downward to make it a furrow wheel when the plows are working to that side.

GAS LAMP.—Leopold Julig, S. F. No. 327,089. Dated Sept. 29, 1885. This gas or vapor lamp consists in an oil reservoir having an outer chamber, to which the oil is fed, and an inner chamber communicating with the outer one. A peculiar burner communicating with the outer chamber, a rotating fan within the inner chamber above the oil, and operated by an electric current, a valved port communicating with the inner chamber, whereby air is drawn in by the fan, and in various details of construction. The object is to provide an effective lamp for burning the gases or vapors originating from gasoline and other liquid hydrocarbons.

CHECK-REIN AND POST HOOK.—C. L. Bard, San Buenaventura. No. 327,056. This is a slotted check-rein, connected at its front to either the ordinary overdrawn or gag check-rein, and having a rear extension attached at a point behind the plane of the pad; and in a peculiar post on the pad through which the check-rein passes, said post having a pivoted hook-lever, the forward point of which is adapted to engage the slot of the check-rein, and its rear end to receive said rein, which passes through it. One object of this arrangement is to enable the driver to check and uncheck his horses at will without being obliged to step out of the vehicle. He can water his horses in a stream or at a trough without leaving the vehicle. In ascending hills or going over rough portions of the roads, where it is desirable to give the horse his head, he can do so with very little exertion. The driver has, with this device, greater control over his horses.

GRAPE STEMMER AND CRUSHER.—Geo. Johnston, S. F., and Edwin G. Smith, Sacramento. No. 327,693. Dated October 6, 1885. This apparatus consists of an approximately horizontal case, in one end of which the bunches of grapes are delivered, a series of revolving arms or heaters fixed upon a shaft which extends through the case, and a series of angular ad-

justable or stationary spirals or guides fixed within the case, by which the stems are caused to pass out of the opposite end of the case after being separated from the grapes; a chute through which the separated grapes are delivered to the peculiarly constructed rollers, and in an inclined revolving and perforated drum or cylinder, within which the pulp and juice are finally separated.

TUNE FORMING MACHINE. John L. Richter, S. F. assignor to W. W. Montague. No. 327,721. Dated Oct. 6, 1885. This is an apparatus for rolling metal tubes. It consists in a rotating traveling roller, moving over the metal sheet within fixed guides, and having a peculiar clamp for securing the edge of the sheet.

SEPARATOR. Linus Stewart, S. F. No. 327,735. Dated October 6, 1885. This invention relates to the class of boilers, and it consists in a plate or shield within the boiler and directly below the entrance of the exit steam pipe. When this water in a boiler is foaming and steam is being drawn from it by a pipe which is simply put in the boiler, the rush of steam toward the exit is such that the water rises or lifts, being highest in its center, and the steam is necessarily drawn out in a wet condition; but by having the shield here patented this lifting of the water in the vicinity of this exit pipe is prevented, and none but dry steam is taken out, because of the protection afforded the entrance of the pipe.

ELEVATED ELECTRIC RAILWAY.—Andrew Jackson, S. F., assignor of one half to John K. Savags, No. 327,690. Dated Oct. 6, 1885. The object of this electric railway is to transport rapidly a small car or receptacle designed to contain small packages and other minor freight. It consists of an electric track, a car or receptacle containing an electric motor and suspended from said track by a suitable wheel adapted to travel thereon, suitably suspended and insulated continuous wires, a means for taking the current from said wires to the electric motor in the car, and a mechanism for transmitting the power of said motor to propel the suspending wheel of the car or receptacle. Certain novel details of construction are covered by the patent.

MUSIC LEAF TURNER.—Chas. Lindemann, S. F., No. 327,698. Dated Oct. 6, 1885. This device for turning the leaves or pages of books or music consists of certain improvements in that class of turning appliances in which a series of arms extend outward between the leaves of the sheet to be turned, and are actuated by short racks which engage the teeth of pinions formed upon the inner ends or journals of these arms. The object is to provide a means for turning leaves in one direction by means of a pedal or foot lever at the bottom of the music stand, while the leaves may be returned by means of a second or releasing lever which allows the spring to act and so turn the pages backward. It also consists of a means by which the music rack may be raised or lowered to suit persons of different heights, or in different positions, without interfering with the turning mechanism.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARRE C. HOAG—California.
J. J. BARTLEY—Sacramento and San Joaquin.
A. C. KNOX—Nevada (State).
G. W. INGALLS—Arizona.
E. L. RICHARDS—Los Angeles and San Bernardino.
R. G. HUSTON—Idaho and Montana.
Geo. McDOWELL—Tulare and Fresno Co's.
HUGH ELIAS—Nevada Co.
J. DE PUE, Colusa and Butte Co's.
R. E. LLOYD, Contra Costa and Stanislaus.
J. WINKLER, Alameda Co.

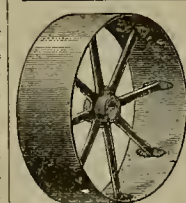
Easy Binder.

Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file holders. Newspapers are quickly placed in it and held neatly as in a cloth-bound book. It is durable and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Masonic Record, Harper's Weekly, and Scientific American, 75 cents; postage, 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.

Lost Papers.

If any subscriber fails to receive this paper promptly after making due inquiries at the Postoffice, he is urgently requested to notify this office by letter, that we may send the missing papers, and, if possible, guard against further irregularities.

CELEBRATED tourists' glasses only at Muller's, 135 Montgomery street, near Bush, opposite Occidental Hotel.



PAT. OCT. 25, 1881.

PERFECT PULLEYS
First Premium Awarded at Mechanics' Fair, 1884.
CLOT & MEESE,
Sole Licensed Manufacturers of the
Medart Patent Wrought Rim Pulley
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of
SHAFTING, HANGERS AND APPURTENANCES.
SEND FOR CIRCULAR AND PRICE LIST.
Nos. 129 and 131 Fremont Street
SAN FRANCISCO, CAL.

NEW BOOKS ON ASSAYING.

BY C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof by knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications "Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores," "That have been 'unsuccessfully' in assay" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Button; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Copied; Assay by Amalgamation; To Find the Value of a Specimen; Test for Oxygen; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.
The volume embraces 106 1/2 pages, with illustrations, well bound in cloth 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market Street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Manual Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assay; Weighing by Oscillations; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 168 1/2 pages, with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F. These are much needed books for miners and other practical men, by an intelligent miner and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

ASSESSMENT NOTICE.

Orleans Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Grass Valley, Nevada county, Cal. NOTICE is hereby given, that at a meeting of the Directors, held on the 17th day of September, 1885, an Assessment (No. 12) of Five (5) Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 934 and 936 Mission street, San Francisco, Cal. Any stock upon which this Assessment shall remain unpaid on the second day of November, 1885, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday the twenty-third day of November, 1885, to pay the Delinquent Assessment, together with costs of advertising and expenses of sale.

GEORGE P. THURSTON, Secretary.
OFFICE—934 and 936 Mission St., San Francisco, Cal.

METALLURGIST.

A Graduate of the Mining School of Clausthal, with some experience on this coast in Assaying, Amalgamating, and general metallurgical work, is desirous of employment in Milling or Smelting operations. Address

ROBT. F. LETTS, Mining Engineer,
328 Montgomery St., San Francisco.
Room 13.

MICA MINE.

Capital Wanted to Develop.

Half Share offered as equivalent.

ADDRESS

G. W. SPAWFORTH, Lang Station, Cal.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

Dewey & Co., American and Foreign Patent Agents.

PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out; Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Soliciting promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and thoroughly established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of most inventions discovered here than any other agents.

Situated so remote from this seat of Government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars of information to inventors, free.

Home Counsel.

Our long experience in obtaining patents for inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintances of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes mis-carry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees intrusted to our agency.

Engravings.

We have superior artists in our employ, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

DEWEY & CO.,

United States and Foreign Patent Agents, publishers Mining and Scientific Press and Pacific Rural Press, 252 Market Street. Elevator, 12 Front St., S. F.

Iron and Machine Works.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines
Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ESTD 1870** ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
Sheathing Nails, Rubber Braces, Hinges, Ship and Steam-
boat Bells and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-
plings and Connections of all sizes and patterns, furnished
with dispatch. **ESTD 1870** PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

H. OMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

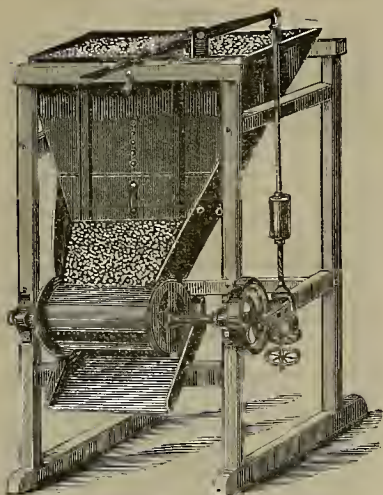
EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use.
It has fewer parts, requires less power, is simpler in
adjustment than any other. Feeds coarse ore or soft clay
alike uniformly, under one or all the stamps in a battery
as required.

In the Bunker Hill Mill it has run continuously for two
years, never having been out of order or costing a dollar
or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, SAN FRANCISCO, CAL.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope,
Sisa Rope, Tarred Manila Rope, Hay Rope, Whale
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

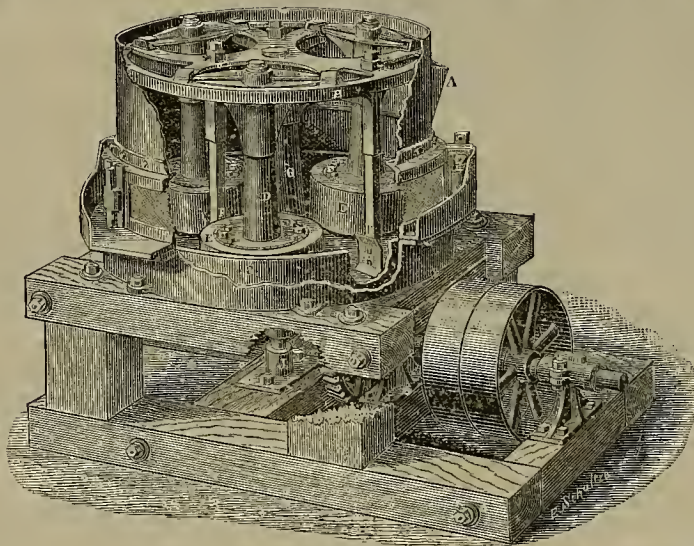
Consumers are respectfully informed that owing to inferior brands of Coke having been sold
in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co.
(Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting
that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works,
Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded
to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.
The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quanti-
ties to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy
in Saving Gold. Economy in Transportation of Machinery.
Economy in Cost of Erection of Mill at Mine. Econ-
omy in Time Required to Establish Plant
(one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of
continuous use at a number of mines in California has enabled the inventor to perfect and im-
prove the machinery until he feels justified in assuring the public that he has reached THE ABSO-
LUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

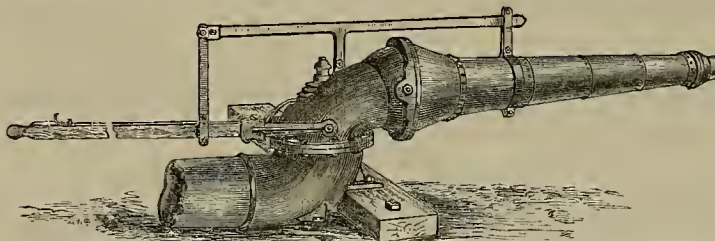
F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ill.

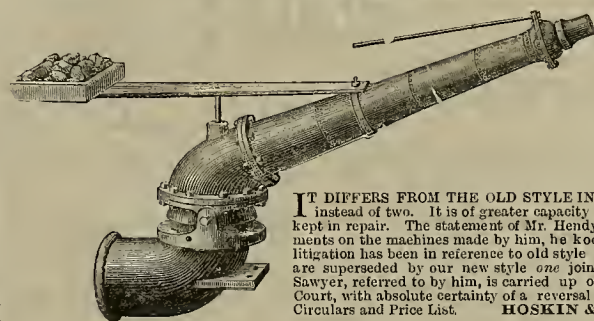
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manu-
facture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under
the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.
ESTD 1870 Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

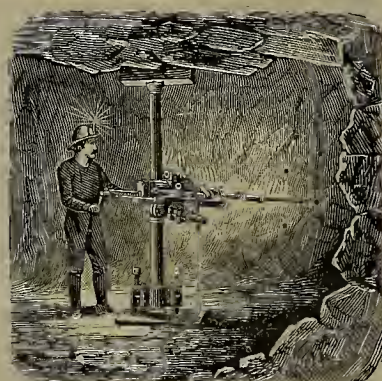
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

IMPROVED
HYDRAULIC
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT
instead of two. It is of greater capacity and more easily worked and
kept in repair. The statement of Mr. Hendy that all styles are infringements
on the machines made by him, he knows to be utterly false. All
litigation has been in reference to old style two jointed machines, which
are superseded by our new style one jointed. The decision of Judge
Sawyer, referred to by him, is carried up on appeal to U. S. Supreme
Court, with absolute certainty of a reversal in our favor. **ESTD 1870** Send for
Circulars and Price List. HOSKIN & CO., Marysville, Cal.



INGERSOLL ROCK DRILLS

.....AND.....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
Ports, will do 20 per cent more work than
the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

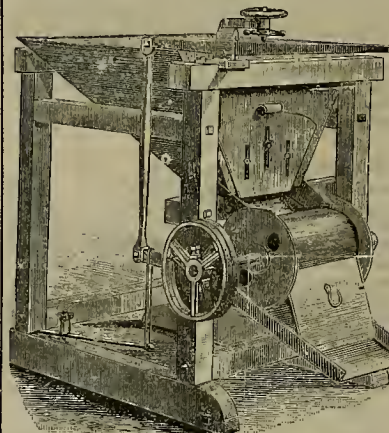
BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar
work. Manufacturers of the Celebrated "Chal-
lenge" Ore Feeders for any character of
ores; also "Stanford Improved" Ore
Feeders and Tullock's Ore Feeders for
dry ores.

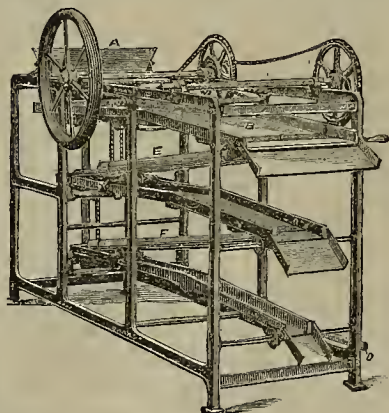
ESTD 1870 Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

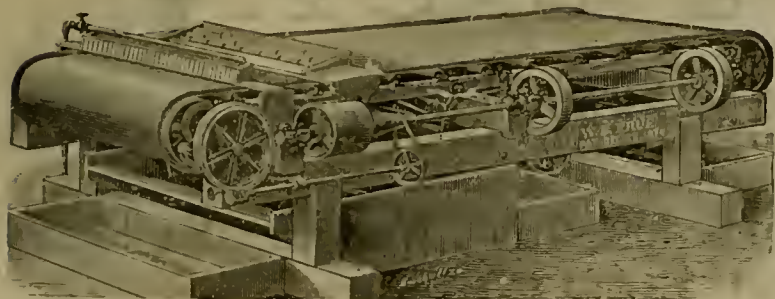
DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken
apart; packs in small compass; may be run by hand or
horse power. Capacity, two tons an hour. No blowers
or 6x1 fans, or quicksilver used. Frame all malleable
iron. Will save a higher percentage of gold than other
machines. TATUM & BOWEN, San Francisco
and Portland, Agents.
Now on exhibition at Mechanics' Fair,
San Francisco, where it may be seen in operation.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 230 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

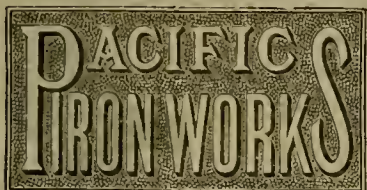
Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850.

1885.

RANKIN, BRAYTON & CO.,

....BUILDERS OF....

MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

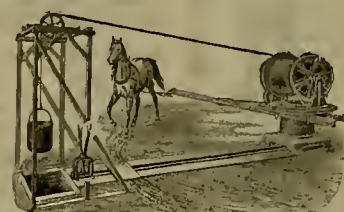
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist, and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 600 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

For Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



Chicago Prices Beaten!
ESTABLISHED 1860.
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.
J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chases, Cement and Steam Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS LOGGING, PORTABLE, STATIONARY, MARINE AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

ORO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

ORO. W. DICKIE, Manager.
J. O'B. OUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

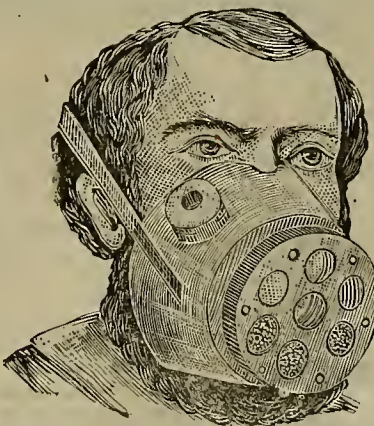
TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Gunpowder Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to
T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

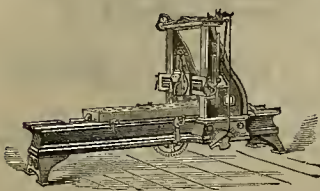
No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



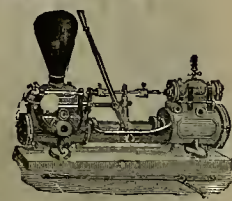
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

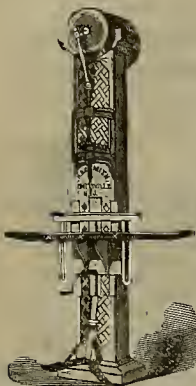
Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

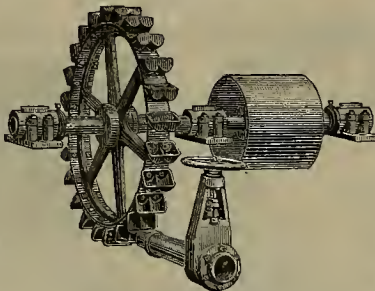
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors;
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
Turvent Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

WIRE FENCING

Of various designs, for S , Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Barbed Wire.**WIRE CLOTH.**

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

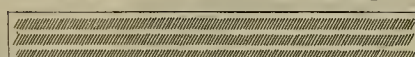
RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of
all kinds of
Chemical Stoneware
—FOR—
Manufacturing
Chemists.
Also Chemical Brick
for Glover Towers.

This paper is printed with Ink Manufactured
by Charles Eneu Johnson & Co., 500
South 10th St., Philadelphia. Branch Offi-
ces—47 Rose St., New York, and 40 La Salle
St., Chicago. Agent for the Pacific Coast—
Joseph H. Dorety, 529 Commercial St., S. F.

FRASER & CHALMERS.

CHICAGO, ILL.

U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

Denver
Office:
No. 248
18th Street,
Denver,
Colo.

NEW YORK OFFICE,
ROOM 43,
NO. 2 WALL ST.

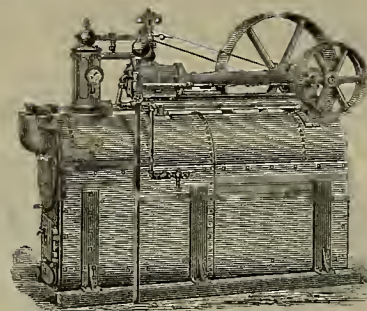
Mexico
Office:
No. 11
Calle
de Sanchez
Chihuahua,
Mexico

**JENKINS PATENT VALVES.****Gate, Globe, Angle, Check and Safety.**

Manufactured of BEST STEAM METAL. We claim the following advantages over
other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impos-
sible to make them tight except by regrinding, which is expensive if done by hand, and if don-
by machine soon wears out the valve, and in most cases they have to be dis- connected from
the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is
manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited.
To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal



SKINNER ENGINE COMPANY'S
CELEBRATED

PORTABLE ENGINES and
BOILERS.

Three Gold Medals at the New Orleans Ex-
position over 25 Competitors.

ALL SIZES CARRIED IN STOCK.

STEEL BOILERS

All sizes and styles made to order. (2-sheet
Steel Boilers a specialty.) 2000 H. P. sold on the Coast
during past three months.

STEARNS MANUF'G CO.,

29 & 31 Spear Street, San Francisco.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 24, 1885.

VOLUME LI
Number 17.

An Efficient Mining Pump.

The Alaska Mining Company, whose quartz mine is in Sierra county, in this State, has issued a very complete and well-printed report, showing the result of work at the mine for the past year. The mine has produced in 11 months \$175,456, of which 94,761, or 46 per cent of the gross product, has been paid or placed to the credit of shareholders. 8 per cent on the total capitalization. The cost of mining is \$5.70 per ton, and of milling \$6.64 per ton. The mine has been systematically opened, equipped and supplied and its value made apparent. A year ago they had three temporary pumps at work removing the water that had flooded the mine for a long time. After the shaft was cleared to the fifth level it was determined that permanent pumping machinery should be placed in the mine. In June last the flow was at the rate of 550 to 600 gallons per minute, which has recently increased to over 1000 gallons per minute, or over 1,400,000 gallons in 24 hours. The registering box gives 80 miners' inches under a six-inch head and 100 inches legal standard under four-inch head. Most mines, with an equal flow of water, would either have been abandoned or an expensive plant of pumping machinery costing, with foundation and freight, from \$100,000 to \$150,000, would have been provided.

To successfully run the mine until its earnings should so equip it was impossible, and plans must be varied or other means tried; so, after thorough investigation, the Worthington Compound Duplex mine pumping engine 18½ in. x 29 in. x 12 in. x 18 in. was selected from its long tested merits in other capacities, while comparatively new in its adaptation to this severe form of service. An engraving of this pump, taken from the official report, is shown on this page. An order was early given for its special manufacture, to be of 1,000,000 gallons daily capacity, at lowest speed, giving measurements of shafts, that no part should fail of admission to the mine. Its weight, with connections, is 15 tons. Its cost, including freight, fittings and setting, has been only \$12,650. Over 1200 tons rock was excavated for its room and reservoir. This pumping engine is placed at the 5th level of the mine, and now throws the entire volume

of water, at single lift, through a 12-inch column 400 feet, to the drain tunnel, and is capable of much greater service, if required, by accelerating its speed. Steam is conveyed to it through a 5-inch pipe 500 feet from the boilers. Steam pipe is thoroughly wrapped with hair felting encased in canvas, and the loss of steam by condensation is insignificant, steam gauge at pumping engine registering same as surface. The water from the upper levels is conveyed through wooden boxes to reservoir at 5th level, supplying in its passage an automatic steam condenser, constructed by Mr. J. H. Barker,

supplying four direct-acting steam pumps to free mine of water and two 10 in. x 20 in. hoisting engines, raising 75 to 80 tons ore and waste daily was 17 cords in 24 hours; quality, pine and spruce. In June with Worthington pump and same duty, fuel consumed eight cords daily. With additional increase since of 400 gallons per minute, consumption has increased to 11 cords daily. In the former case three firemen were employed in 24 hours; now two persons perform the labor.

Of the Worthington mine pumping engine, after three months severest test, as compared

The Crescent Mine.

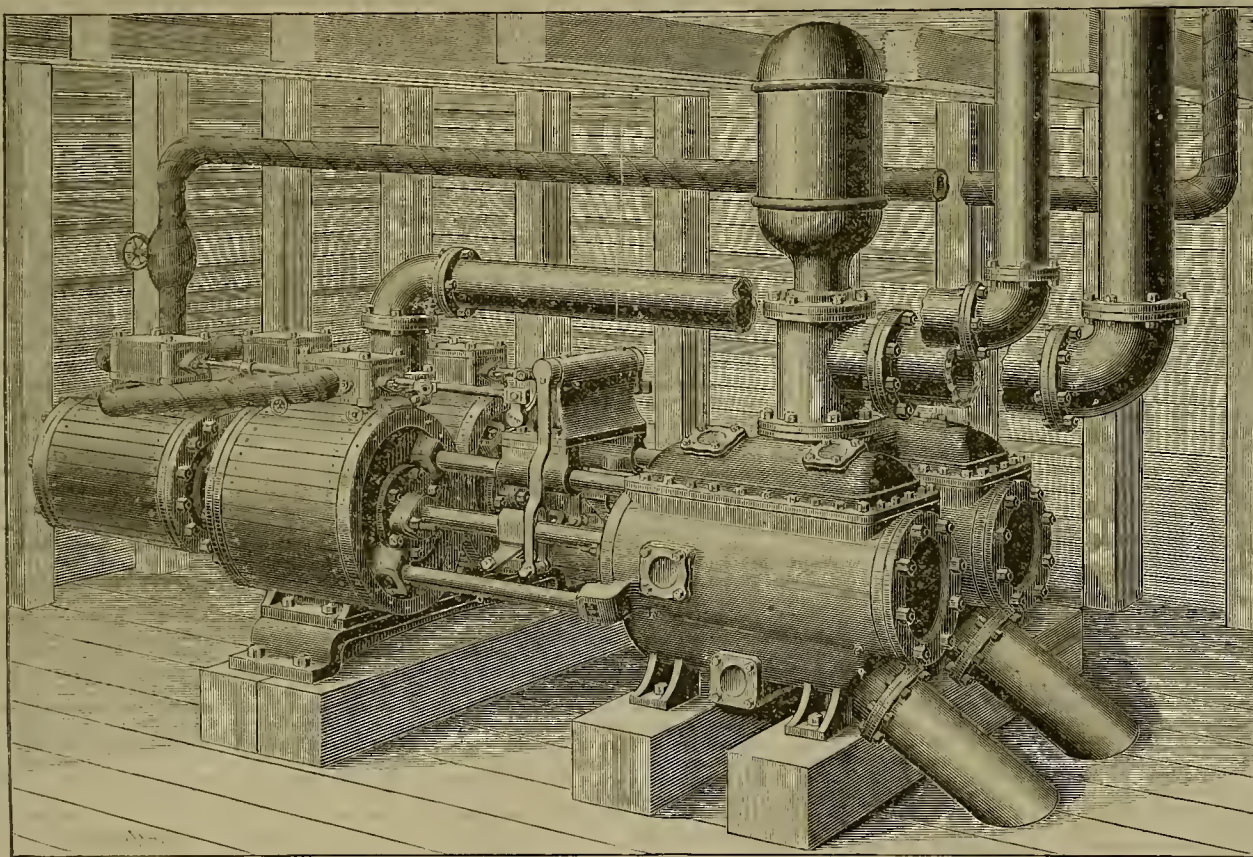
At the annual meeting of the Crescent Mining Co., in Salt Lake City, the Michigan men kept the control and elected themselves directors and officers. This Utah mine is making a good record as a bullion producer. The concentrator and sampling mill have been doing good work. In the sampling mill all the shipping ore of the company has been sampled satisfactorily, both to the company and to purchasers, and it has saved to the company during the year \$6825. The books of the company show that 986 tons

of concentrates have been sold during the year, with a net profit of \$4,021. There have been extracted and sold during the year 11,581 tons of ore, which netted to the company at Park City \$199,413. The grade of ore during the year has averaged about the same in lead, but slightly less in silver. The amount produced has been 1203 tons less than last year the time being 11 months instead of 12, owing to the time of the annual meeting being changed from November to October. During the past six months the price of silver has been greatly depreciated, but the price of lead has been better than during the former year.

The company this year brought water from the springs to the

mine, thus saving \$200 a month. The locomotive for hauling the ore works successfully, and with the additional cars furnished will no doubt provide for the transportation of the second-class ore that is capable of being reduced by the concentrator. The Etna tunnel has been extended until connection was made with the old works on the east side of the hill, thus furnishing air for the tunnel and relieving the mine from the expense of fans. Some drifting has been done east and west upon said tunnel with satisfactory results. As for the general run of ore avails of sales have been about \$17.18 per ton, and from other sources, as above enumerated, \$3.09, a total of \$20.27. The total disbursements for all purposes have been about \$12.21 per ton. Net over all, which represents the amount paid on former indebtedness, dividend No. 5 and improvements, \$8.06 per ton.

MONTANA'S silver production during 1884 was about \$8,000,000; gold, \$2,000,000.



THE WORTHINGTON PUMP IN LEVEL NO. 5, ALASKA MINE, SIERRA COUNTY, CAL.

machinist and chief engineer at the mine, which assists the engine with vacuum pressure, registering 23 inches; at same time water is utilized for air blast to ventilate the mine, thus dispensing with fan machinery.

The three ordinary direct-acting steam pumps, formerly in use, have been placed respectively at 3d, 4th and 5th levels, to be used as relief to large pump in case of stoppage to change valves, or for any other cause, which would be equally necessary with any other pumping system. Until the last large increase of water, they have been of sufficient capacity to furnish such relief. Now, the one at No. 3 level, by actual test, at very high speed, is found sufficient; but due precaution and necessity requires another of equal or greater power to be placed immediately at No. 5, to throw the water to No. 3 pump, and one has been ordered, as the two smaller ones in use would be quickly overpowered in case of emergency. By actual measurement, wood consumption in month of May last, with two pair boilers, 54 in. x 16 ft.

with other form of steam pumps or Cornish plant the officers of the company have tested, and are prepared to say that the service it renders, the durability its mechanism ensures, the economy of its use and the comparatively small cost of its plant, the Worthington stands unrivalled and incomparable.

SILICON SHIPMENT.—Four carloads, containing 50 tons of silicon from J. S. Noe's mine, north of this city, says the *Virginia Enterprise*, have been shipped during the past week: two to San Francisco and one to New York, making 500 tons shipped thus far during the present year. It is used in the manufacture of asbestos preparations, and the deposit is inexhaustible.

The issue of standard dollars from the mints during the week ending Oct. 17th was \$1,029,750, and during the corresponding period of last year, \$594,997. The shipment of fractional silver coin from Oct. 1st to Oct. 17th amounted to \$567,559.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Russell Leaching Process.

A Glance at Mr. Stetefeldt's Pamphlet.

[Written for PRESS by C. H. AARON.]

Mr. Russell certainly deserves the thanks (and something more) of all who are interested, whether from a scientific or a practical point of view, in the treatment of silver ores. The amount of labor he has performed, though but partially represented by the pamphlet in question, can only be appreciated by those who have made more or less similar experiments.

Mr. Russell is apparently a candid and conscientious investigator, and as such will not object to a few comments, which may in some points savor of criticism, on the pamphlet in which some of the results of his labors are given to the world.

To begin with page 1, we find that "Mr. Russell has discovered that lead can be completely separated from a sodium hyposulphite solution, as carbonate, by sodium carbonate or purified soda-ash, without precipitating any copper or silver." The fact that I made the same discovery in 1882, as heretofore stated in your columns, would scarcely have been known to Russell, and consequently does not diminish the credit due to him, nor interfere with his patent unless in so far as that I have the right of using this part of the process. That I have not used it heretofore is simply because I have had no occasion. At the Silver King leaching works the lead was not particularly troublesome, because the roasted precipitate was refined by cupellation, in which an additional quantity of lead was requisite to work off the copper.

Passing to page 3: "In making chlorination tests of roasted silver ores, with a sodium hyposulphite solution, it has been generally assumed that the silver extracted is all in the form of chloride. This is not correct." The passage quoted is not quite candid; compare pages 93 and 132, etc., of my work on "Leaching Gold and Silver Ores," and investigations in 1876 published in the MINING AND SCIENTIFIC PRESS. This matter was also mentioned in my recent letter.

We now come to the "scientific" portion of the pamphlet. In "The Reactions of Sodium Hyposulphite Solution," we find that metallic gold and silver sulphide are insoluble, while gold sulphide, silver arsenate and antimonate, as well as cuprous chloride, lead sulphate and calcium sulphate are soluble, the latter best in cold, rather dilute solutions. In all this there is nothing particularly new or surprising, though the statement of the facts is very proper in view of what follows later. However, I venture to suggest that the behavior of compounds produced in the wet way, as some of these seem to have been, may differ from that of those formed in the furnace.

In regard to the solubility of silver chloride in sodium hyposulphite solution, the valuable points stated are that "by using solutions of more than 10 per cent concentration, the Ag. Cl. hardens into lumps," and that "temperature does not influence results materially." The latter statement, taken jointly with this, "the solubility of lead sulphate increases materially with the temperature of the solution," is verified in practice, it being well known that warm solution brings out more base metal than cold.

The author says: "The solubility of silver chloride may be determined in two ways." First, by exposing freshly precipitated Ag. Cl. to the solution (the method used by Russell). Second, by adding Ag. No. 3 to a hyposulphite solution which contains sodium chloride, until saturation is indicated by turbidity. The first method gives somewhat variable results, with an average of 0.4 silver chloride to 1 crystallized sodium hyposulphite in the solution. The second gives 0.485 to 1 and, according to the pamphlet, "the latter figures are to be considered as the more correct ones." It seems possible that the introduction of sodium nitrate in the second method may make some difference, but the question does not appear to be of any metallurgical importance. It is to be presumed that the salt used in the second method is a very small quantity, merely to indicate the ending or saturation point. However, the effect of salt in the solution should be determined, as that (or calcium chloride) will accumulate in the leaching liquid in practice.

The next conclusion is that the presence of lead sulphate in the leaching liquid does practically reduce the power of that to dissolve silver chloride and, to quote, "It is not astonishing that this should be so, because a part of the sodium hyposulphite is consumed in the formation of the lead-salt," alluding to the double lead and sodium hyposulphite which, with sodium sulphite, results. "Assuming that this has the formula $2\text{Na}_2\text{S}_2\text{O}_3$, PbS_2O_3 , and calculating the amount of sodium hyposulphite necessary in its formation, we find that the dissolving energy of the solution for silver chloride has been less reduced than should be expected, taking Mr. Russell's value of 0.4 for the solubility of silver chloride as a basis." Then follows a tabular statement showing that the actual reduction of solvent power is considerably less than the calculated reduction, from which I draw the inference that either the as-

sumed composition of the lead salt is incorrect or its presence increases the solvent power of the sodium hyposulphite remaining unchanged, notwithstanding the formation of sodium sulphate, which, in another place, is said to be injurious. These mixture questions become very complicated, and as they would seem to have only a practical value, it would perhaps be best to confine observations to practical results. In this case, the practical fact is that the presence of lead sulphate lessens the solubility of silver chloride in a given solution. I shall have occasion, further on, to point out what seems to be a false inference drawn by the author of the pamphlet from this and similar facts.

The efficiency of the leaching liquid is not sensibly lessened by presence of calcium sulphate, is the next point established by Mr. Russell's experiments.

Sodium sulphate "depresses the solvent energy of sodium hyposulphite for silver chloride." This is so far important that a considerable quantity of sodium sulphate will be formed in leaching ore containing lead sulphate where, as necessarily in Russell's process, the sodium hyposulphite is used instead of the corresponding calcium salt.

"Mr. Russell found that the presence of a very slight quantity of a caustic alkali, or an alkaline earth in a hyposulphite solution has a very deleterious effect on the solubility of silver chloride and other silver combinations." In adding one-half of one per cent of caustic lime to a sodium hyposulphite solution, the percentage of silver extracted from Ontario ore was depressed from 11 to 24 per cent.

"A sample of roasted Ontario ore, which yielded by lixiviation-tests (solubility assays), with ordinary solution 86.5 per cent, was first leached with water and then treated for 36 hours with sodium hyposulphite solutions of two and a half per cent concentration, to which various amounts of caustic soda had been added." Then follows a table showing that with 0.2 per cent of caustic soda only 6.5 per cent of the silver was extracted, and with 5 per cent 5.9 per cent of the silver was dissolved, on which the author remarks that "after the maximum effect has been produced, an increase of caustic soda is actually beneficial," which paradoxical looking, though not impossible, result seems to require confirmation, as only four tests are given, and "it appears that the effect of caustic soda is generally not so pronounced as in the example given above." It also seems that caustic lime is very much less injurious.

This matter is important, for, as justly remarked by the author, "caustics may be introduced into a lixiviation solution by the alkaline sulphides used as precipitants," and in the removal of lead by means of lime, as is done at the Mount Cory mill, or by soda-ash as proposed by Mr. Russell.

"If caustic soda is present in the lixiviation solution, Mr. Russell counteracts its injurious effect by making the solution slightly acid with sulphuric acid." That is, I presume to say, that sulphuric acid is added until the liquid becomes slightly charged with evolved sulphurous acid.

The effect of caustics, both practically and scientifically considered, seems to require further elucidation. It seems improbable that the mere presence of a small fraction of a per cent of caustic soda should have such a tremendous effect unless it produces a chemical change in the solvent or in the substance to be dissolved. As to the latter, it is known that caustics can convert silver chloride into oxide, but it would hardly seem that this could occur in a cold and weak solution; moreover, would not the silver oxide be soluble? It is not stated, and it is important from a practical point of view, whether in these trials the ore was leached continuously with fresh solution or simply steeped so long in a fixed quantity and then washed. The point to which I alluded when speaking of the effect of lead sulphate comes in here also, and in several other places. The author seems to imply that, because the coefficient of solubility of silver chloride is lessened by the presence of a certain substance; therefore, the ultimate result of the leaching operation is necessarily impaired. I confess that I cannot see why this should be so unless a change had been produced in the substance to be dissolved. In practice we leach as long as any silver worth the trouble can be got out of the ore, and the only effect of reducing the coefficient of solubility would be to lengthen the time necessary to complete the leaching. It is true that we judge of the practical termination of the extraction by the quantity of silver in a given measure of the leach, but that quantity necessarily grows progressively smaller, and must be very small indeed before we consider the work finished. Toward the last the quantity of silver dissolved must be a function of the quantity remaining in the ore in a soluble condition as to that menstruum, rather than of the strength of the menstruum itself, which must be weak indeed if it will not take up enough to justify continuing while there is much remaining. Of course I do not now speak of silver compounds which may be insoluble or hardly soluble in hypo. I suggest this as a matter for explanation.

We now come to paragraph 11, in which the removal of lead from the leach, by means of an alkaline carbonate is discussed. Mr. Russell proposes to use commercial soda-ash for this purpose. This sometimes contains sodium sulphide, sulphate, and hydroxide, all of which are injurious, but are easily removed.

"If lead is to be precipitated by this process, the use of calcium hyposulphite is not admissi-

ble; neither can a calcium sulphide be used for the precipitation." That is to say, in case the lead carbonate is to be saved, as Mr. Russell proposes, sodium instead of calcium salts must be used, and a special set of vats must be provided in which the lead may be precipitated as carbonate previous to the precipitation of silver (and copper, if present) as sulphide in another set of vats. If, however, the lead is not to be saved, it will answer to keep the leaching solution charged with sodium carbonate, and allow the lead to remain in the ore, as I contemplated doing at the Silver King works, or to place a layer of the carbonate on the top of the ore in the vat, after the washing and before the introduction of the leaching liquid. This, if feasible, would avoid the necessity for an extra set of vats.

"Mr. Russell's second and most important improvement" consists in a second leaching with a solution of sodium hyposulphite, to which a certain quantity of copper sulphate has been added. This he calls the "extra solution." For an interesting discussion of the compounds resulting from this mixture, the reader is referred to the pamphlet itself. The only remark I wish to make as to this part is that where the author alludes to the use of cuprous chloride in amalgamation, and says "it becomes too expensive for practical operations, and also produces a bullion of low fineness," I beg to differ. I and others under my instructions have treated thousands of tons of ore by amalgamation through the agency of cuprous chloride, at less cost than by roasting, and with an average result of 95 per cent of the silver contents of the ore, while the bullion got was, for long periods, and might have been always, from .900 to .998 fine. I presume, however, that pan amalgamation is meant, but even in pans cuprous or cupric chloride may often be used and often are used with very great advantage, and with proper management bullion of very good quality—over .900 fine is got.

It appears from Mr. Russell's experiments that while silver chlorides are less soluble in "extra" than in ordinary solution, the former dissolves metallic silver, silver sulphide and some unspecified, probably unknown compounds which exist more or less in roasted ore. The extra solution also dissolves gold sulphides (artificial).

Silver sulphides will not be found in any decently roasted ore, and the action of extra solution on it would have no practical significance, were it not for the suggested feasibility of leaching some ores in the raw state. It appears, however, that only artificially produced silver sulphide was tried, and this can hardly be considered a fair test, as the natural sulphide may behave differently, especially when combined with galena or copper glance, in fact it appears in another part of the pamphlet, that sulphureted compounds of silver and copper are not much acted on by this solvent. Much more important is the statement that metallic silver is dissolved by the extra solution, especially if warmed to 50° C. Ordinary solution also dissolves metallic silver slightly, according to Mr. Russell, and much more if warmed, but the efficiency of the extra as compared with ordinary, is stated to be as 9 to 1 if cold, and as 31 to 1 at 50° C. It would be interesting to ascertain the nature of the reaction, if not already known, by which metallic silver dissolves in a solution of sodium hypo. One thing is certain, silver is precipitated by either copper or iron, from a hypo solution, as a brilliant, adherent coat of metallic silver, with at least in the case of copper, solution of the precipitating metal. Perhaps this may afford a means of preparing Russell's extra solution, by treating some of the rich leach with cement copper.

Metallic silver may exist to some extent in ores which have been subjected to a chloridizing roasting, especially if all the requisites of such roasting are not present; if the ore is roasted without salt, a certain proportion of the silver is almost sure to be in the metallic state. It is not clear from the pamphlet whether a given quantity of metallic silver has ever been dissolved completely by either solution.

Metallic gold is not dissolved. Silver arsenate and antimonate are equally soluble in either solution.

We now come to practical tests on roasted ore at the Ontario mill. The ore is roasted in the Stetefeldt furnace. A tabular statement of lixiviation tests (solubility assays) covering a period of 10 months, gives the following results: Percentage of the silver extracted by ordinary solution 88.1; by extra solution 92.6. It is stated that the tests with extra solution were made by adding to one-quarter assay ton of ore 25 gm. sodium hyposulphite and five gm. copper sulphate, both previously dissolved in water, then the whole diluted to 500 c. c. and heated to 50° C. for one hour, then filtered, dried and assayed. Another set of assays were made "by the old method, that is, with ordinary solution," though whether otherwise in the same way, or by continuous cold leaching, we are not informed.

In making solubility assays I always leach until the liquid only gives a slight coloration with a soluble sulphide. We are not told whether this was done with either solution; however, Mr. Russell says "I have found that a longer time of exposure than one hour does not produce materially differing results." Some operators leave the ore soaking all night; I have found that the results so got were far inferior to those by continuous leaching.

With imperfectly chloridized Ontario ore, the difference between the tests made with ordin-

ary and with extra solution are very striking, ranging from 11.1 to 31 per cent in favor of the latter, the ore being roasted in the Stetefeldt furnace. In 49 samples of Bertrand ore, roasted in a modified Bruckner furnace, the average difference in favor of extra solution was 10.1 per cent. It is noticeable that with Alice ore in a Howell furnace the differences given are 3.7, 15.5 and 6. per cent; with Bruckner furnaces at different mills 3.2 and 5.6 per cent, and with a Howell, at Black Warrior, 1.2 per cent; while with a Stetefeldt furnace, at Manhattan and Lexington, we find 1.2 and 0.5 per cent recorded in favor of extra solution.

From what has been said, it will be readily seen that the difference in results becomes less as the silver in the ore is more completely converted to chloride, whether through finer crushing, more careful roasting or the greater fitness of the ore itself for the purpose, but I think the author may have generalized a little hastily when he says, "the difference decreases with the fineness of the ore," because some ores chloridize best when not too fine. In speaking of pan tailings containing some silver which is soluble in ordinary solution, the author says: "From such tailings a much larger percentage of silver is extracted by extra solution;" and then follows a table showing differences from 1.7 to 52.6 per cent more silver extracted from tailings at different localities by extra than by ordinary solution. This author next treats of the lixiviation of ores in the raw state, giving some very instructive results, though stating that certain ores, such as argentiferous lead carbonate, lead antimonate and "fahl" ores, are not suitable, and that the most appropriate classes of ores for the purpose are those containing native silver, silver sulphureted and the group of antimonial and arsenical sulphurets. I have before stated that partzite, an oxidized antimonial ore, rich in copper, yields 80 per cent or more of its silver to warm solution of sodium hyposulphite.

A tabulated statement of results of raw leaching tests on ores from many different mines shows considerable variation, as might be expected; but the advantages on the side of extra solution is given as from 3.8 per cent in the case of Bertrand ore containing 24 oz. to the ton, of which less than half was got by either solution, to 57 per cent in an ore from Durango, Mexico, containing 32.8 oz. to the ton, of which only 8 per cent was extracted by ordinary and 65.3 per cent by extra solution. From Lexington ore 68.5 per cent was got with extra solution, against 26 per cent with ordinary. Tombstone ore gives a better result in this way than the reported average by amalgamation.

It is to be regretted that no information is given as to the time consumed in obtaining these results.

The author states that fine crushing is essential, but further on says: "Recent investigations have demonstrated that * * * in the greater number of cases, crushing through No. 120, No. 30, and even No. 20 screen, produces no great differences in the percentage of silver extracted by extra solution."

In some cases the extra solution extracted less silver than the ordinary, but if the raw ore was first treated with ordinary and then with extra, the latter extracted an additional quantity of silver. Then follows another table of results, which the extra solution extracts from 48.1 to 93.7 per cent from various raw ores.

Mr. Russell experimented on leaching with ordinary and with extra solution samples roasted in the muffle without salt. The results, while showing the superiority of extra solution, were not satisfactory from a practical point of view, the highest extraction being 64.5 per cent, but they were useful in that they led up to the conclusion that a very brief roasting gave the best results. This led to experiments on ore roasted in a Stetefeldt furnace, in which the extra solution comes out considerably ahead, and from which the author suggests the possibility of lixiviating ores after a roasting without salt (in a Stetefeldt furnace?).

It is to be observed in regard to this series of experiments that the results got in leaching the samples roasted without any salt in the muffle were generally low, in most cases very low. Samples taken from the "inside of shaft and flue" of the Stetefeldt furnace gave better results, still not high enough; while samples taken "after the ore has remained 16 hours on cooling floor" give from 80.6 to 85 per cent, with extra solution. Now, the ore roasted in the furnace was unavoidably mixed with about one per cent of salt, owing to the difficulty of thoroughly cleaning the screw conveyors, etc.; moreover, though this is not mentioned in the pamphlet, the furnace itself must have contained a quantity of chloridized matter from previous roastings, which would give off fumes when heated, especially so at the "very high temperature" used. These facts must raise a doubt as to whether the improved results got from the furnace samples, as compared with the muffle roasts, were not due to the presence of chlorine during the roasting, and the doubt is not lessened by the fact that still better results were got "after the ore had remained 16 hours on the cooling floor." That the improvement was not due to an increase in the quantity of silver sulphate is proved by the results of leaching with water, as given in the tables. On the whole, the prospect for roasting without salt is not, as yet, encouraging, especially as it is well known that more of the silver is usually volatilized where no salt is used.

In my recent letter I asked if the cuprous chloride remaining in roasted ore in many cases was not as good as the added bluestone of Rus-

sell's extra solution. The author states on this point that "the extra solution formed by the cuprous chloride in contact with ordinary solution can only be very weak, and its effect cannot be very pronounced," and he might have added that as it is shown by the experiments that the extra solution should follow the ordinary, the copper of the ore comes into play at the wrong end of the operation.

Some experiments on the treatment of argenterous copper matte, by a combination of the Ziervogel process with that of Russell, give very good results. The author discusses the extraction of gold from chloridized silver ores with the general result that more may be got by leaching with hyposulphites than by amalgamation.

"Mr. Russell has not been content with mere laboratory experiments, but has tested his process on a large scale." He has among other things, "determined in 10 charges, of 2 tons each, the total amount of silver dissolved by the wash-water, and the amount recovered with cement copper," showing a final loss of 0.1 oz. per ton. The plan adopted where the wash-water contained zinc, copper and some silver, was to add calcium polysulphide while stirring, until the white zinc sulphide began to be permanent. The liquid then contained no silver. As Russell's process precludes the use of calcium salts, the author devotes a number of pages to the consideration of the relative economy of these and the sodium salts, with conclusions in favor of the latter. The solvent energy of the sodium salt for silver chloride being taken as 100, that of the calcium salt was found to be 91.5, the solution being of "one and one-half per cent concentration." This seems to have been hardly fair, considering the atomic weights of sodium and calcium, and the prices of soda and lime. It would seem unnecessary to discuss this question here, because the adoption of the process will depend primarily on the verification in practice of the alleged superiority of results. However, it is clear that a considerable saving of sulphur may be effected by the use of a monosulphide in place of a polysulphide for precipitation, unless the otherwise wasted sulphur is recovered by distillation or by boiling the precipitate with lime or caustic soda.

The author proposes to treat the precipitated sulphides of silver and copper with sulphuric acid and niter, with recovery of nitrated products by usual means, and production of pure silver, pure gold, and bluestone. Under "Practical Results at the Ontario Mill" on two-ton charges, we find an average of 88.6 per cent soluble silver by ordinary "chlorination assay" against 92.2 per cent by the new method, and, as actual results of the working, 92.6 per cent extracted. Again, in seven charges, the tests gave 90 and 93.9 per cent respectively, and the working 94.4. The economy of the process as compared with amalgamation is discussed, needless to say with conclusions in favor of the new process. A system of continuous leaching is suggested for low-grade ores, similar in mechanical details to that which I have proposed for the treatment of auriferous sea sand, by which a strong solution would always be got for the precipitation.

The remainder of the pamphlet is devoted to "Historical Notes" of the leaching process, and a comparison between Krom's rolls and the stamp battery, in which the rolls are shown to be cheaper and better than stamps, especially where the ore is to be treated by lixiviation.

It is natural that the writer of a pamphlet like the one in question, which has doubtless a commercial purpose, should present the best side of his case, but it cannot be disputed that, if the facts and figures here given in apparent good faith are verified by further experience, an important advance will have been made in the treatment of silver ores, and as we are assured that Mr. Russell is still at work, while others will certainly take the subject up, we may expect more of the same kind.

If I should find time and opportunity to make any experiments in this line, your readers shall have the benefit of them.

Notes.

I have proved that if cuprous chloride and silver chloride exist together in a hot solution of sodium chloride, the copper may be almost completely precipitated by a soluble sulphide, leaving the silver dissolved. This is because silver sulphide is readily converted to chloride by such a solution of copper. In like manner, if, as stated in the pamphlet, freshly precipitated silver sulphide is instantaneously dissolved by extra solution, it should be possible to remove the copper from a lixivium containing silver also, leaving the silver dissolved, to be afterwards precipitated in other vats as nearly pure silver sulphide.

The lead having been previously removed by sodium carbonate, fine bullion could be got by the usual roasting and melting process. This would require three sets of precipitation vats, or if the ore contained no lead two sets. As gold sulphide is somewhat soluble in hypo it might also remain dissolved, though it is a question.

As to the proposed treatment of the mixed precipitate with sulphuric acid and niter, it seems a little doubtful if all the gold would be left as a residue. Gold can be dissolved by sulphuric acid with the addition of a little nitric, and in decomposing a solution of gold in hypo by nitric acid, boiling until precipitated sulphur was redissolved (as sulphuric acid) the gold was also dissolved, though it must be remarked that this may have been due to a minute trace of salt

in the water with which the hypo solution had been made.

There are, especially down this way, many silver ores which contain no gold, and if copper were separated in the manner proposed, the cost of the acid plant would be saved and the treatment of the precipitates simplified.

Bonding and Selling Mines.

EDITORS PRESS:—I have read several articles in the PRESS, rather abusive of a class of men who have proved of great benefit in the past to the mine owner and prospector—middlemen. I may premise of myself, that I have, in years past, bought outright for cost, both on my own account and for a syndicate, have taken working bonds, paid forfeits, as high as five thousand dollars, besides work, grub-staked prospectors, and been through the mining racket pretty thoroughly, except that of stocking properties. In all, I have been interested in, perhaps, a hundred mines and prospects. This may entitle my opinion to some respect. This experience, some of it good and some very sad, has led me to the following conclusions, which cover the points raised in the articles alluded to:

1st. That a capitalist of known ability to handle large sums, should never go in person to a mine owner. He will be asked many prices for the mine. None but an expert, with knowledge of the local camp, is competent to judge of a mine, and negotiate for it, and get a fair price. Owners, generally, overrate their property. If not equipped with a mill they will have specimen assays or a small mill run, and swear by that superficial test. They have, sometimes, to put it mildly, been known to conceal fatal facts, that a cursory examination cannot discover. More caution is necessary in buying a mine than anything else under the sun. With the best judges many get left.

2d. The purchaser of mining property should have the same privilege of examination and test as with any other property. A certain amount of work is necessary to determine cost of extraction of ore, and milling a sufficient quantity to test its working value, when there is no reliable record, and to pay for this privilege is absurd. The cost is serious without. Indeed, to examine the many properties offered and find one good one costs a deal of money. When one is found looking fair, very likely the owner will ask thousands of dollars for the privilege of 30 or 60 days to examine the mine, and arrange payment, if even thorough examination establishes its value. He is afraid a little work may make it look worse, and wants to be insured against that calamity: while if it improved with a little work the purchaser paid for it, and is entitled to its benefit. The purchaser takes all the risk. The mine-owner is entitled to nothing unless his mine is worth something.

3d. Nine-tenths of all the money that has been invested in mines has been drummed up by middlemen, who have taken bonds on the mines, and worked them up in schemes in the financial centers. If the miner sits down in his cabin and smokes and dreams over his mine, and waits the coming of some capitalist to take his elephant off his hands, at a fabulous price, or any price, he will wait a long time. The men who go to the camps with money at command to plank down for a mine are precious few. There are a few mining capitalists in California that may have their experts out hunting for properties, but there are none in the East. The capital obtained in the past from the East, has been secured by the abused middlemen, who have risked expense and reputation in the effort, and they have placed properties that were never phenomenal enough to attract notice. At a time when "every prospect pleased" they worked off an immense number of properties, to the profit of the mine, and often to the sorrow of the investor. The miner has no cause of complaint. But for the middlemen, the poor prospector would long ago have come to grief. When merchants find it necessary to send drummers everywhere to sell what people have to buy, much more is it necessary "to drum" to sell what people are not seeking for, and only buy after an infinite deal of talk of the most glowing kind. So much expense is incurred, and so many have to be bought to co-operate, the price gets well loaded to the investor, and this has been a great evil in forming stock companies. But the miner got his harvest out of it. And now he will have to make all this allowance in his price, and ever will, or work his own mine himself. No one will sell his mine for him without a profit commensurate with the risk taken.

4th. Bonding a mine, for the foregoing reasons, to some reliable mine operator, is the more certain way of selling it. If he fails to sell, he advertises it well, and "howe" it into notoriety, and very likely, after his bond has expired somebody, waiting that event, will go direct to the owner and buy the mine, and the latter profits perhaps all the more. The operator takes all the risk, spends months of time, besides expense on a trip East, and perhaps to London, and then may fail to come to time. Though his work may effect a sale, he may get no benefit from it.

Finally, the mine owners and prospectors in the camps, who smoke their pipes over half developed properties and prospect holes, should understand that there is no boom in mines now in any of the financial centers. Indeed, as far as the East is concerned, it is not over safe to offer a mine. A streak of personal magnetism,

"cheek and chic" and favoring circumstances, are necessary to succeed, with the best of property. Intelligent investors will do little more than equip a property for the larger interest, and when a mine owner can get his mine equipped with a mill, and worked, and have even a quarter interest, he has a larger possibility in that reserve than in selling out, and chancing another discovery, for any price he could likely obtain outright. In the present state of feeling over mining, expert risks must be taken.

EXPERT MINER.

San Francisco, Oct. 15, 1885.

Mineral Wealth of British Columbia.

William Teague writes from Yale, B. C., to the *London Mining Journal* as follows: Knowing you are not very often troubled with communications from this remote quarter of Her Majesty's dominions, a circumstance which undoubtedly has precluded the outside world from becoming acquainted with the great mineral wealth lying dormant in this country, I feel it incumbent to convey before your readers the following particulars, which may prove interesting as emanating from one who has resided in the province for 27 years, dating from the gold excitement of 1858. Consequently upon the gold discoveries made at that time, British Columbia sprang into existence as a colony. The placer mines proving one of the richest alluvial deposits ever known, attracted large numbers of men to its shores to search for the precious metals, while some sought employment in the gold-diggings at £2 per day. The question of gold and silver mining now comes prominently to the front as a result of the premonitory indications which appear; and the attention of capitalists is being solicited to lay open properties presenting such unmistakable indices: no country in the world affording more favorable inducements, and no country more liberal in granting mineral rights of the Crown. A nominal charge of £1 per acre by the Government secures the title of the land without any further demand of taxes or royalty. Gold mining has been, and still continues to be a never failing attraction; silver mining is a more recent operation, and its developments are yet in its infancy. During the excitement attendant on the gold discoveries the silver-bearing ledges were disregarded, but of late the argenteriferous galena leads have been assayed with such gratifying results from the out-cropping for silver that it becomes increasingly apparent that silver mining will form one of the principal industries in the country.

With adequate machinery and additional small outlays gold mining would be far more remunerative and extensive. It is necessary to examine the deep channels and beds of streams in the immediate vicinity of gold-producing ground which would beyond all doubt prove remunerative. The auriferous deposits of British Columbia still hold forth every encouragement; they are undeveloped in many parts as evinced in prospecting. Among scientific men it is a well known fact that the great silver-bearing belt extends its course northward from New Mexico into Colorado, Wyoming, Nevada, Idaho, through British Columbia, trending its northerly course into Siberia. During my sojourn here I have examined samples of argenteriferous ores which are indisputably connected with richer deposits at deeper sections, and the quartz of which is analogous to that found in Nevada, California and other renowned silver-bearing districts. Lithologically the general characteristics of the rocks I have observed are almost identical with those forming the Cordilleras, on the western slopes of which are situated the Chilean silver mines, and which have given prodigious profits. The stratification, too, are encouraging features, being associated with the silver-bearing rocks of the world, and which are indispensably necessary for the production of metalliferous ores as water is for the life of a man. The agricultural lands of the province are very limited; the external appearance of the surrounding mountainous country presenting that peculiar barrenness which nature often stamps upon the surface beneath which her rich treasures of mineral are deposited. The country, however, possesses timber belts unexcelled by those of any other country, and that they will be a source of unlimited wealth, affording in due course much employment is a foregone conclusion.

British Columbia alone contains an area of 341,305 square miles, and there is not a shaft sunk 200 feet deep on any of her mineral resources, except for coal at Nanaimo. The operations in connection with gold mining have invariably been very shallow, and what have been so far wrought upon in the shape of quartz mining have been injudiciously managed by inexperienced hands, swallowing up a large amount of capital, producing the most abortive results. What has also militated against successful mining in the province has been the remoteness of the localities from railway communication, thereby entailing considerable costs in the transportation of necessary material of freights, a grievance now happily remedied. In all probability ere this letter reaches you the unfinished gap between the Selkirk range and the gold range of mountains will be *un fait accompli*. With the completion of the Canadian Pacific Railway, converting British Columbia into one of the world's highways and forming an important era in its future industries, every facility will be afforded for communication with

all parts of the world hitherto so far distant and difficult to reach, and thus placing the explorer in a position to examine vast tracts of unexplored ground, which eminent scientists, judging from the congenial geological features of the province generally, state must be highly mineralized. The excitement caused by the great discoveries of silver and gold in various adjacent parts of the United States has prevented proper attention being paid to the mineral resources of this province. Prospecting, too, in the past, owing to the circumstances I have mentioned, was a most arduous task, and mining operations have, therefore, languished. Mines can be worked very cheaply; there are inexhaustible supplies of wood and water in abundance to meet all purposes. Few countries, then, offering better and safer inducements for profitable mining do not exist. Similar indications as present themselves here have given birth to many famed mines in Nevada and other parts of the world, and with such reassuring prospects the time has arrived when it behooves British capitalists to open up these fields of hidden wealth.

The Law of Trade Marks.

A. L. Bancroft & Co., of 721 Market St., S. F., have issued a second edition of "A Treatise on the Law of Trade Marks and Analogous Subjects" (firm names, business signs, good will, labels, etc.), by Wm. Henry Browne, of the Bar of the Supreme Court of the United States. We are pleased to acknowledge the receipt of the above work.

We are pleased to acknowledge the receipt of the above work. The author, in his preface, states as a reason for issuing a second edition, revised and enlarged, the crude state of the law at the time of the issuance of his first edition, some years ago. Since that time there has grown up a more full appreciation of the importance of this subject. This has been manifested in many treatises and acts of legislation, these latter referring not only to our own country, but to almost every country of the civilized world.

With greater sources of information at hand, the author has, therefore, considered it necessary to re-write his work, bringing, as he says, "order out of chaos."

In looking over the contents of the work, the reader will be impressed by the completeness of the arrangement of matter and the ground which it covers. As in all law books, an index to the cases cited, is given. An introduction follows which is a complete and exhaustive essay upon the origin, growth and utility of trademarks, the definition and nature of which, and the ownership and protection of such property being also fully set forth. He also gives many examples of trademarks. Then follows a resume of the federal legislation upon this subject. The work further treats of infringements, actions in law and equity, defenses and damages. There are also chapters upon rights analogous to those of trademarks, the practice in the Patent office, interferences in the Patent office, and the abandonment of this class of property. An appendix accompanies the work, giving the treaties and conventions upon this subject of a number of countries, and also the trademark laws of all countries were such property exists.

It will, therefore be seen that the work is very complete in its character and fills a want which has been felt, not only by lawyers, but by merchants who desire to know their general rights in such property.

WIPE SPECTACLES.—The old gentleman with his spectacles, the "Lord Dundreary" with his "glasses," the myopic reader and short-sighted persons generally, who carefully wipe the dimness from their spectacles and eyeglasses with silk handkerchiefs, are perhaps not aware that a piece of paper will do the service much better. No matter how fine the silk may be, it will not leave the surface of the glass so finely polished as the paper will. If pains are taken to lightly brush off any particles of gritty dust that may be on the glasses before rubbing them, the paper will never injure their surface with the slightest scratch. Dampen the glasses with vapor or water, or possibly with the breath, and the paper will absorb all the moisture and whatever else is deposited on the glass, now in a much softened condition. The best paper is unsized and quite porous, like the paper used by newspapers. Blotting paper leaves short fibers on the glass and is not desirable.

A VALUABLE discovery of petroleum has been made on Vancouver island. A sample was taken to Victoria and gave very satisfactory tests as to its burning quality and specific gravity. The scene of the discovery is a point near the eastern side of Vancouver island, and within five miles of the seashore, where there is a good harbor for ships.

A TYPE-SETTING invention, which has been long perfecting, and which it is said will revolutionize type-setting, will soon be practically introduced in New York. It has been claimed that anyone capable of using a type-writing machine will be able to set type and stereotype at the same time the type required for printing the newspapers.

THREE teams and a force of men have constant employment at Monterey in putting up and shipping sand to San Francisco, San Jose and other points.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES.	1 week.	1 month.	3 mos.	12 mos.
Per line (agate).....	.25	.80	\$2.20	\$5.00
Half inch (1 square)...	\$1.50	\$4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 24, 1885.

TABLE OF CONTENTS.

EDITORIALS.—An Efficient Mining Pump; The Crescent Mine, 273. Passing Events; Edible Fungi of California; Harbor Improvements; Quiescent Mercury for Amalgamation, 276. The Silver Question; The Hartford Smelting Furnace; The State University; Silphium and Arsenic from Ores, 277.

ILLUSTRATIONS.—The Worthington Pump in Level No. 5, Alaska Mine, Sierra County, Cal., 273. The Hartford Portable Smelting Furnace, 277.

CORRESPONDENCE.—The Russell Leaching Process, 274. Bonding and Selling Mines, 275.

MECHANICAL PROGRESS.—The Possible Metal of the Future; General Machine Works; Oil in Boxes, 278.

SCIENTIFIC PROGRESS.—Peculiarities of Lighting; Government Aid to Scientific Research; Lamp Shades and the Eyes; Nitrogenous Substances; A Large Meteor; To Determine the Condition of the Atmosphere in Cities; Solids Carried by Rivers; Smoke Consumption; Ether vs. Chloroform, 278.

USEFUL INFORMATION.—Women's Complaint About Car Seats; How Bees Predict the Weather; How Sealed Cans are Tested; To Clean Hair Brushes; A Fisherman's Knife; Wax Matches are Made in this Country; A Wash for Old Painted Woodwork; An Expensive Spire; Another Wood-Filler; Lathe Cement; A Fine Exposition Building; Mice as Fishers, 279.

GOOD HEALTH.—First Indications of Consumption; Pneumonia and Ozone; Removing Hair and Freckles by Electricity; Sore Throat; For Kidney Trouble; Proportionate Value of Railway Accidents; Medical Value of Small Fruits; Hot Water in Syncope; Mustard Plaster that will Not blister, 279.

MISCELLANEOUS.—Mineral Wealth of British Columbia; The Law of Trade-marks, 275. Growth of American Manufactures, 279.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 276-77.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board. Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 254.

Business Announcements.

Ore Pulverizer—Fulton Iron Works, S. F.
American Exchange Hotel—S. F.
Winsor House—C. C. Wheeler, Oakland.
Lubricating Oils—Charles J. Woodbury, S. F.
Leather Binding—H. N. Cook, S. F.
Pacific Electric Company—S. F.
Machinery—San Francisco Tool Co.
Horse Power—E. W. Krogh & Co., S. F.
Situation Wanted—A. H. S. F.
Iron Mine—G. W. Spawford, S. F.
Steam Pumps—C. H. Evans Machine Works, S. F.

See Advertising Columns.

Passing Events.

The mining region around Granite creek, B. C., is developing an excitement, large pay being reported in Victoria. A town is being built, and crowds are rushing to the diggings. No details have so far come to hand.

The rich strike in the Crown Point mine, Nevada county, which used to be known as the William Penn, is making some excitement, and is another proof that many of the old abandoned mines will pay to develop under the better conditions of to-day.

The burning of the big railroad bridge across the Colorado entails great loss and delay, but another will be immediately built.

The new gold discovery, six miles east of the junction of the San Pedro and Gila mines, Arizona, is attracting attention. The ore is said to be generally of high grade, and is free milling.

In Idaho, Montana, Colorado, and the more elevated regions, some of the mines are beginning to shut down for the winter. An advantage possessed by this State is that there are few places where quartz mining cannot be carried on all winter.

Edible Fungi of California.

Almost everybody knows the common mushroom (in scientific nomenclature, *Agaricus campestris*), which grows everywhere, and is universally eaten; but few know that there are many others of the fungus family which are eatable, and which are at the same time abundant in this State. They form sources of nutritious and palatable food, which are at present wholly neglected or utilized by a very few of our foreign population.

Dr. H. W. Harkness, Vice-President of the California Academy of Sciences, is an enthusiastic mycologist, and has made a special study of this class of plants. At the meeting of the Academy this week, he exhibited several varieties of edible fungi which are found in this State, and which are in season at the present time. He stated that next in economic importance to the common mushroom in this vicinity is the *Boletus granulatus*, specimens of which were shown. The boletus is distinguished from the common mushroom, by the fact that the under surface, instead of rows of vertical plates (gills), presents in the young specimens a smooth and even surface, which, at maturity, shows the openings of numerous tubes placed side by side, somewhat larger and slightly resembling the depressions of a thimble, though much deeper.

Of this genus three species are found in the vicinity of San Francisco, all edible. Possibly others may occur, but they have so far escaped scrutiny. Two of these species are not yet in season. The third is now found in the Park, and its season is just commencing. This species grows under pine and cypress trees. It is hemispherical, of a dirty white color, becoming brownish yellow when mature, and covered with a slimy secretion to which adheres pine leaves, etc., underneath which it emerged from the ground. The under surface on the young specimens is creamy white, nearly smooth, and dotted here and there with globules of milky juice. Later the milky juice disappears and the surface becomes a yellowish mass of open pores, lined with a membrane which produces the reproductive bodies (spores) by which the future generations are assured.

The specimens exhibited by Dr. Harkness were very small, but later in the year, when the moisture is plentiful, they are often found eight inches or more across at maturity. The Doctor testifies from personal experience to the eatable qualities of this boletus. Its taste is quite unlike that of the mushroom but quite as agreeable. It is of a firmer flesh and requires more cooking. The skin is readily removed and the creamy white then revealed looks much like a slice of Bellflower apple. They are even more liable to be attacked by insects than the mushroom and the mature ones should be avoided on this account.

The garden slug, which loves the toothsome morsel, is extravagantly fond of this fungus, and it is often discovered early in the season when too small to rise above its coating of pine needles, by the presence of a small army of this pest, all apparently doing nothing in particular, until a closer inspection would reveal them with head underneath the leaves, luxuriating in their chosen tidbit.

Thousands of pounds of this delicious food rot yearly under the trees in the park, and on the University grounds at Berkeley. It is quite as good eating and much safer than the mushroom, for it is absolutely impossible to mistake it for anything else. It should be introduced at our markets for common use.

Another important fungus is the *Helvella lacunosa*, which belongs to the family of the Morels. In structure it approaches nearly to the truffle. It is found sparingly everywhere in the vicinity of San Francisco, chiefly under oaks. It has a white, irregular stem and a black, irregularly convoluted head. Its spores are borne in long pod-like sacs all over the black surface. At maturity it emits its spores in a cloud on receiving some slight jar which usually somewhat mystifies the observer who sees it without previous knowledge of the phenomenon. Its flesh is firm and thin and, unlike most fungi, it can readily be preserved by drying, strung like dried apples, and used at any time.

It is ordinarily used for flavoring soups, etc., though it may be cooked in any way preferred, and having once been seen in nature, or in a picture, cannot be mistaken.

The *Helvella Californica*, a species peculiar to this State, but not found near San Francisco, and *Helvella conica*, which is found in the Coast range as well as in the Old World, belong to the same genus as the last and are used in a similar manner.

Of the tubers, or underground fungi, Dr. Harkness exhibited two species. *Tuber rufum*, or red truffle, is of no economic importance. The other, *Tuber magnatum*, the white truffle, has not yet been found in sufficient quantity, but is prized in Europe though not considered equal to the black or Perigord truffle. Many of the species of underground fungi which are so numerous in this vicinity would be excellent articles of food if they were sufficiently abundant, and, fortunately, their wholesomeness is above suspicion.

Harbor Improvements.

The Government has not spent very much money on this coast for harbor improvements, but in some cases it has been an absolute necessity to do so. The mouth of the San Diego river has been turned from San Diego bay into False bay, so the material brought down would not fill in the harbor. Wilmington harbor, the sea-port of Los Angeles, has been formed by a breakwater, so that shelter is now provided instead of an open roadstead. Oakland harbor has been formed in San Francisco bay by the construction of two stone sea-walls or jetties to confine the channel, and a great deal of dredging has been done. San Francisco bay itself has needed few expenditures. The blowing up of Blossom and Rincon rocks comprise about all that the Government has had to do in the matter of harbor improvement.

The most important work that has to be done on the coast is that going on at the mouth of the Columbia river, Oregon. The bar at this river is the worst on the coast, and one of the worst in the world. There have been many wrecks there and the surroundings and conditions are such that the improvements are very expensive indeed.

Col. Geo. H. Mendell and Capt. Powell, of the U. S. Engineers, have just been visiting the works at the mouth of the river, where the jetty is being built. Work is still going on, but will cease at the end of the month, when all the material will be boused awaiting a further Congressional appropriation. The jetty extends 4200 feet from the starting point, 1200 feet of which are brush and rock. Col. Mendell is well satisfied with the results so far. Nature seconded the efforts of the engineers at every step advanced, and the effect already produced is, the Colonel says, the most satisfactory proof that the original plan for the improvement of the Columbia river bar adopted by the Board of United States Engineers was the right one. Captain Powell states that special precautions have been taken to so strengthen the completed end of the jetty that it will withstand the heavy seas which roll in during the winter storms.

It is unfortunate, in all this harbor work, that progress is delayed by uncertainty of appropriations by Congress. This not only entails increased expenditures in the end, but actual loss. The engineers are hampered by the system and the work takes a long time to complete. Instead of appropriating a lump sum to do the work, as is the custom abroad, we give more or less each couple of years, and when the fund is exhausted, the work stops until a new appropriation is made. The system is very bad, indeed, and in some cases entails an expenditure of twice the sum which work done promptly would require.

SHIPMENTS of coin from the overcrowded vaults of the different sub-treasuries to the Treasury at Washington since the general transfer began—September 31—amount to about \$26,000,000 in silver, and about \$5,000,000 in gold. The \$10,400,000 in silver brought from New Orleans in naval vessels is included in the above statement. All the gold came from San Francisco, from which place about \$13,000,000 in gold had previously been sent to New York by registered mail. Several millions in gold were sent East from here in fruit cars last week, the train looking like an ordinary fruit train.

The Big Bend tunnel is in a distance of over 10,000 feet, and will be ready in March next to receive the North Fork Feather river and dump it into the "Dark Canyon."

Quiescent Mercury for Amalgamation.

A new idea in amalgamation is that of overcoming the disturbing effects of a current caused by the rising of ore through mercury by allowing the mercury to remain for a sufficient time in a state of quiescence for complete amalgamation to take place, or for the operation of gravity, while at the same time a continuous operation is carried on. In most cases where a mass of mercury is used, the amalgam, or amalgamated particles of the triturated ore, is, to a greater or less extent, carried upward by the currents, together with the lighter particles. Abel H. Bliss, of Chicago, has produced an appliance founded upon the hypothesis that separation can be most effectually attained by combined action of amalgamation and gravity the latter being assisted by a downward current in the mercury, while the ore is passing upward.

These actions are still further assisted by the retention of the ore beneath a body of mercury by stopping its upward passage for a brief time, giving the particles of a superior specific gravity time to descend, and giving amalgamation time to act. That is to say, according to the argument of the inventor, if a body of ore reduced to a finely divided state is allowed to pass into a chamber containing mercury in a state of quiescence, and is caused to remain there for a brief period, and then is allowed to pass into a tray of mercury or another chamber above the first, a portion of mercury in the upper chamber simply exchanges place with the ore rising from the lower chamber, producing a downward current of the mercury, whereby the free metal and amalgam are carried downward, and ultimately settle upon the bottom. If the operation is permitted to take place through a series of vertical chambers opening and closing alternately, and if mercury is caused to flow in a circuit through these, proportioned in its speed to the quantity of the rising ore, whereby they are constantly kept filled, it is obvious that the operation will be rendered continuous.

In this way ample opportunity is given for the amalgamation to take place, while the downward current of the mercury aids the descent of the amalgam, and of that which does not amalgamate, but which has a specific gravity superior to that of mercury and carries it to the bottom. In addition, the pulp passing to the top of a chamber and then receiving the pressure of the mercury from below increases the tendency of all the heavier particles of the ore to descend into the mercury and accelerate the amalgamation.

Mr. Bliss has invented an apparatus to carry this process into effect, which consists of a combination of the following elements: a vessel for containing mercury, a rotary stand-pipe supported within the vessel and having one or more discharge openings near its lower end, and a hopper at its top; means for permitting the stand-pipe to be revolved; a hollow body of smaller diameter than the mercury vessel, and standing around the stand-pipe within the vessel, and opening at or near its base into the space surrounding it, said body being formed in sections superposed one upon another, and divided by partitions into compartments having openings in their tops; sliding plates in contact with the top of the compartments and provided with openings to register with those in the said tops, and mechanism for sliding the said plates back and forth through the revolutions of the stand pipe, comprising cams upon the stand-pipe and spring mechanism operating in opposition to the cams.

From the foregoing description it is seen that the process consists first in introducing the pulp beneath a column of mercury and alternately stopping its upward progress, and permitting it to continue the same, whereby for one or more brief periods in its passage through the mercury, it is caused to come to rest within the mercury in a state of quiescence; and also in creating downward currents in that portion of the mercury through which the pulp rises in intermittent stages, thereby aiding the settlement of the amalgam and of the heavier particles. Provision can be made for more or less compartments or vertical series according as ore presents more or less difficulty in treatment. Thus, whereas a single stoppage and release will suffice for some ores, with others the best results can be received only by causing it to be stopped and released several times in the course of its upward progress.

The Silver Question.

When the Federal courts decided that hydraulic mining, as conducted in this State, was unlawful, the gold mining industry of California received a severe setback. But if the Government demonetizes silver the whole mining industry of the country will receive a blow, the magnitude of which can scarcely be comprehended. There are so many millions of dollars invested, and so many thousands of men employed, that capital and labor alike will feel the ill effects. Therefore, the silver question now being agitated is of the utmost importance to the mining interests. Should silver be demonetized this coast, particularly, will suffer, as no silver mining is carried on in the East. It is the Pacific States and Territories which will be most seriously affected. But Eastern bankers and money lenders will scarcely consider that much importance if they can have their way. California is not so vitally interested as other States and Territories, her precious metal product being mainly gold; but our miners have experienced here the effects of the stoppage of one class of mining, so they will know how to appreciate the sufferings of others, if silver mining is discontinued.

Nevada is specially interested in this question as she is the "Silver State." At the meeting of the Nevada Silver Association at Virginia City, on Tuesday, ex-Senator Stewart delivered a stirring address on the silver question. A series of resolutions was adopted as follows:

Resolved, That we view with alarm the bondholders' conspiracy to depress labor, destroy values, and paralyze the energies and industries of the civilized world by their agitation to demonetize silver—a policy which, if successful, means low wages, low prices and social degradation, with a tendency to human slavery.

Resolved, That the enormous bonded indebtedness of the world, amounting to not less than fifty thousand millions of dollars, in the hands of a few unscrupulous aristocrats, has already destroyed all hope of liberty in most of the Old World, and is threatening the independence and future of the American people; that by retiring one-half of the metallic currency of the world, the basis of values upon which this bonded indebtedness was created, the debt itself is virtually doubled; it is, therefore, a plain proposition that he who goes in debt sells money short—that is, agrees to deliver at a future day something that he does not then possess; understanding this proposition, the object of the manipulators of the bonded indebtedness of the world is to make gold dear and labor cheap, and thereby increase their mortgage upon the productive resources of the world.

Resolved, That the demonetization of silver will compel the producer to pay the bondholders two bushels of wheat, two hales of cotton, and two tons of iron where he contracted to pay only one.

Resolved, That to the people of Nevada the agitation to demonetize silver is the more especially aggravating since the success of such a policy involves the annihilation of millions of dollars worth of capital locked up in their mills and mines, thus inflicting ruin and bankruptcy upon a people who have, under the encouragement of the Government, developed the mining industry and established their homes in a remote Territory, where they have successfully planted all the influences of American civilization, and founded a free and sovereign State.

Resolved, That our Senators and Representatives in Congress, irrespective of party, be requested to use their influence by all honorable means to avert so dire a calamity as is involved in the threatened demonetization of silver.

The Hartsfeld Smelting Furnace.

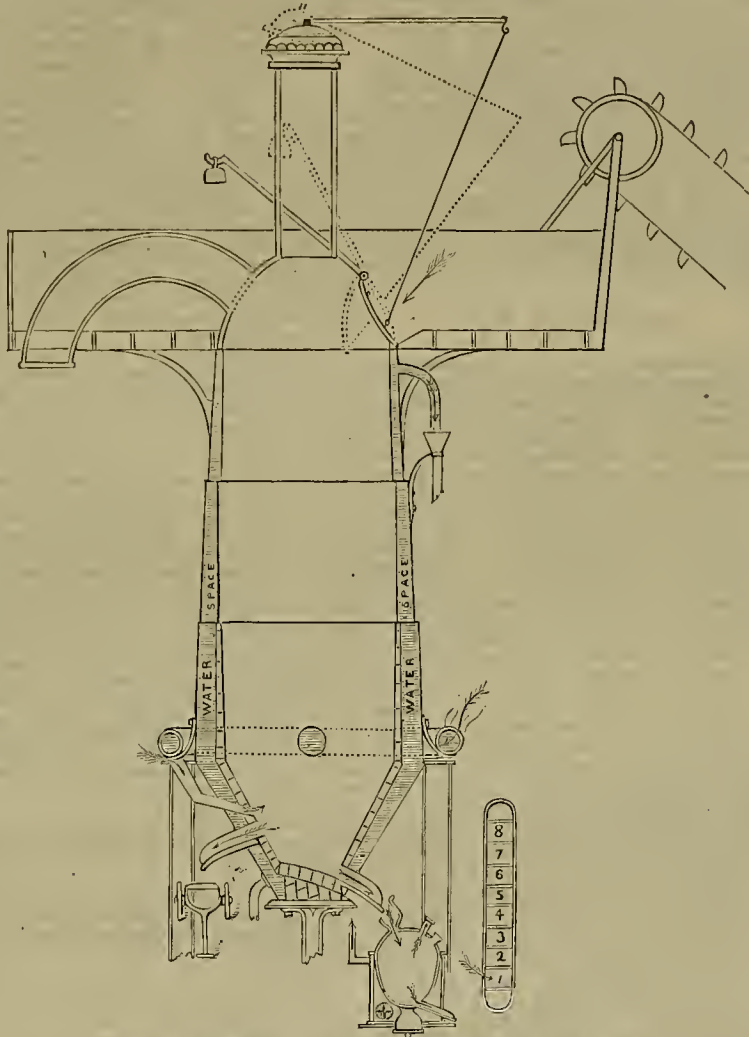
The engraving on this page represents a portable smelting furnace which is manufactured by the Hartsfeld Portable Smelting Furnace and Mining Company, Newport, Ky. The furnace has been put to use in Austria, Hungary, Russia, Norway and Sweden, Holland, Belgium, France and Germany, and is now being introduced in England, Australia and the United States. The cost and weight of the furnace are both small. The whole structure is made complete at the shops, of wrought-iron and steel plates, and in sections for transportation. No brick-work is required. The water circulation is claimed to be perfect, preventing any scales from the steel plates and overheating. The plant is comparatively inexpensive and the furnace can be run continuously without expensive manual labor or frequent stoppage for repairs. The furnaces are built in capacities of 1-ton, 5-ton, 10-ton, 30-ton and 50-ton, the largest sizes being recommended as the most economical as to cost and attendance. The manufacturers state that there need be no hesitation about difficulties in smelting any ores that run above seven ounces in silver per

ton, "as the most refractory ores, with 10 per cent lead, with the Hartsfeld process will run like butter and separate like oil and water from each other by gravitation." Charcoal or coke is preferred as fuel, one ton to every ten tons of ore; properly speaking, 10 to 12½ per cent of fuel. Coal will answer. Dry wood has given very good results, but requires 15 to 20 per cent of fuel by weight, and is a one fifth slower process than the former.

This furnace can be worked by any metallurgist who can read the printed instructions furnished with every furnace sold how to set up the furnace and test it; how to mix and prepare the Hartsfeld inexpensive basic fluxing process. This furnace is free from clogging or hanging, because the space in the furnace widens as the charge recedes downward until the blast reduces it fluid. (See cut.) The steel inside is smooth without any rivet heads projecting, and kept cool by the water continuously circulating in spiral form until it arrives on the top of the blower, from where it passes downwards into

columns, blast and tuyer pipes, water pipes, valves and fittings, slag pots and spouts, boiler-plate foundation, curb pressure gauge, etc. one elevator to feed furnace; three sets of Hartsfeld's metal molds with company's brand; six slag pots, two slag trucks; six ladles, one set furnace irons; one No. 4½ Baker pressure blower; one 20 horse-power engine to drive pressure blower and elevator for the 30 ton and 25-horse power for the 50 ton; one 25 horse-power tubular boiler, one steam boiler feed-pump, one pump for supplying furnace; all necessary pipe and fittings, valves, connections, etc., shipping weight about 34,000 pounds. A one-ton capacity furnace plant contains the following: Furnace with hand blower, metal dust condenser, metal molds, blast and tuyer pipes, water pipes, valves, slag pots and a set of furnace irons. A five and 10-ton plant, includes all the attachments as for 30 and 50 ton, excepting elevator, also smaller sizes of the necessary machinery.

The inventor states that the cost of reducing



THE HARTSFELD PORTABLE SMELTING FURNACE.

the metal dust condenser, in a steam like vapor, carrying with it all and every particle of metal dust, and depositing in the lower condenser water space (heretofore principally lost) where the gases are stripped of their metallic contents before passing out on the other side and are reused for the hot blast stove (not shown), and for generating steam for the boilers; also for the metal separatory (or better known as the lead well), for an even temperature. It is claimed that all points of economy are embodied in this furnace plant.

Mr. Hartsfeld has won fame as a builder of furnaces in Europe, and the merits of the present devices have already been recognized in many of our continental countries. Every furnace sent out is guaranteed as to durability, economy in fuel, and ability to save the precious metal. The total weight of a 50-ton furnace set up complete is 12,400 pounds, and its size is 7x29 feet. The capacity of the smallest furnace built, is five tons in eight hours and its weight is 1600 pounds. Its size is two feet three inches in diameter by seven feet six inches in height.

The general specifications for a complete plant is as follows:

One 30 or 50-ton smelting furnace, complete, with portable metal dust condenser, gravity metal separatory, as shown in cut, including

ore is about \$4 to \$5 a ton on a 50-ton smelter. Rebellious ores containing antimony, tin, zinc, bismuth, etc., do not affect the fluxing process nor the furnace by reason of the peculiar form in construction and attachments. The manufacturers state that the bacciferous fluxing process is in a printed form, and is only sent to those who have adopted the furnace.

JUDGE EDMONDS has decided the case of the New River Hydraulic Mining Company vs. Joseph Lufken *et al*, in favor of plaintiff, as prayed for in the complaint. The action was brought to recover judgment against Joseph Lufken and James W. Duncan for \$10,000, against Chester Brown for \$5,000, against Joseph S. Taylor and C. E. McNear for \$2500 each, as damages sustained by a breach of contract for the construction of a ditch and flume of about nine miles in length from the upper end of Hawkins Bar, on Trinity river to a point on New river in Trinity county, and also for the construction of a saw-mill with machinery of a capacity of sawing not less than 20,000 feet of lumber every 24 hours.

BUTTE, M. T., is the largest copper camp in the United States, Lake Superior alone ex-

The State University.

Since the resignation of President Reid of the University of California, the Board of Regents have been in search of a suitable person to fill the chief position at the University. There seems to have been an idea prevalent that affairs were not being conducted in a manner to make the institution popular. The Regents, being aware of this sentiment, have been anxious to select some person of reputation and experience, to take charge of the University, who would tend to popularize it, and would have administrative ability to conduct its affairs in a more satisfactory manner. The finances of the University are in good condition, and its standard of scholarship is good. The various departments are under the supervision of competent persons who are interested in their special work, and there seems no reason why the institution should not prosper and be a source of pride to the State. That it has not held the position hoped for has been attributed to the fact that the Presidents have not possessed all the requirements necessary to advance a young and growing seat of learning.

On Tuesday of this week, the Regents of the State University elected Dr. E. S. Holden, a distinguished Eastern scientist, to the presidency of that institution. Professor E. S. Holden is a native of Missouri, from which State he was appointed as a cadet to the military academy at West Point, and from which he was graduated in 1870. He was then assigned as a second lieutenant to the Fourth Regiment of Artillery, serving in it for two years, when he was transferred to the Corps of Engineers of the army. He resigned his army commission in 1873, and devoted himself to the study of astronomy, for which he had a great natural predilection. He was attached for some time to the National Observatory at Washington, and had charge of one of the astronomical parties which on one of the islands of the southern seas made the observations on the late transit of Venus. Though but 37 years of age, Professor Holden stands in the foremost rank of astronomers, and it was this fact that was largely considered in his selection and election. The Regents appointed Professor Holden to the Directorship of the Lick observatory, as well as to the presidency of the University. For fitness to the presidency the professor brings the reputation of a high standing in the literary and scientific world.

Sulphur and Arsenic from Ores.

An Eastern inventor has recently devised an apparatus for treating ores for the removal of sulphur and arsenic from them. He has a jacketed cylinder mounted upon longitudinal and transverse trunnions with movable bearings, so that it may be rotated on transverse pivots for charging and discharging, and on its axis for agitating the contents. It is provided with pipes to admit and discharge steam, superheated or otherwise, to the jacket surrounding the cylinder, and with one or more pipes and manholes communicating with the interior chamber, for the introduction and removal of materials to be treated, and for the discharge of aqueous and other vapors which are thrown off by the heat, assisted, when required, by exhaust through the discharge pipe or pipes so as to create more or less vacuum.

Condensation of the superheated steam in the jacket space while the apparatus is in operation is provided for. By turning the cylinder on its radial trunnions, either of the two manholes may be brought to the top for charging the cylinder, or to the bottom for discharging it. Its axial trunnions may be used for agitating the material under treatment. By the aid of a nearly complete vacuum and alternate heating and cooling of the ores, the inventor thinks that deleterious matter may be effectually discharged therefrom.

THE President has virtually decided to postpone the appointment of a superintendent of the Coast and Geodetic Survey until after the meeting of Congress. It has been suggested to the President that an engineer officer of the army or navy might properly be detailed to perform the duties of the office. What seems more proper, however, is to promote one of the assistants to the position. They have had the training and experience, and no mere politician is suited for superintendent of a department requiring technical knowledge.

MECHANICAL PROGRESS.

The Possible Metal of the Future.

The mechanical and scientific world have long been looking for some method of producing the valuable metal known as aluminum in so cheap a manner as to render it generally available in the mechanic arts. Up to within the last three or four years it has been fairly entitled to be ranked as among the rare and precious metals.

It first became known to science and the world about 50 years ago. Very soon after its discovery its valuable mechanical properties became quite fully known, and an immense amount of money has been expended in experiments to reduce the cost of its product, which, until recently, has been fabulously high. The largest block of the metal which has ever been made is that which forms the cap of the Washington monument, which is said to have cost \$2 per ounce.

New Process for Its Manufacture.

Quite recently several experimenters have come forward with claims for new and comparatively cheap processes for the manufacture of aluminum. One of the first on the list is the Messrs. Cowles, Cleveland, Ohio, who made the block above alluded to for the Washington monument. These parties claim to have made a direct reduction of aluminum, manganese, magnesium, sodium, potassium, calcium, strontium and other metals, as well as the costly metaloids boron and silicon, from their oxides. They effect this by means of electricity, and an account of their discovery has been read to the Science Association meeting at Ann Arbor. The cost of the process is so small that the inventors expect "to make as great a revolution in the brass, bronze and German silver trade as the Bessemer process has in the iron trade." An enthusiast predicts that from this invention the best bronze, 10 per cent aluminum, 90 per cent copper will be made at a cost to compete with brass; that bronze and various alloys of aluminum will compete with iron and steel in the manufacture of many articles for which they are intrinsically better adapted, and that aluminum, which closely resembles silver and is much less subject to oxidation than that metal, will supersede plated silver and nickel in table cutlery and plumbers and gas-fitters' goods. This process is said to be substantially one for smelting the ore, which is common clay, by direct process by aid of the electric current.

The *Railroad Gazette* recently announced that the editor of that journal had been assured that a member of a firm of high standing, well known to railroad men, has perfected another process for producing aluminum in large quantities and at a very low cost per pound. This process, the *Gazette* is informed, is an entirely different one from the Cleveland process, and one by which, it is claimed the metal can be produced at a still lower cost.

An English Process.

Our English cousins have recently become very much elated over the apparent success of a process invented by a well known metallurgist of that country—Mr. James Webster. According to the *Pall Mall Gazette* aluminum bronzes are now being produced, under the Webster aluminum process, at a point about six miles distant from Birmingham, in such quantities as to keep a manufactory which covers half an acre of ground at work both night and day. Mr. Webster claims to have continued his experiments over a term of 30 years, and to have greatly reduced the original cost of the production of the metal.

It is claimed by the *Gazette* that Mr. Webster "has discovered a method of making alumina by burning alum, instead of, as is usual, by precipitation. Alumina, however, is not aluminum. There is a long stage between a fine gray powder and a firm white metal, and, though Mr. Webster has succeeded in shortening this somewhat, the process of manufacturing the metal from the powder is still very much what it has been hitherto. Twelve tons of alumina deposit go to the manufacture of one ton of aluminum, and the exact meaning of the new discovery is that this alumina can be obtained by a much shorter process in much larger quantities and at one-tenth of the ordinary cost. It does not follow that the cost of aluminum is therefore one-tenth what it has been up to this time, nor that it will be thrown upon the market in such bulk as to seriously interfere with some of our principal industries. What is actually certain is that a metal, which has hitherto been very difficult to procure, can now be applied to a great number of purposes for which it has not been available on account of its scarcity. Mr. Webster burns alum and pitch in a calcining furnace, and produces therefrom, as the result, a gray cinder, in appearance not unlike the refuse of an engine fire. According to all scientific authority, this cinder ought not to be anything more valuable than burned alum. By further process however, it is converted into something which contains almost 90 per cent of alumina, and which, in process of manufacture, has left behind several by-products of almost sufficient value to defray the cost of working. After this, Mr. Webster, to use his own phraseology, "got what he wanted" in the shape of a gray powder, about 89 per cent in fineness. By the new process of manufacturing alumina, what would hitherto have occupied six months can now be accomplished in a week. The company manufactures a ton in that period, or as much alumi-

num as will yield almost 200 pounds of aluminum."

The Mechanical Properties of Aluminum.

If there is any large amount of fact in the claims above set forth no metallurgical advance has been made equal in value to this since the discovery of the Bessemer process of making steel. The chief commercial value of aluminum consists in its use for tempering alloys. It gives to copper or zinc or tin such properties as are to be obtained by no other means. It seems to soften their nature, while really increasing their strength and hardness. It enables them to resist such tests as are applied to silver and gold, preserves them from corrosion, renders them more ductile, and generally refines them. One consequence of the discovery of the new process of making aluminum will probably be the rejection of all plated goods in favor of articles made of aluminum or bismuth-bronze. Cups, or dishes or spoons made of the latter, have all the appearance of the best plated goods. They do not tarnish or lose their color, and they will wear through without any change in the look of the metal. As for German silver, even the best qualities compare unfavorably with tin which has received a dash of aluminum. It is especially valuable in making bronzes, whether for art or commercial purposes. Its alloys are found especially valuable for piano-forte wires and wires for telegraph purposes. When used for the former purpose, the wires are said to vibrate for ten seconds longer than the wires now in use. It furnishes for such purposes the greatest strength with the least weight, and is almost proof against corrosion. Pure aluminum weighs only one-third as much as iron. It is extremely ductile and elastic. Its elastic range is about three times that of steel, and five times that of wrought-iron. The tensile strength of the pure metal, in proportion to its weight, shows a high mechanical value. It closely resembles silver in appearance, rings like a bell, and can be cut with a knife.

General Machine Works.

The American *Machinist* is of the opinion that the effort on the part of most machine shop proprietors in this country, for the past few years, has been to change from general work to specialties—to convert the machine shop into a manufacturing establishment. In many instances, it looks as if the plan had been too well carried out. Shops that are ready for jobs out of the line of regularly manufactured specialties are, we believe, as a rule, better provided at the present with work than those engaged on specialties. There will always be room for a fair number of good shops, well fitted for taking hold of jobs not in any special line of manufacture. A certain proportion—not a small proportion, either—of machine work is general in its character. Jobs, large and small, are constantly wanted that will never require duplication, and these naturally find their way to shops that are well provided for doing them at reasonable cost without special appliances. Again, there is always being constructed a large amount of experimental machinery, in which important modifications will be made before it passes to the stage of manufacture. The general machine shop should be able to bring this machinery up to the point of manufacture, and then pass it along to those who will arrange for systematic manufacture. Good tools, judiciously selected for this kind of work, and, above all, the best kind of shop management, is required for this. With these the general machine shop is not always the one that is left in the race for business. The ability to handle a variety of general work, so as to get it out well and cheaply, has come to be more of a specialty than the manufacture of any particular line of machinery. There is, in the future, fair prospects for the general machine shop ready to take hold of a job without any red-tape preparation.

A SPLIT NAIL or tack of new form is suggested by R. S. Pickett, of New Haven, Conn. The nail has a head and a shank that is provided with a longitudinal slot extending from the point well up toward the head. In cross section the nail is oblong or oval, the corners being rounded, so that the oblong has rounded ends. The slot is parallel to the rounded edges or sides of the shank. At the point the ends of the prongs are beveled inward on each side toward the slot. Instead of making this bevel plain it may be made concave. The bevel of each prong end is concaved not only transversely, but also longitudinally. This leaves not only a much sharper cutting edge at the extreme point of each prong than a plain bevel would, but also makes sharp edges extending some distance up the sides of the prong ends. The inventor states that prong points of this peculiar shape insure the easiest penetration and also an easy spread of the points, so that they take the firmest hold on the material into which they are driven.

OIL IN BOXES.—There is one thing about journals and boxes that has not been spoken of very much, and that is the circulation of the oil in the box. If the oil circulates throughout the box there is less danger of heating. Good results may be obtained in habbiting boxes, especially solid boxes, by taking paper and placing around the shaft, and then taking stout string and tying around the paper in the form of a quick thread, letting the string go to right and to left.

SCIENTIFIC PROGRESS.

Peculiarities of Lightning.

A correspondent of *Nature* says that in the plains of India at the commencement of the monsoon, storms occur in which the lightning runs like snakes all over the sky at the rate of three or four flashes in a second, and the thunder roars without a break for, frequently, one or two hours at a time. During 12 years' residence in India he had heard of only two human beings and three buildings being struck, although in parts of lower Bengal the population amounts to more than 600 to the square mile. He attributes the scarcity of accidents to the great depth of the stratum of heated air next to the ground, keeping the clouds at such a height that most of the flashes pass from cloud to cloud, and very few reach the earth. The idea is supported by the fact that in the Himalayas, at 6000 feet, objects are frequently struck.

In the British islands thunder storms are said to be more dangerous in winter than in summer, and such a fact, if true, can be explained by the very thin stratum of air then intervening between the clouds and earth.

It is now quite generally conceded that the "return shocks" or "ground strokes"—the electricity passing from the earth to the clouds—are the ones which do the most damage.

L. J. Le Conte, a civil engineer, recently read a paper before the Technical Society of this city, in which he undertook to trace the cause of several recent dynamite explosions in this vicinity to the electricity generated by or accompanying our peculiar desiccating north windstorms. The presence of an abnormal amount of electricity in the atmosphere at such times is shown by the facility with which it may be developed in the clothing of persons when exposed to such winds. Similar phenomena are observed on the hair of horses when at work at such times—particularly on their tails, which sometimes bristle out to twice their usual diameter.

Careful observation and examination have shown that all of the dynamite explosions in the vicinity of San Francisco hay—some eight or ten in number—have occurred during the prevalence of such storms, and when the atmosphere contained a very small amount of humidity.

These explosions are not supposed to result from the direct action of electricity, but from a secondary cause. The electricity causes a "dust explosion," the impact of which fires the dynamite. To further account for the dust explosion, it is stated that the rooms of buildings where dynamite is manufactured are more or less filled with dust from the dry absorbent used in the manufacture, and that this dust is always found saturated with acid nitro glycerine—a condition of that substance very susceptible to even spontaneous combustion, and when so saturated, the slightest spark, such as might be produced by the rubbing of a woollen coat sleeve in a highly electrified atmosphere, might produce a violent explosion. Dust explosions in flour-mills are often caused in such a manner, and so, no doubt, are many, so called, "gas explosions" in coal mines.

It is held that if a certain degree of moisture can be maintained in an atmosphere where dust explosions are likely to occur such danger might be avoided.

Mr. Le Conte thinks that the remarkable electrical phenomena witnessed by parties at Mount McGregor, while preparations were being made for Grant's funeral, were caused by "ground shocks."

Mr. Le Conte further remarks that an impression has long existed in the public mind in regard to lightning, which is hard to eradicate, namely: Most people suppose that all fatal strokes of lightning necessarily come from a thunder cloud overhead, whereas a large percentage comes from the ground.

A stroke of lightning from a cloud has only a local effect at the particular point where it may strike, whereas the return shock, induced by the electrified cloud, may shock the entire country around the point for 20 square miles, more or less, depending on the size of the cloud.

GOVERNMENT AID TO SCIENTIFIC RESEARCH.—In addition to scientific labors of an immediate necessary character, other scientific work is frequently carried on at government expense, which aims at the discovery of truth for its own sake, apart from its direct applications. For examples, the transit of Venus and solar eclipse expeditions may be named, as well as the work carried on by the Bureau of Ethnology. In the latter organization, by government aid, valuable data are saved which would otherwise be lost to science; and this is as it should be. Too often, in our busy, every day life, we forget that there can be no applied science unless there is some pure science to apply; and that the larger problems of science, including much of material value to mankind, are too vast to be grappled by unaided individuals, or even by private corporations. They can be solved only by the combined efforts of many trained experts, working with the best facilities and under systematic direction—a state of affairs which can only be brought about by governmental assistance. When that stops, science languishes; and the growth of every industry, public or private, dependent upon science, is checked. Since every modern government is necessarily in competition with other governments, either in the way of increasing its resources or perfect-

ing its means of defense, it follows that aid to science is one of the factors essential to success; and that that nation which fails in far-sighted intelligence will lag behind in material affairs also. Science, both pure and applied, has become a necessity, upon which the welfare and very life of nations must depend. No nation can fairly expect to receive all the benefits of science while giving nothing in return. Even the narrowest utilitarian must see what vast results sprang from the niggardly public grant which rendered possible the first line of the Morse telegraph.

LAMP SHADES AND THE EYES.—Professor H. L. Cohn describes in *Science* a long series of determinations of the relative values of various forms of lamp shades. The method pursued was to measure the brightness of white paper lying on a table over which the source of artificial light was suspended at a given distance by means of a Weber photometer. As one would anticipate, the general effect of a shade is to increase very greatly the illumination immediately under the light, and not modify it notably at an angular distance greater than 45 degrees from this region. The last section of the pamphlet, which deals with the illumination requisite for easiest use of the eyes, is of the most general interest. Taking as a measure of the value of the illumination in this case the number of lines which can be read from a newspaper in a minute, and as the unit of illumination that of a normal candle at a perpendicular distance of a meter from the paper, he finds that the best illumination is not less than 50 such units. Since even a fifth of this illumination is very rarely secured, except immediately under a lamp provided with a good shade, the author emphasizes the conclusion that few school children work in a satisfactory light.

NITROGENOUS SUBSTANCES.—Herr Stutzer maintains that all vegetables contain three groups of nitrogenous substances: The first represented by asparagine, is soluble water; the second, comprising albumen, is dissolved by the hydrochloric acid pepsin of the stomach, and is distinguished chemically from amides by forming insoluble compounds with copper hydroxide in neutral solutions, and the third is composed of all those nitrogenous substances which are not soluble in water or in acid pepsin. He examined the last group, Commercial cocoonant cake used as fodder by farmers was treated with pepsin and pancreatic extracts, and it was found that the latter in an alkaline solution had somewhat less action on proteins than acid pepsin. Herr Stutzer believes that soda alone is quite as powerful a solvent of nitrogenous principles as when combined with pancreatic ferment.

A LARGE METEOR.—A brilliant meteor recently passed over a portion of Western Pennsylvania, and fell near the West Virginia line. Its location has since been traced, and hundreds of curious people visit it daily. The fallen meteor, which is of immense size, presents the usual characteristics of meteoric iron. A person who saw it during its flight in mid air says: "I never beheld a more awful or impressive scene. My horse suddenly stopped, and I heard a noise as of a mighty rushing wind. Looking up, I saw moving high above me a huge mass resembling a great coal of fire, equal in size to the largest barn I ever saw. There appeared to be attached to it an immense flame of a deep red color, which tapered off into a darker color. The mass gradually assumed a whitish hue, which it retained until it passed out of sight."

TO DETERMINE THE CONDITION OF THE ATMOSPHERE IN CITIES.—Under the slow but continuous action of the sulphurous acid thrown in the air of cities by the combustion of coal and the influence of the frequent changes in the degree of atmospheric humidity, M. G. Witz finds that the peroxide of red lead, used in coloring certain plaacards, is destroyed and sulphated. At the same time the protoxide of lead thus liberated is transformed into an insoluble sulphate. This salt being easily analyzed, a new and certain means is thus obtained for determining the condition of the atmosphere in large cities.

SOLIDS CARRIED BY RIVERS.—One hundred and fifty million tons of matter in solution are annually poured into the Gulf of Mexico by the Mississippi. At this rate one foot of land over the whole basin would be removed in 4000 years. Similar calculations applied to the St. Lawrence, La Plata and the Amazon reach the result that 100 tons per square mile is removed from the entire American continent every year. One cubic mile of earth is deposited every year in the Atlantic Ocean, from America, Africa, Europe and Asia.

SMOKE CONSUMPTION.—Nearly all smoke may be consumed without special apparatus, by attending with a little common sense to a few simple rules. Suppose we have a battery of boilers and "soft coal" is the fuel. Go to the first boiler, shut the damper nearly up, and fire up one-half of the furnace, close the door, open the damper and go to the next boiler and repeat the firing. By this method, nearly, if not quite all the smoke will be consumed.

ETHER VS. CHLOROFORM.—The comparative cases of fatal accidents in the use of these two anesthetics are given as follows: The mortality of chloroform is 1 to 5860; that of ether, 1 to 16,542; that of nitrous oxide, 1 to 100,000,

Growth of American Manufactures.

The birth of manufacturing and mechanical industry in the United States dates from the birth of the republic. During our Colonial existence the repressive policy of the home Government in regard to manufacturing and mechanical industries in the then Colonies, prevented even the inception of any industry whatever, however petty, save that of agriculture alone. The most arbitrary and unjust acts were passed by Parliament, with the view of making England the workshop of America, and America the farmhouse of England.

As a natural consequence, the newly emancipated nation, so soon as it found itself independent of the mother country, and with a rapidly growing population, also found itself cruelly hampered in all the ways of industry outside of agriculture. We had no skilled mechanics and no machinery with which to employ or instruct them. Makeshifts innumerable were resorted to, and native Yankee ingenuity was tasked to its utmost to meet the necessities of the people. England, during the preceding century, had been working under a most stringent protective policy. She was at that time the most determined of all nations against free trade or even "fair trade." She had protected her industries until she had grown rich and overbearing. All nations paid tribute to her, and bought even the most ordinary necessities of life at her factories and her workshops. Her advantages were so great that she was enabled to place enormous profits on her wares.

Possessing such opportunities at the time these States achieved their independence, quite a lively trade immediately sprang up between the two countries, and for the time appeared advantageous to both; so much so to England that the younger Pitt boasted in his place in Parliament that he had re-conquered the American colonies, and that they were worth more to England as commercial dependencies than they had previously been as political dependencies.

But our wise and far seeing statesmen soon began to comprehend the situation and at once arranged for the establishment of manufacturing facilities of our own. In doing so they simply copied the policy under which England had grown wealthy and powerful—that of protection. The first tariff bill was signed by Washington on the seventh of July, 1789, and was most appropriately and solemnly pronounced our second Declaration of Independence—a Declaration of industrial independence.

When England heard and fully understood the meaning and force of this act, she recognized it as a greater blow to her prosperity than our first declaration of political independence. It was then, more than ever before, that the skill and ingenuity of our citizens was put to its metal. Our people at first commenced working with the ill-devised and clumsy machinery which they found then in existence. But the superior skill and cheap labor of England was too much for them, and it soon became evident that it was necessary to meet and overcome those advantages by improved machinery and methods.

Congress once more stepped in to aid our growing industries and supplemented its tariff acts with a provision for the protection of imports, and our system of patent protection was evolved, simple and crude at first; but it was the beginning of what is now acknowledged as the most effective and liberal system of patent laws ever devised. The result was a new departure in manufacturing and mechanical enterprise, by which the cost of production was so reduced by improved machinery and better methods that we were soon not only placed independent of the mother country, but we were even able to come in competition with her, in the markets of the world.

Those necessities and our liberal patent laws have finally made us a nation of inventors—a people that has introduced more valuable inventions than all the world has done hitherto, since mother Eve first invented the fig leaf apron. Yankee invention has, in fact, become proverbial, and is illustrated by the carpet loom, the cotton gin, the lathe for turning irregular shapes, the sewing machine, improvised explosives, interchangeable machines and implements of various kinds, the cable road, the telegraph, the telephone, the audiophone, anæsthetic, and hundreds of other special inventions which might also be enumerated.

As early as 1810 our manufacturing interests had reached a stage sufficient to cause an order by Congress for a special enumeration in the census of that year. The returns, however, were very meager, and produced no results of a very satisfactory nature. The census of 1820 was quite as unsatisfactory, and it was not until 1850, and later, that, by a change of methods in taking the census, really valuable and satisfactory reports have been obtained. Since that time the industrial growth of the country has been something quite marvelous.

By the census of 1850 the number of manufacturing establishments was 123,029. Ten years later they had increased to 140,433. In the next decade the number advanced to 252,148, but between 1870 and 1880 the increase was hardly noticeable, the number in 1880 being 253,940.

A different rate of increase is shown in the amount of capital employed. In 1850 it was \$533,245,351, increasing to \$1,009,855,715 in 1860, and doubling again between 1860 and

1870 to \$2,118,208,769. Between 1870 and 1880 it increased to \$2,790,223,506.

The shops and manufactories gave employment in 1850 to 953,079 toilers who had increased in number by the year 1860 to 1,311,246, and by 1870 to 2,053,996. In the next ten years the increase, as in the other cases, was slow, for in 1880 the workers numbered only 2,738,750, an annual increase for the decade of less than 69,000.

The materials consumed in manufacture were valued in 1880 at \$3,394,340,029. The products increased from \$1,019,109,616 in 1850 to \$5,369,667,706 in 1880.

In the payment of wages, all the States show an increase excepting Nevada, Missouri and Mississippi. Minnesota and Texas doubled their annual payment of wages in the last census decade, and California increased from \$21,000,000 to \$38,000,000.

And now destiny points to this country as the one bound, in the near future, to become the largest manufacturing nation in the world, as we are already the largest producer in point of agricultural products. Our natural resources are almost unlimited both in extent and variety, which, with our accumulating population and the general intelligence of our working people form all the necessary factors for the grand result anticipated.

USEFUL INFORMATION.

WOMEN'S COMPLAINT ABOUT CAR SEATS.—Car-builders and others will take notice that a definite grievance has been presented by the Women's Rights Convention recently in session in New York. About 40 ladies were present, and a complaint made in relation to car seats was unanimously indorsed by all the members of the convention. The complaint was that the seats in cars, both for steam and street railroads, and in ferryboats and other public conveyances, were constructed entirely for the use of men, and were consequently too high for the accommodation of most women. Several ladies present, of whom it is said that they were certainly not below the average height, said that in nine cases out of ten when they took a seat they were unable to put their feet comfortably on the floor, and others said that they were either unable to reach the floor at all or could only do so by stretching the toes, which was unpleasant as well as injurious to health. They could recall no reason why seats should not be made lower, and a memorial asking for reform in this direction was drawn up and signed by all present, and is to be circulated for further signatures. The complaint of the ladies in this respect is certainly justified by the facts, and we think that many men as well as women will admit that the car seats, as now constructed, are certainly higher than there is any necessity of making them. It may also be added that the average car seat is constructed without any reference to the conformation of the human body, the effort of many builders being, apparently, to make the seats as uncomfortable as they can possibly be.

HOW BEES PREDICT THE WEATHER.—No. 17 of *Die Natur* contains an article by Herr Emerig, of Laugingen, on German bees as storm warners. From numerous observations, the writer advances tentatively the theory that, on the approach of thunder storms, bees, otherwise gentle and harmless, become excited and exceedingly irritable, and will at once attack any one, even their usual attendant, approaching their hives. A succession of instances are given in which the barometer and hygrometer foretold a storm, the bees remaining quiet, and no storm occurred; or the instruments gave no intimation of a storm, but the bees for hours before were irritable, and the storm came. He concludes, therefore, that the conduct of bees is a trustworthy indication whether a storm is impending over a certain district or not, and that, whatever the appearances, if bees are still, one need not fear a storm.

HOW SEALED CANS ARE TESTED.—An ingenious system has been devised for testing sealed cans in which food supplies are packed, to determine whether they are air tight. This is a matter of importance alike to packers and consumers. To the one it saves money, loss from spoiled goods, and to the other the danger of inadvertently using canned goods that have been partially decomposed. Immediately after the cans have been sealed they are placed in an iron or steel vessel that can be hermetically closed. The vessel is then filled with air under strong pressure, and after a few minutes the compressed air is allowed to escape suddenly. If a can has been imperfectly closed it will be filled with air under pressure, and when the outside pressure is suddenly removed that which is inside the can, being unable to escape through minute apertures quickly enough, will exert a strong outward pressure and bulge one or both heads. The bulged cans can then be picked out from the whole lot and resealed.

TO CLEAN HAIR BRUSHES.—The best way in which to clean hair brushes is with spirits of ammonia, as its effect is immediate. No rubbing is required, and cold water can be used just as successfully as warm. Take a teaspoonful of ammonia to a quart of water, dip the hair part of the brush without wetting the ivory, and in a moment the grease is removed; then

rinse in cold water, shake well and dry in the air, but not in the sun. Soda and soap soften the bristles and invariably turn ivory yellow.

A FISHERMAN'S KNIFE.—An English cutler now makes what he calls a fisherman's knife, which weighs less than a pound, and is carried at the belt, yet contains a gaff, scissors, weighing scale up to twenty pounds, large and small blade, a screw driver and file, a long disgorger and file, a tin opener, a corkscrew, a gimlet, an eight inch measurer, tweezers and pricker.

WAX MATCHES ARE MADE IN THIS COUNTRY.—An item has been going the round of the papers, to the effect that no wax matches are made in this country. A New York correspondent of the *Inventor* has written that journal that the report is incorrect—that wax matches are made by a firm in New York city, and that the business is a profitable one.

A WASH FOR OLD PAINTED WOODWORK.—Two ounces of soda dissolved in a quart of hot water will make a ready and useful solution for cleaning old painted work preparatory to repainting. This mixture, in the above proportion, should be applied when warm, and the woodwork afterward washed with water to remove all traces of soda.

AN EXPENSIVE SPIRE.—The spire for St. Patrick's cathedral in New York will cost, according to the architect's computation, \$190,000. The lower part, or tower, will be octagonal in shape, and 67 feet high, with a base of 32 feet. In each of the eight sides will be a window. Rising from this tower will be the spire itself, also octagonal.

ANOTHER WOOD-FILLER.—A wood filling composition may be made of whiting, 6 ounces; japan one half pint; boiled linseed oil, one half pint; turpentine, one half pint; cornstarch one ounce. Mix well together, and apply to the wood. For walnut, add a little burned umber, or cherry, a little venetian red to the above mixture.

LATHE CEMENT.—Take eight ounces best orange shellac, half an ounce ultramarine blue; melt the shellac in a vessel set in water or sand bath, and when melted stir in the ultramarine blue thoroughly and let it cool until it can be taken out with the hands and drawn or rolled into sticks of convenient size.

A FINE EXPOSITION BUILDING.—Pittsburg, Pa., is about to erect a very imposing and a permanent exposition building. To make it perfectly safe against fire it will be constructed entirely of iron and glass and will cost \$200,000.

MICE AS FISHERS.—It is not generally known that mice will dive in water to collect and eat the spawn and eggs of fishes.

GOOD HEALTH.

First Indications of Consumption.

It is not as extensively known as it ought to be, says *Hall's Journal of Health*, that in the large majority of cases consumption begins with a slight cough in the morning on getting up. After a while it is perceived at night on going to bed; next there is an occasional coughing spell some time during the night; by this time there is a difficulty of breathing on any slightly unusual exercise, or in ascending a hill, and the patient expresses himself with some surprise: "Why, it never used to tire me so!" Next there is occasional coughing after a full meal, and sometimes "coughing up." Even before this person begins to feel weak, while there is an almost imperceptible thinning in flesh and a gradual diminution in weight—harassing cough, loose bowels, difficult breathing, swollen extremities, daily fever and miserable death. Miserable because it is tedious, painful and inevitable. How much it is to be wished that the symptoms of this hateful disease were more generally studied and understood, that it might be detected in its first insidious approaches and application be made at once for its arrest and total eradication, for certain it is that in very many instances it could be accomplished.

It must be remembered that cough is not an invariable attendant of consumption of the lungs, inasmuch as persons have died and on examination a large portion of the lungs was found to have decayed away, and yet these same persons were never noticed to have had a cough or observed it themselves, until within a few days of death. But such instances are rare, and an habitual cough on getting up and on going to bed may be safely set down as indicating consumption begun.

Cough, as just stated, is originally a curative process—the means which nature uses to rid the body of that which offends, of that which is foreign to the system and ought to be out of it; hence the folly of using medicine to keep down the cough, as all cough remedies sold in the shops merely do, without taking means at the same time for removing that state of things which makes cough necessary.

PNEUMONIA AND OZONE.—Dr. Draper, of the Meteorological Observatory at Central Park, New York City, has called attention to the fact that during the past eight years there has been an apparent connection between the death-rate from pneumonia in New York and the presence

of ozone in the atmosphere. The epidemic has been particularly fatal during the present year, and it is stated on good authority that the death-rate from this cause has exceeded that from cholera in 1854. It has not been determined whether the connection between the disease and the ozone in the air is simply a coincidence, or whether there are scientific reasons for their joint appearance.

We know as yet but little about either the cause of the disease or of the modified form of oxygen which we denominate as ozone. In pursuing an investigation to discover their true relation, should any be found, two cases are possible: either that the ozone, which in large quantities we know to be injurious to health, is the direct cause of the disease, or that the same atmospheric conditions which produce ozone are also favorable to the spread of pneumonia. We are inclined to believe that the connection is purely accidental, but of the two hypotheses, the latter seems the more tenable, though Dr. Draper has apparently given it no consideration.

Removing Hair and Freckles by Electricity.

The American Dermatological Association lately held its ninth annual meeting at Greenwich, Conn. Among the proceedings were remarks by various doctors who gave their experiences in removing hair from the face by electricity. Quite a large and important business is done in this line, especially among ladies. The only remedy is to kill the root of each hair, which must be done separately, by means of an electrical needle and battery.

Dr. Fox said: In the case of a young woman with a heavy beard, he has removed, by actual count, 8000 hairs. This process has required two or three years. Since then it had been necessary to remove only a few dozen hairs.

The President, Dr. Hardaway, had performed the operation of electrolysis for ten or twelve years, probably longer than any other member of the association. He used the irido-platinum needle, which had the advantage of being bent, and was not likely to pass through the follicle well. The moment the follicle was entered there was an escape of sebum. One case, that of a woman with heavy black beard, had been entirely relieved. Electrolysis with a fine needle afforded a method of getting rid of freckles. The plan was to dot the surface covered by the freckle with the needle.

Freckles.

The following ointment was recommended by Dr. Heitzman and others at the late Greenwich meeting of the American Dermatological Association, being an ointment recommended by Wertheim, of Vienna:

White precipitate, 1 drachm.
Substrate of b'south } each, 1 drachm.
Glycerine ointment, 1 ounce.

This was to be applied in a thin layer every other night, and in from four to six weeks the result would be found to be highly satisfactory.

SORE THROAT.—Everybody has a cure for this trouble, but simple remedies appear to be most effectual. Salt and water is used by many as a gargle, but a little alum and honey dissolved in sage tea is better. An application of cloths wrung out of hot water and applied to the neck, changing as often as they begin to cool, has the most potency for removing inflammation of anything we ever tried. It should be kept up for a number of hours; during the evening is usually the most convenient time for applying this remedy.

FOR KIDNEY TROUBLE.—EDITORS PRESS:—Take the leaves of the common fir or spruce tree, make a tea by steeping (not boiling) them in hot water some 20 or 30 minutes. Drink hot. It will relieve almost instantly, unless the trouble is of long standing, when it requires a longer time.—M. S., *Pope Valley, Napa Co., Cal.*

PROPORTIONATE VALUE OF RAILWAY ACCIDENTS.—A French statistic gives the following as the proportionate number of persons killed annually on the railways of the respective countries: France, one in every 2,000,000; England, one in every 5,250,000; Belgium, one in every 9,000,000; Prussia, one in every 21,500,000.

MEDICAL VALUE OF SMALL FRUITS.—The small seed fruits, such as blackberries, figs, raspberries, currants and strawberries, may be classed among the best foods and medicines. The sugar in them is nutritious, the acid is cooling and purifying, and the seeds are laxative.

HOT WATER IN SYNCOPE.—Writers in the *London Lancet* call attention to the great value of hot water applications to the head in cases of fainting or syncope. They say also that a prompt use of it, applied to the forehead with cloths, will very often avert such attacks.

MUSTARD PLASTER THAT WILL NOT BLISTER.—Few people know how to apply a mustard plaster so as not to blister the skin. If the mustard be mixed with the white of an egg, instead of water, the plaster will draw thoroughly without blistering the most delicate skin.

TOOTHACHE, caused by a cold in the facial nerves, may often be relieved by wringing a soft towel out of cold water and sprinkling it with strong vinegar. This should be laid on the face like a poultice, and will often be followed by a refreshing sleep.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLEAN UP.—Amador Ledger, Oct. 17: The first regular clean-up of the Amador Queen mill was made Saturday and Sunday. How it turned out we are unable to say, although it is reported that the result was satisfactory. The first clean-up was not expected to average high, as a great deal of dirt and refuse material was mixed with the quartz. Mr. Shugert started Monday morning for San Francisco, on business relating to the mine. The mill has been running from 15 to 20 stamps the past week. At the Moore mine sinking operations have been temporarily suspended until pumping machinery can be put in, the flow of water being too strong to control with a bucket. The ledge of pay ore is said to be four feet wide, and the presence of a strong body of water is regarded as a good indication. The Plymouth Consolidated Mining Company, it is almost needless to say, paid a dividend on the 5th inst. of 50 cents a share, aggregating \$50,000. With this dividend this property has paid the stockholders \$14.50 per share, in 29 dividends, aggregating \$750,000. The parties who are working the Kennedy mine, under agreement with the owners to purchase the said mine, in case it meets with expectations upon being worked, are as follows: Thomas Varney, E. Judson, M. W. Belshaw, John Taylor, John Barton, J. M. Shotwell, Dr. Thomas Boyson, George Goodman, J. S. Doe, John Curry, F. Reichling, F. F. Thomas, David McClure, Jr., Charles F. Doe. They bind themselves in the sum of \$20,000 not to allow any liens of any kind to be placed upon the property on account of any work done or material furnished to said mine while in their possession. An agreement to this effect has been placed on record. Work has been resumed on the St. Julian at Middle Bar. A contract has been let to J. R. Price and H. Tripp to extend the lower tunnel 300 feet, the price, we are informed, is \$3.40 per foot. Work on the contract was commenced this week.

Calaveras.

GLENCOE.—Calaveras Chronicle, Oct. 17: Mr. F. A. Hanks, our well known capitalist, is erecting large hoisting works which he intends putting in motion in the near future. James Sullivan has bought an interest in the mine known as the Charlotte, situated about a mile and a half from town. They have fair prospects for a good mine, and as soon as water can be obtained they will begin operations. They have 700 tons of ore on the dump that will average from ten to forty dollars a ton.

Inyo.

KEELER NOTES.—Cor. Inyo Independent, Oct. 19: Thomas Boland shipped fifty tons of ore from Cerro Gordo this week. W. C. Morrison shipped thirty tons from the same place. Ten tons of ore are being hauled from Cerro Gordo daily. Eight men are now employed at the soda works on Owens lake. A dwelling house and engine house are being erected. The roof of Eddy's mill in Snow's canyon was torn off during a late wind storm, and the run had to be delayed a week or two for repairs. Mr. Israel Luce, proprietor of large marble works in Sacramento, arrived at Keeler on Thursday. He brought with him two men, and will soon put a force of men at work on his marble quarry at Swansea. Some Mexicans have struck a rich body of ore near the Yellow Grade on the Cerro Gordo road. Mr. Fairman went up to Independence on Thursday, on his way to Carson, where he will have his mill for Panamint framed; he reports the road nearly completed.

DARWIN.—Fitzgerald has increased his force of men, and is taking out A. No. 1 ore. Jack Wilson has several men out at Lee district chloriding. The recent success of Jerry Fitzgerald out there kind of "lightens up the gloom," as it were. No idle miners in town now. Every man who knows how to hit a drill "and 'it un 'ard," have gone to work.

Monro.

MILL CREEK.—Cor. Bodie Free Press, Oct. 17: Messrs. Schmeck, Kirkpatrick & Co. are working on their placer claim at the head of the lake. This claim covers all the tailings that come down the creek from the Gorilla and May Lundy mines. Experienced placer miners say that if these tailings, a deposit of six years, is handled right, thousands of dollars can be realized. Monday afternoon the dam on the middle lake in Lake canyon, broke and caused some damage to Eshe's reduction works.

Nevada.

RICH QUARTZ.—Grass Valley Union, Oct. 19: Several pieces of rich gold-bearing quartz from the Crown Point mine were brought to town yesterday afternoon by Richard Gauthier, which attracted much attention. The gold was in compact and solid granular streaks running entirely through the rock, unmingled with sulphurets. The rock itself was of that lively character that a practical miner always likes to see, as it gives assurance of a good gold-bearing vein, and such the Crown Point is showing itself to be by every day's developments. This rich rock was taken out at a depth of 180 feet, and at a point where the ledge is six feet in width.

PRICHENIX.—Foothill Tidings, Oct. 19: Work is going on admirably at the Phoenix mine, under the direction of B. A. Penhall, superintendent. This mine has but recently been started up, having been bonded by a Grass Valley company, and the entire amount of stock, save perhaps a few shares, is held by our townspeople. The shaft is now down 240 feet, the bottom level being in 80 feet, south from the shaft, with an 18 inch ledge. The ledge is well defined, and has every indication of being permanent. The last crushing taken from this ledge yielded \$127 per load.

NORTH STAR.—Work is being vigorously pushed forward, and the ledge is looking as well as ever. The shaft is still going down on the main incline, and soon the 1400 foot level will be run. It is expected that the company will strike a richer chute of ore in this level than they have in any other portion of the mine. The 10-stamp mill is kept running night and day on ore from the mine. Several weeks ago a shipment was made of \$2800 for one week's run at the mill, of 10 stamps, not including the sulphurets, which amounted to \$500. Sunday last there was a shipment made of \$2600 for less than six days' run, 10-stamps, not including sulphurets. We are informed by the superintendent, David McKay, that the sulphurets are worth \$113 per ton. The mill is now running on tribute rock mostly, and it verages \$70 per load.

DAISY HILL.—Seven loads of rock just crushed at Rogers' mill and taken from the Daisy Hill ledge, on south Auburn street, yielded 110 ounces, or nearly \$2000 in gold. This was taken out by two men in six weeks time, and came from the depth of about 130 feet.

COMET.—This property has been bonded by Richard Jones and party for \$3,000. Riley's mill recently crushed seven loads of ore from the Comet, and it yielded \$35 per load.

LOVE TREE.—The prospects are still bright for this mine, which is being put in proper shape for a run.

COE MINE.—The old Coe mine, located on the Grass Valley and Nevada City road about one mile from town, will soon have work commenced upon it.

HORSE SHOE.—The 26-foot wheel at the Horse Shoe shaft is getting ready to begin pumping water. A contract will then be let for sinking the shaft 100 feet deeper.

MAGENTA.—The water is about pumped out in the Magenta, and in a short time a contract will be let to sink the shaft 200 feet deeper, making a total of 500 feet. Of the Idaho and Empire there is nothing to say unless we repeat the same old story that has been told for years. They are both working away, are sinking deeper and deeper, have good ore and are paying regular monthly dividends.

OUTSIDE OF TOWN.—E. W. Roberts, representing San Francisco and Oakland capitalists, has bonded the extensive mining property owned by L. F. Buck, and located between Moore's and Orleans Flat, about 22 miles above Nevada City. The ledge is a very large one and can be worked through the tunnel which will soon be timbered and completed. John Lawrence, of the Plaza Foundry at Nevada City, is busily engaged in building the entire iron work for the 10-stamp mill, which will be placed on the Buck property as soon as the casting, etc., are completed.

THE CROWN POINT MINE.—Grass Valley Union, Oct. 20: It has only been a short time since the Crown Point mine was brought to the particular notice of the public, and now beyond all doubt it is one of the best properties in Grass Valley district. The ledge was located as early as 1858, but very little work was done on the location at that time. In 1871 or 1872 the ledge was worked by the William Penn Company, and considerable money was expended at that time toward development. A shaft was sunk to the depth of 250 feet or more and quite an amount of rock was taken from the shaft and the western drift, but not paying the mine was abandoned and the machinery sold. The property is now owned by A. Gauthier, who has been untiring in his efforts to find the pay chute. Mr. Gauthier continued the westerly drift some distance, but failed to find anything very encouraging in that direction, when he started a drift eastward at a depth of 180 feet. At a distance of about 40 feet he came upon the ledge and pushed the drift to a distance of 100 feet or more, the ledge increasing in width and the ore becoming better as the drift was advanced.

Placer.

HOTALING.—Herald, Oct. 17: In shaft No. 2 at the iron mine, which has been sunk with the view of prospecting the extent of the iron deposit, good ore was struck last Tuesday. It lies several hundred feet easterly from the old shaft, and gives proof of an extensive ore body. The quantity of coal and ore on hand at the furnace bespeaks a big run out there when they start.

MICHIGAN BLUFF AND VICINITY.—Argus, Oct. 17: The ledge at Last Chance owned by Byrne & McCarthy is reported to be looking richer than ever. The owners have a force of men at work running a tunnel on the ledge to tap their gravel channel. When this is done they will work the quartz in good shape. The Ralston & Nougues ledge at Last Chance is looking better and better. The ledge has been tapped about 200 feet below the surface, by means of a tunnel, and some of the richest quartz rock ever seen in this section of country was brought to view. Last Chance is looking up, decidedly.

Shasta.

FRENCH GULCH MINING.—Republican Free Press, Oct. 17: Our correspondent from French Gulch writes that owing to the scarcity of water, milling facilities are not extraordinary. The Washington is running but three stamps, and the Niagara, on Deadwood, is turning out the usual amount of bullion. The Huntington mill, just erected on the Vermont works, is working satisfactory with very good returns. The mills of McDonald, Bros. & Franck and Watt & Co., still keep up their lick. Quite a number of the mines are producing good ore. On the French Gulch side the Scorpion is working eight men with satisfactory results. Tom Green keeps about the same, and Wheeler & Son have just built a new cabin at their mine. The Brunswick Company are getting some good ore. When water comes the chances for a good turn out of wealth is good. The shipment through W. F. & Co. for September was \$11,500. The hills are full of prospectors.

NOTES.—Shasta Democrat, Oct. 14: Last week another rich pocket was struck in Lowry's claim near Centerville. The new strike pans out hugely. About 40 tons of high-grade sulphurets from Coleman's mine at French Gulch are at the depot to be shipped below. Mr. Merethew & Co. will have their quartzmill at Lower Springs running shortly with considerable good ore out to start on. Tom Green was down from French Gulch yesterday and shipped to the mint 97 ounces of gold bullion, the result of a two-weeks' run. We are told by reliable authority that a custom quartz mill will be erected this fall on the river near Redding. Such an accommodation is badly needed and will pay well. Dick Abbot last week made two locations in Old Diggings for himself and Tom Green that have the ear-marks of being good property. Some of the ore assays over 900 per ton. J. O. Stewart writes us a note from Copper City in which he states that the reduction works on the Winthrop mine are running along nicely, and the company will be shipping bullion three or four times a month. The Brunswick mining and milling company recently struck a rich pay chute on the De

Bonne location, situated in French Gulch district, this county. Considerable of the ore from this discovery is estimated to be worth \$1000 per ton. Whitton & Bassett will start up the arastra on their Squaw creek mine in a few days. They propose to put up a small mill as soon as they are able. We also learn that Jack Conant is constructing an arastra on his mine in the same district. Everything is booming at Iron Mountain, and just now it is about the liveliest camp in the county. Men are employed in the mine getting out ore, on the mill, on roads, cutting wood and timber, etc. About 100 men we are told are employed at various kinds of work and there will probably be room for more as fast as developments are made. Superintendent Elsworth has his hands full and has the good will of all under him.

Sierra.

GOLD.—Alt. Messenger, Oct. 17: Bald Mountain Extension Company, Forest city, cleaned up for last week's work 154 ounces of gold. The various branches of the Yuoa at and around Downville are lower now than they have been for years. The Ruby Company have the channel more concentrated than ever before, and are doing well. The large pipe for the Cleveland quartz mine, at Nigger canyon, went up Thursday morning. The mill will be started in a short time. Jesse Carney has his mill at the head of Jim Crow canyon about ready to run.

Tuolumne.

DEVELOPING.—Tuolumne Independent, Oct. 17: Fred, Sutton is developing his San Guiseppe mine, near town. The shaft is down 70 feet, and the rock raised looks fine. About 70 tons are on the dump and is being ground in an arastra. He expects to work about 100 tons as a test of the ore. Water being short the arastra only runs half the complement of drags; but this disability will be removed upon the advent of the full rains. Messrs. Stucker and Gale have been taking it out rich lately on the Garrett claim, at Brown's Flat. It is said that they have taken out between \$2000 and \$3000. Mr. Richards will soon commence operations on his claim at Table Mountain. He will doubtless reap a rich harvest, as the claim is supposed to be among the best.

SOLD.—Hon. W. G. Long has, we learn, disposed of the Willetta quartz mine, located near Jacksonville, to parties in San Francisco. It is a valuable mine. The rock is of a low grade, but in immense body, and a large number of stamps can be run to advantage. It is one of those claims which will do for permanent investment, with sure and regular dividends. Tuolumne has many such, and the sooner they are developed and disposed of to those having the capital to properly operate them the better for this county.

TO START UP.—The Riverside mine will shortly start up. Mr. James Barron has charge of the operations. This mine has been tried and proved, and under Mr. Barron's competent and skillful supervision will, without doubt, be made to pay. Several mines, having good reputations in the immediate locality, are lying idle for want of capital. Men having capital to invest in mines would do well to give Tuolumne a call.

NEVADA.

Washoe District.

HALE & NORCROSS.—Enterprise, Oct. 17: The track floor of the main lateral drift on the 3100 level has been regulated to a uniform grade, the drift put in proper trim throughout, with ample drain boxes placed to take any flow of water that may be encountered through to the Combination pump. Three new crosscuts have been started west into the ore vein, No. 1 at the Chollar south line, No. 2, 90 feet north and No. 3, 40 feet south of the deep winze. The two first mentioned are in about 35 feet each, both in good vein quartz carrying small streaks and spots of ore, with increasing signs of stronger mineralization as further advancement is made. No. 3 is in only about 13 feet. It cut through two or three small veins or stringers of ore, and its face was stopped in a good vein of ore which gives high assays. This had to be done in order to get the other crosscuts in out of the way, so that the car could pass without interfering with the workmen. Work is resumed in it, or will be to-day. On the 3000 level the north lateral drift from the top chamber of the deep winze is steadily pushing along towards the Savage south line, which is now 100 feet distant. A crosscut west from this drift, about 50 feet back from its face will be commenced to-day. As the drift is skirting along the east side of the ore vein, this west crosscut should demonstrate something before long.

CHOLLAR.—Crosscut No. 1 on the 3100 level, started during the past week on the line between this and the Hale & Norcross mine, and being run jointly with that company, is now in 35 feet west from the main lateral drift. It is all in fine-looking solid vein quartz, carrying small streaks and spots of mineral. Nothing is being done at present in the face of the main west Combination drift or crosscut or the southwest branch drift. The pressure pipe for the new or duplicate section of the big hydraulic pump at the Combination shaft is all in place, complete, and the connection will be made to-day. This will complete the pump, doubling its present capacity, ready for effective action whenever required by any increase of water tapped in the deep explorations. Its importance in that respect can hardly be overestimated.

CON. CALIFORNIA AND VIRGINIA.—About 100 tons per day is the present yield from the 1750 level, being extracted on company account and shipped to the Michigan mill for reduction, giving an average assay of about \$17 per ton. Twenty thousand dollars worth of bullion was shipped on Wednesday. Some little work is being done in the Jones lease section between the 1300 and 1400 levels, preparing better facilities for ore extraction when increase of water in the Carson river shall furnish the requisite motive power to run the Eureka mill.

CROWN POINT.—Sufficient ore is being extracted from this mine and the Belcher to give the Mexican, Vivian and Santiago mills what their present limited capacity will allow them to crush, which, in the aggregate, amounts to 160 tons per day. The old upper workings of Crown Point still show large amounts of low-grade ore. That from the Belcher is of higher grade, and comes from the 1750 level, above the water surface.

YELLOW JACKET.—About 170 tons continues to be the daily yield from the 1300 level and above. There is a vast amount of low-grade ore in this mine,

and while regular extraction goes steadily along, keeping the Brunswick mill well supplied, considerable prospecting work is being done in the upper portion of the mine, and also on the 1700 level through the Crown Point and Kentuck, above the water level.

UNION CONSOLIDATED.—On the 500 level the crosscut west was advanced 25 feet during the week, making a total distance of 84 feet. Material in face vein porphyry and quartz of a very favorable nature. The crosscut east on this same level, 100 feet south of the Sierra Nevada line, is also in very promising vein material.

SIERRA NEVADA.—On the 520 level the crosscut west 1000 feet north of the shaft, was advanced 40 feet during the week, making a total length of 445 feet. The face is now in hard dry porphyry, and evidently nearing the west wall of the vein.

BEST & BELCHER.—Crosscut No. 2 west on the 1000 level, 100 feet south of the old Consolidated Virginia line, was advanced 45 feet during the week. It is now 331 feet in length. Material in face vein porphyry, clay and a little quartz.

OPHIR.—The main drift or crosscut west on the 400 level from the old Mexican shaft is being continued across the ore vein towards the west wall, preparatory to stopping upward for the extraction of the ore at that point.

ALTA.—The west drift on the 700 level is making better advancement, owing to the formation being not so hard as it has been heretofore. Less than 200 feet farther will carry it into the ore body for which it is running.

GOULD & CURRY.—On the 1000 level crosscut No. 1 west at the Savage line has been extended 45 feet making a total length of 500 feet. Material in face hard, dry vein porphyry, with an occasional streak of quartz.

ANDER.—The crosscuts west on the 175 and 375 levels still give a good showing of quartz carrying a small amount of mineral. The lower level gives good assays occasionally from small streaks and spots of ore.

MEXICAN.—The middle crosscut east is being steadily advanced. The face continues in a heavy clay and soft, wet porphyry formation, with streaks of quartz which give low assays.

JUSTICE.—Some little prospecting work is being done at the south end, and ore extraction will be more actively resumed as soon as the old Thompson mill is ready for regular work.

KENTUCK.—The old upper workings continue their regular yield of low-grade ore, keeping the Rock Point mill steadily running.

MONTE CRISTO.—The new shaft is now down 175 feet. Bottom in hard-blasting rock.

Cottonwood District.

NICKEL.—Cor. Silver State, Oct. 16: It is authentically reported that the greatest nickel property of this coast, and, in fact, the most extensive yet discovered, has been lately sold to New York capitalists. This property was discovered in 1830 by the Bell Brothers, in the range of mountains bordering on the great salt deserts in Churchill county. The London mine, which is beyond doubt the most wonderful of the group, is situated at the junction of Cottonwood and Bolivar canyons, and, as far as developed, has produced the richest nickel ore that has ever been found. This character of ore has but lately been brought to the notice of metallurgists, and has been subjected to the many trials that follow all new discoveries, and in fact has passed through the many ordeals that befall all ores of unknown worth. It has been prophesied by nearly all metallurgists that the metal could not be extracted from the ore without great expense, but this has been wholly set at rest by the working of several tons of ore by a process of Chas. Bell, who reduced the ore and extracted the metal at a cost of three cents per pound. He informs me that the different ores can be handled as easily and cheaply as lead carbonates, taking into consideration the intense heat required to melt the metal. Bell has certainly overcome the main obstacle in cost of producing nickel. It may be of interest to give the various character of ores that are found on this property, the most characteristic being a grade called "arseniate," which is found in well defined veins, in large quantities, carrying from 20 to 28 per cent metal, while a character called "arsenite," which runs in connection with the first named character, will grade from 45 to 64 per cent metal. There is another grade called "arsenio-sulphure," which lies in large bodies but the most extensive character is the "silicate," which lies in bodies over 150 feet wide. There was also included in the sale three other locations, which are considered equal in extent and richness to those described. From what has thus far been done upon the property, it is safe to say that the new company can produce all the nickel used in the world for the next 20 years, and it is understood that a complete plant will be put upon the property within the next 60 days, and the property put upon a paying basis, which will equal those of the Comstock in its palmist days. We have not learned the amount paid for the mines, but believe it to be very large, as \$150,000 was offered for them a year ago.

Eureka District.

AN ENCOURAGING SIGN.—Eureka Sentinel, Oct. 17: Quite a good deal of substantial work is being done in a great many what might be termed "small" mines of Eureka district, and at no previous time has there been so little said about it on the part of the miners, many of whom have heretofore wanted mentioned in the paper every little inch or two-inch streak of ore encountered in their properties. It is a cheering sign, this quiet settling down to work instead of sitting around the hotels or standing on the corners telling of the wonderful merits of this or that piece of property. People have apparently learned that no matter how good a piece of property may be, unless enough development work has been done upon it to prove the value, it is no good either to themselves or anyone else. Wealth undeveloped is as good as no wealth at all.

Jackson District.

ENCOURAGING.—Silver State, Oct. 13: Very encouraging reports are received from Jackson mining district, some forty or fifty miles northwest of this place. The Pennsylvania mine on which John Catlow is building a new mill is looking well. A Fleming who recently arrived there from Colorado, has discovered a lead which pays from the surface, and

quite a mining boom is looked for when the mill is completed and they commence shipping bullion.

Mount Hope District.

A DISTRICT OF POSSIBILITIES.—*Eureka Sentinel*, Oct. 13: Inasmuch as a number of practical mining men of Eureka district expressed from time to time a desire to see his group of mining properties at Mt. Hope, and inasmuch as he had some business there that required his personal attention, Hon. Thomas Wren, on Sunday last, procured a special train over the E. and P. road and invited in all some 25 miners and friends to take a trip there. Mt. Hope is distant from Eureka 24 miles, and in early days was known as McGarry district. It lies in a range of mountains about one mile from the railroad track, and from some of the mining properties being worked a most enchanting view of a broad expanse of valley and rugged mountain country can be had. The district was worked, in a way, some 12 years ago, when ore shipments were made to Palisade and afterwards to the Richmond furnaces, but from what can be seen now of those workings they were both impracticable and fruitless of what should have followed the large sums of money and the labor expended. The formation of the district is, in the main, porphyry, with some little limestone; also, white crystalline and dark grayish rocks. Most of the claims located belong to Mr. Wren individually, and in two or three of them work is being systematically and actively prosecuted, so that in the course of a few weeks it would not surprise us to hear of ore shipments again being resumed. In one of the mines, near the surface, a large body of sulphate of zinc has been discovered and penetrated several feet, and there being plenty of water close at hand for the purpose, there is no doubt but that it could be cheaply mined and leached. On three or four dumps are good-sized piles of ore, but as the quality is low grade the same would either have to be assayed or concentrated to pay for shipping and working and then a profit to the owner. All the ore mined, however, is not low grade. On one dump was a pile which, no doubt, will be shipped some time, as it is heavy in lead and assays well in the precious metals. Altogether the district makes a much more favorable showing than any of the party expected to see. In fact, it abounds in excellent prospects.

Osceola District.

THE MILL.—*Cor. White Pine News*, Oct. 10: Our five-stamp mill is keeping up its regular tick day and night. It cleaned up from 100 tons of ore from the Gilded Age mine on the 1st instant 96½ ounces of gold bullion, or about \$1700, which shows Osceola to be a bullion producing camp, and I firmly believe that in less than one year we will take the lead of any camp in Eastern Nevada in this particular. We have plenty of ore here and no discount on our bullion when it leaves the mill. A. R. Watson, the principal owner of the Gilded Age, worked the mine and is now reaping the golden fruit of his labor. He has a breast of ore in the mine 4½ feet wide, all pay rock. Part of the vein is picking ground, and five men take out more than are enough to keep the mill running. A new office and blacksmith shop have been erected at the mine. Charles Bussy and L. S. Scott are taking out paying ore from the Florida mine, which they own, of which they have a large body in sight. Pat Reiva is working the Red Monster and taking out good ore.

Pioche District.

BULLIONVILLE.—*Pioche Record*: The smelting company have commenced operations in earnest at Bullionville. They have some 30 men now at work, grading and laying the foundation for the Statefeldt furnace, which is going to be the largest of the kind on the coast. The foundation is to be of solid masonry—80 feet in length, 13 in width and five feet high. It will be a month yet before the bricklayer can get to work, and two more before the furnace can be completed. One hundred thousand more bricks will be required to complete the building, a contract for that amount having been given to Mr. Morris, of Salt Lake City. It is estimated that the entire cost of the leaching plant and furnace will reach \$75,000.

Secret Canyon District.

NOTES.—*Cor. Eureka Sentinel*, Oct. 14: B. C. Levy and Jim Allen have taken a six months' lease of the Scorpion mine, Page canyon, Secret canyon district. They start in with a fine prospect ahead and some ore to work on from the word go. Dick Merryman has made another new strike in the Content mine, Page canyon, about 25 feet from the locality of the ore he took out several weeks ago. The Water Jacket mine, Page canyon, is yielding good ore right along. The lessees have great faith in the property, and are about to commence a new shaft for the more convenient working of it. Levy and Allen have a fair prospect in Harmon's claim north of the Geddes, and have started a tunnel, which will tap the vein at a short distance, and from which thorough and cheap prospecting can be done. Messrs. Nelson and Anderson are shipping another lot of good ore from the Geddes mine, Secret canyon. They are doing well. The Geddes mine, Secret canyon, is looking well in every direction, and it is said that the company starts up again the mill can be kept running on better ore than formerly for an indefinite period. The Irish Imbassador mine, Secret canyon, is said to be yielding some good ore, but not in such quantities as the friends of the owner and lessees would like to see. The latter, however, are the right men for the place, and will not damage the former good reputation of the property.

Willow Creek District.

WILD DEER.—*Silver State*, Oct. 14: W. H. Long has received a letter from Willow creek, which says the Wild Deer mine is opening up splendidly. They have struck fine bodies of rich ore in the lower works as well as in the upper levels. J. T. Griffin, who arrived here yesterday, reports that a gold bearing vein was discovered a few days ago not far from the Wild Deer, which seems to be as rich as the Oro Fino at Silver City. He brought down a specimen which is literally covered with gold from the new lead.

ARIZONA.

ARASTRAS.—*Prescott Courier*, Oct. 17: John Hutchins, an irrepressible miner, was here Saturday last, from Groom creek district, and seemed pleased to state that Mr. Rupert & Son are working hard to get their arastras going. They have some promising gold rock to crush. Capt. Spann, of Turkey creek district will, ere long, start one of his mills. Mr.

Ross returned here a few days ago from viewing the "Morgan's Kid" and other mines in Turkey creek district. He believes the owners of the Kid will have the silver extracted from the ore at the Tuscon-bia mill, which is now working fine ore for Messrs. Roach & Mulvenon. Major Houston tells us that the dam for retaining water on the upper canyon of the Hassayampa was completed on Saturday last at noon, by the Oro Fino Placer Mining Co. The cubical contents of the rock and concrete are 200 feet. Relatively, however, it is the smallest dam ever constructed on the coast for retaining the large quantity of water that is actually confined behind it, the conformation of the canyon above the dam being such that half a million gallons of water is retained before any passes over the waste gate. The company is now putting in flume work in the canyon.

DE NOON.—*Arizona Silver Belt*, Oct. 17: Mr. A. G. Pendleton, deputy U. S. mineral surveyor, has returned from De Noon, having just completed the surveys of the Woodpecker and West Side mines, which he says are excellent properties. The ledge is large, the outcrop being from 20 to 40 feet wide, the ore exceptionally rich; the character being chlorides, malleable silver and argentiferous galena. The vein is a contact between slate and porphyry. The country rock is slate. Sufficient development work has been done to prove the true character of the ledge; one shaft having been sunk to the depth of 80 feet with a good showing of fine grade ore. There is also a 40-foot cut showing 7 feet of free milling ore; at this place the walls are 20 feet apart. Taking the size of the ledge, quality of ore and amount in sight, the Woodpecker has few equals. He believes De Noon is the coming camp, in fact another Tombstone. The Woodpecker is on the same ledge as the Continental group, better known as the Keymer mines, and which have been incorporated in San Francisco. The Keymer is a splendid property. On one of these claims there is a continuous unbroken body of rich ore from the surface to the bottom of the shaft, a depth of 105 feet. There are many other promising properties in the district. A great mining camp at De Noon cannot fail to be a benefit to the entire territory.

A BIG LEDGE.—*Cor. Prescott Courier*, Oct. 16: Standing upon a knoll to the left of Antelope creek, a mile and a half below Stanton's, and looking to the north, I first saw the Veta Madre, the mother section of this section. Running easterly and westerly over the low foothills, losing itself in the mesa at one end and in the higher hills at the other, the mighty reef crested the bright and undulating ground with its bright and sparkling quartz. Walking over to the hill, where the croppings were most prominent, I found the whole summit and northern slope to consist of this huge mass of quartz, the apparent size of the true ledge being greatly increased by its dip to the north. The portion I was on I found to be the patented claim of Mr. E. P. Stanton, and in a tunnel and several cuts run in the vein by him, a better opportunity for judging its true size and character was given than the upper croppings could afford. In this tunnel, a cross-cut, the vein is seen to be split in three sections. The first is about eighteen inches across. Three or four feet of country rock (porphyry) intervene. Then another section of ten or more feet occurs. This is separated by another layer of country rock from the main body of the vein in which the tunnel stops. The total width of the three layers is probably not less than thirty feet, a truly gigantic size for a vein that affords, as I learn from several sources, from fifteen to twenty dollars in free milling gold per ton. Eight inches of gouge lie between the vein and its walls, and several feet of placer gravel cap the vein at the mouth of the tunnel. A large quantity of ore lies at the openings of the cuttings. This is seamed, mottled, oxidized and often honeycombed, and carries traces of copper. Many rich pockets have been discovered in the vein and many hundreds of tons have been profitably extracted. Dennis May, a well known and respected miner in this section, was, with Stanton, an original locator on the ledge, in 1872. Sexton, who then owned the Vulture mine, bought May out for \$10,000, and Stanton afterwards acquired it from Sexton. This vein, though lost to sight after reaching Antelope creek, passes through Rich Hill, and is found again at the head of Weaver creek, where Mr. William Johnson has been working it for many years. Mr. Johnson is one of the many remarkable instances that Arizona affords of untrifling belief in and devotion to a mining career. He has had, moreover, the exceptional good judgment to concentrate his efforts, the result being that his undivided work has opened up a mine in the real sense of the word. Many thousand feet of tunnels, drifts and shafts have developed a tremendous body of ore, low grade, but in a quantity that suggests a bonanza chamber of the Comstock or Silver King. Two adjacent properties, belonging to Mr. Johnson, are rich in gold, and enable him, with his two assistants, to live an independent and comfortable, though solitary life. It is believed by many that this great ledge, generally known as the old Sexton ledge, has, during its many years of disintegration, supplied the whole country round with the gold that is so profusely scattered in its ravines and mesas.

COLORADO.

GOLD AND SILVER KING.—*Georgetown Courier*, Oct. 14: Downie & Newkirk have let a contract to drive the tunnel on this Dumont property. They intend working the property steadily.

ALIUNDE.—The work of sinking the shaft goes steadily forward. Mr. Turck expects to continue active operations all winter.

MENDOTA.—Machinery has been placed over the Shay shaft, which is 200 feet deep, and a contract let to sink it an additional 150 feet, to make connection with the Victoria tunnel. Every working on the mine is in pay.

BALTIMORE.—The property is looking exceedingly well, and continues to output as usual. Several fine streaks of high grade ore are opened on the fifth level.

BISMARCK.—Four parties of lessees are at work on as many streaks of good grade ore, and the 15 men engaged are making over \$4 per day each, notwithstanding the low price of silver. Several millruns from this property were made this week.

STANTON MILL.—The test-runs made by the Stanton Engineering Co. on concentrating ores from several of our mines have convinced the stockholders that the Golden Gate concentrators are the machines for this vicinity at least. The company accordingly

decided last week to fit up the mill for winter work, and to substitute a new 100-ton crushing plant in place of the old stamps, which have proved inadequate.

SEVEN-THIRTY.—The first three days of this month there were shipped from the Seven-Thirty mine to Idaho Springs, 21 tons of ore that averaged over \$200 per ton, after deducting freight and smelting charges; the lot realized nearly \$5000. This ore was from various parts of the mine—the extreme east and west workings being at the present time large producers. Two men in drifting on the 80-foot level east took out ten tons of ore in two weeks. This ore was sold at Idaho Springs on the 3d inst. for \$1523.95, or at the rate of \$380 per week per man. Pretty good pay. A notable characteristic of mining in Clear Creek county during the past year has been the renewed work on long abandoned properties. Many mines that had become fossilized, as it were, have been re-opened, and are now yielding their quota of mineral. This has not been confined to particular districts, but is more noticeable in the sections immediate to Georgetown. In most instances where parties have resumed work on lodes having lain idle for years, the efforts have proven profitable, and the benefits will continue to be felt by the yield in the future. This fact gives evidence of a more stable condition of the mining industry. Democrat mountain mines are holding their own in point of production with other localities in this vicinity. Dumont people contemplate organizing a co-operative mining company to develop the properties in that neighborhood. During the month of September nine cars of ore were shipped from Silver Plume, one going to Denver and five going to Idaho Springs. The remainder was concentrating ore for the Stanton mill in Georgetown.

IDAHO.

ATLANTA.—News comes from Atlanta that the Atlanta Company has concluded to close down its mine and mill for the winter, and that Colonel Pettit, the superintendent, will leave in a few days for Hailey, on his way East to spend the winter. Owing to the pending negotiations for the sale of the Tahoma and Buffalo mine and mill companies' properties to English companies, very little work has been done on those properties this summer, and none whatever will be done upon them this winter—so that the only companies working in Atlanta this winter will be the Jessie Benton and Atlanta Hill, or Last Chance. The former will employ four or five men, and the latter eight to twelve. The total steady working force of Atlanta the coming winter will therefore scarcely exceed 25 men. The outlook for the town the coming winter is therefore worse than for years. Next spring, however, if the sales under way are accomplished, the place will be livelier than before.

THE RED ELEPHANT GROUP.—The last month's yield of first-class ore of the Red Elephant group of mines at Bullion, was marketed in this city yesterday. It consisted of 15½ tons, which, after deducting \$43 per ton for freight, sampling, reduction and hauling to the sampler, yielded an average of \$18.86½ net per ton, or a total of \$1780. The ore carried 123 ounces silver and the usual high percentage of lead. Even on this small shipment the effect of the discount on silver is very noticeable. If silver had been up to the average rate of the past few years, to wit, 113 per ounce, the Red Elephant ore would have brought \$12.30 more per ton, or \$190.65 additional for the 15½ tons.

MORE STAMPS FOR THE GOLD BELT.—Wood River Times, Oct. 17: The tappers, cams, shoes, dies, mortars, etc., for the ten additional stamps of the Camas No. 2 mill came in to-day, and will be hauled out to-morrow by Lufkin's teams to the Gold Belt where the battery blocks are already in place. The new stamps will be ready to start up in two weeks probably.

THE RECENT DISCOVERY.—The recent discovery in Bullwhacker gulch, Deer creek, of a mineral-bearing ridge has again demonstrated the truth of the saying that this region of country has scarcely begun to be prospected. Prospectors and pleasure-seekers have been riding all over the hills in the vicinity of Bolton's Springs, in every direction for years, suspecting, probably, that vast wealth lay beneath them, but unable to find it. At last, two painstaking men begin a systematic prospecting. They pick up a small piece of float, trace it up to whence it came, near the top of the hill, and get to an unpromising boulder, or succession of boulders, coated with white lime. One of these is broken, and behold! glittering galena—the purest kind of "truck"—is seen. A few blows of the pick, and 18 inches of high grade ore is found in place. A location is made, Abbie by name, and the work of uncovering the ledge proceeds with the gratifying sight, within four days, of a vein carrying ore of the thickness stated for a length of 60 feet or more. This discovery naturally caused some excitement, and the hills in Panther, Narrow Gauge and Bullwhacker gulches have since been alive with prospectors. At least a dozen new locations have been made, all of which are very promising, and two of which show a vein of solid galena. Messrs. Sulton and Mahoney intend to try to dig the bottom out of their mine at once, as they do not see any use of trying to put it on dress parade for moneyed men to see. So they have gone right to work, and will endeavor to begin shipping in a few days. So will Mr. Metcalf and his associates; they have a seam of ore, and they will take that out while looking for more. If this discovery holds out as expected, there will be a lively camp at Bolton's Springs next summer, as fully 200 miners will be at work within a radius of five miles.

KETCHUM NOTES.—*Keystone*, Oct. 15: Schad, Grenau & Willard will work the Tiptoe all winter. The Senate company is putting air pipes in its mines at Galena. The Ceresus on Smoky has ceased to ship ore for the winter. It is rumored that work will soon be resumed on the Buzzo group. Among Boulder mines to be worked all winter are the Ophir, Yankee Blade, Belcher and Tiptoe. A new body of ore has been discovered on the Ophir ground. It is five inches of black sulphurets. A great majority of miners at work on the Ramshorn, Postboy and Excelsior were discharged on the 3d instant. J. O. Swift was up Tuesday, attending to matters relative to closing down the Homestake mine and mill. They were closed down for the winter. In addition to the regular monthly bullion shipments from this point, the Vienoa mill and the Custer mill ship bar silver and the Fisher mill gold. Bassett Bros., who re-

cently leased the Star of the Mountain mine of I. J. Lewis, have struck ore and extracted from six to eight tons for shipment, with more in sight. The Rayhorse Smelting Co., it is currently reported, will build a stamp mill to replace their furnaces. A trial lot of their ore at the Custer mill convinced them that the dry process is the best. They lack sufficient lead for smelting. The new works will be built in the spring about two miles up the creek from Rayhorse.

MONTANA.

HELENA DISTRICT.—*Independent*, Oct. 17: The developments so far in this district are very encouraging, and the idea that has heretofore prevailed in Montana in regard to slate formation being no good for mines bids fair to be utterly exploded.

NEW MEXICO.

MAGDALENA.—*Socorro Bulletin*, Oct. 17: The Juana is working and shipping ore. Roseboom is steadily developing his Magdalena claims. Gen. Strickler is shipping ore from Bailey & Ryan's bonanza in Hop canyon. The Graphic is working full night and day shifts, which will be increased in a short time. Wythe Walker is working the Silver Bell, and proposes to ship one carload per week of good grade mineral, commencing in a few days. G. W. Parker, superintendent of the Anchor mine, is in the city. He reports the 150-foot contract in that property has been completed. It presents a very encouraging appearance. The Right Hand Beaver, Left Hand Beaver and Alamosa are undergoing the throes of development. The group is owned by E. Van Patten, and displays large bodies of galena and carbonate ore. The Kelly mine continues to yield sufficient ore daily to run the 180-ton Billing works of this city. The Graphic Mining and Smelting Co. of this city blew in one of its stacks Wednesday night. Mr. W. A. Konegan is the general manager; Professor W. J. Kohler metallurgist.

MISCELLANEOUS.—The Merritt mine is working increased shifts. The Las Vegas and St. L. M. & S. Co. are working steadily in Water canyon. The Carnero and Pajaro are both in full process of exploitation, and are delivering ore to the Brittenstone M. & M. Co.'s mill. The Brittenstone Mining and Milling Co. are showing the greatest diligence in placing their mill in operation. They fired up successfully on Wednesday last. The main shaft in the Silver Glimpse has attained a depth of 235 feet, and work progresses steadily. At that depth a vein of argentiferous galena in crystallized quartz has been encountered. The Santa Teresa, Induigan and other claims in the Socorro district, owned by Hon. F. A. Manzanarres and Don Abeyta Montoya, are showing up increased volume of ore under recent developments.

OREGON.

WINTER OPERATIONS.—*Jacksonville Times*, Oct. 17: Miners are making extensive preparations for next winter's run. Jack Layton has finished cleaning up and is getting ready for winter. Robt. Morris of Louise creek has a good mine which he will operate next season. J. W. Baker has purchased Robt. H. Dean's interest in the Willow Springs mines. A quantity of ore has been sent to Chicks & Co.'s mill in Siskiyou county, Cal., for testing. J. J. Brown is engaged in getting Wm. Bybee's claim on Rogue river in shipshape for winter. A number of prospectors are out looking for quartz ledges in the mountains south and west of Ashland. Henry D. Kubli, who was over from Applegate this year, reports considerable prospecting going on in that section. Sargent Bros. are doing well on Brush creek, in the Steamboat district. They will mine on a more extensive scale than ever next winter. A meeting was held at the town hall this week to consider Geo. H. Chick's proposition to put his mill here. No definite arrangements were made, but maybe hereafter. John O'Brien has bought several hundred feet of hydraulic pipe of Hays & Magruder, which he intends using in the Steamboat district. He has men employed in cleaning out his old ditch. Kinney & Lind have several tons of ore on their dump in the Evans Creek district which is very promising. Their claims continue to improve as work progresses. There are several other good ledges in the same region. The project of putting up a quartz mill at Medford has been abandoned, and Mr. Chicks proposes putting it up in this vicinity, if he can get enough inducements. A mill would be of vast benefit to Jacksonville in more ways than one. Marshal Curtis, who went to Josephine county last week on a prospecting tour, has returned. He informs us that he located a promising placer mine on Fall creek, a tributary of Jump-off-Joe, and has men engaged in thoroughly prospecting it. What this section needs more than anything else is a first-class quartz mill to work the ores of the ledges already discovered, many of which will pay well. Everything possible should be done to get one, for there is no calculating the benefit it will be. There is no doubt but what we have good quartz in Jackson and Josephine counties; but we must prove it before we can expect any amount of foreign capital to be invested here.

UTAH.

THE CHRISTY COMPANY.—*Southern Utah Times*, Oct. 10: Work is being pushed rapidly in the New Shaft, and the mine will be put in working condition as soon as possible. There has been several hundred tons of ore piled up on the California dump since the mill shut down. Within the past week an important strike was made in this mine. In running the drift north on the ledge, from the winze below the fifth level, the ore streak opened out to a width of five feet, a sample of which assayed 141 ounces per ton. The drift that cuts this ore body is 117 feet lower than the deepest working on the Buckeye Reef, and speaks well for the permanency of the Silver Reef mines. The Stormont Company produced \$18,300 worth of silver bullion last month. The mill crushed an average of 40 tons per day last week; the Savage & Buckeye furnishing 37 tons per day, while the balance was custom ore. The following shipments of ore were made to the River mill last week, by chlorides: Couch & Knowlton, 10 tons of ore from the Thompson; Ed. Lochney, 10 tons from the Bonanza; Smith & Jarmin, 10 tons from the old Lamb & Steele on the East Reef, the pulp assay of which was 76 ounces per ton.

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION

Of the City and County of San Francisco.



PREMIUMS AWARDED.

SAN FRANCISCO TOOL COMPANY

WERE AWARDED AT MECHANICS' FAIR, 1885,

GRAND SILVER MEDAL.....BEST DISPLAY OF TOOLS.
 SILVER MEDAL.....BEST ENGINE LATHE.
 SILVER MEDAL.....BEST DRILL PRESS.
 GRAND BRONZE MEDAL.....CENTRIFUGAL PUMP.
 BRONZE MEDAL.....HIGH SPEED ENGINE.
 BRONZE MEDAL.....BEST SHAPER.
 DIPLOMA.....BEST SHAFT COUPLING.
 DIPLOMA.....BEST CHECK AND FOOT VALVES.
 DIPLOMA.....SACK ELEVATOR.

AND AT SACRAMENTO STATE FAIR:

FIRST PREMIUM.....ENGINE AND PUMP COMBINED.
 FIRST PREMIUM.....TURBINE WATER WHEEL.
 SILVER MEDAL.....LOFTUS PATENT VALVE.
 SILVER MEDAL.....SINGLE-ACTING ENGINE.
 DIPLOMA.....SACK ELEVATOR.

CORRESPONDENCE SOLICITED.

SAN FRANCISCO TOOL CO., First and Stevenson Sts., San Francisco.

GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD,

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentages of result.

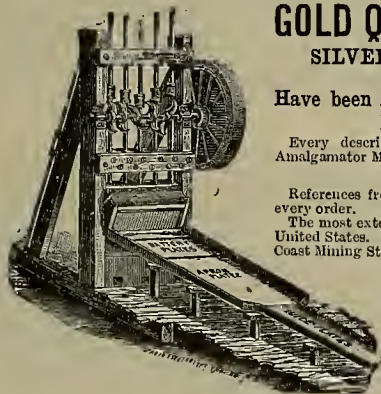
SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND

NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal.

E. G. DENNISTON, Prop'r.



H. N. COOK,

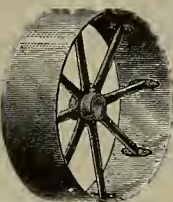
Manufacturer of

LEATHER BELTING and LACING.

OAK-TANNED, SHORT-LAP BELTING.

Awarded GRAND SILVER MEDAL for Best Exhibit of Leather Belting, Hose, Raw Hide, etc., of California Make.

SPECIALTY: HEAVY DRIVING BELTS.

Order direct from the manufacturer for perfect guarantee and lowest prices. Correspondence solicited.
 Send for Catalogue. 405 MARKET ST., Cor. Fremont, SAN FRANCISCO.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street - SAN FRANCISCO, CAL.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, San Francisco, Cal.

IRON CASTINGS OF ALL DESCRIPTIONS.

A. T. DEWEY,
W. B. EWER,
GEO. H. STROGO.

Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding homastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

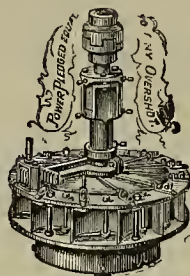
JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address



JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

For Best Slide Valve Engine

and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street,

SAN FRANCISCO.

AUTOMATIC

ENGINES

A Specialty.



HORSE POWERS, WINDMILLS, TANKS and all kinds of Pumping Machinery built to order. Awarded First Premium for Windmills at Mechanics' Fair, 1885.

F. W. KROGH & CO.,

51 Beale St., San Francisco.

RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Springs. Worn with perfect comfort night and day. Give universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDDER, (Druggist) 701 Market Street, over Third, San Francisco.



WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

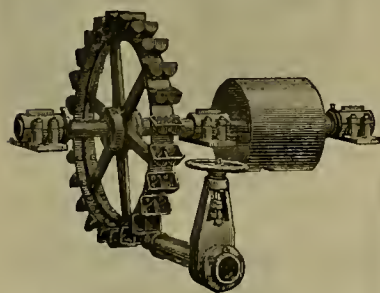
WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent, distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

**MACHINE TOOLS,
PRESSES AND DIES,
PUNCHING and SHEARING
MACHINERY.**

F. A. ROBBINS,

....MANUFACTURES OF....

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

**N. W. SPAULDING
SAW COMPANY**

Manufacturers of
SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Cata-
logue. 17 and 19 Fremont St., San Francisco.

INVENTORS. MODEL MAKER,
L. PETERSON,
258 Market St., N. E. cor Front, up-stairs, S. F. Experiment-
machinery and all kinds of models, tin, copper and brass.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'fg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's
Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

DEWEY & CO.'S

Scientific Press



Patent Agency.

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old
experienced, first-class Agency. We have able and trustworthy Associates and Agents in Wash-
ington and the capital cities of the principal nations of the world. In connection with our edi-
torial, scientific and Patent Law Library, and record of original cases in our office, we have
other advantages far beyond those which can be offered home inventors by other agencies. The
information accumulated through long and careful practice before the Office, and the frequent
examination of Patents already granted, for the purpose of determining the patentability of
inventions brought before us, enables us often to give advice which will save inventors the
expense of applying for Patents upon inventions which are not new. Circulars of advice sent
free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.
A. T. DEWEY. W. B. EWER. GEO. H. STRONG,

Metallurgy and Ores.

**SELBY
SMELTING and LEAD CO.,**

416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for
**GOLD, SILVER and LEAD ORES
AND SULPHURETS.**

....MANUFACTURERS OF....

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.Special attention paid to Examinations
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.

Location of Works: Melrose, Alameda Co., Cal.

OFFICE: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 up-
ward per ton; Jewelers' sweepings and scrapings bought
or worked for the owners at a fixed rate per ton. Rebell-
ious ores especially solicited. Ores worked and practical
working tests made by any process, to wit: Amalgama-
tion in battery and copperplates for free gold ores.
Amalgamation in pans for silver and gold ores, with or
without roasting. Leaching of silver ores. Chlorination
of gold sulphurets. Assaying, Chemical Analyses of Ores,
Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO, - - CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL.

H. KUSTEL.

METALLURGICAL WORKS,
318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.

Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.

Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

118 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING OCTOBER 13, 1885.

- 327,983.—CAN OPENER—I. N. Arment, Dayton, W. T.
 327,998.—PAPER CUTTER AND STAMP—Albert Brown, Mendocino, Cal.
 328,187.—WINDMILL HEAD—Jas. T. Cinnick, Elk Grove, Cal.
 328,114.—DOOR OPERATING DEVICE—Julius Finck, S. F.
 328,030.—ELECTRIC BOLT RELEASING DEVICE—G. L. Henzel, S. F.
 328,240.—SHAVING MUG—Thos. Maylor, Oak Harbor, W. T.
 328,136.—WASHING MACHINE—W. C. Nelson, Santa Rosa, Cal.
 328,138.—WEIGHING DELIVERY WAGON—S. Park, Oakland, Cal.
 328,164.—SAW—H. W. Wheeler, S. F.
 328,167.—PIPE WRENCH—R. E. Williams, Modesto, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

POUNDING AND WASHING MACHINE.—Wm. C. Nelson, Santa Rosa, No. 328,136. Dated Oct. 13, 1885. This device for pounding and washing clothes consists of a vessel open at the upper end, having elastic arms secured to each side and extending to some distance above the top, their upper ends inclining outwardly, and having flexible cords uniting and drawing them together, and a means for suspending the handle of a pounder centrally over the open top of the vessel, so that it may be forced down by hand to strike upon the contents of the vessel, and it will be raised by the elasticity of the arms. The pounder has also a number of perforations and a valve within it.

DOOR OPENING DEVICE. Julius Finck, S. F., assignor to Will & Finck, No. 328,114. Dated Oct. 13, 1885. This invention relates to that class of devices or mechanism used for operating doors from a distance, and it consists in a spring tending to open the door, and a spring tending to close it, both being preferably used in connection with a device for pushing back or releasing the door-latch. In many houses it is customary to provide means by which, when a summons is heard from the front door, the latch is released from a distant portion of the house; but it is obvious that the device is to a certain extent incomplete, from the fact that with many doors so svenly hung as to remain on the portion set, the mere pushing back of the latch will not notify the person outside that the door is ready to be opened. The object of the present invention is to produce a spring which will, when the latch is released, throw the door open; and as on many doors there are closing springs, it is necessary that the opening spring shall be of such a nature that, while performing its own functions, it will not interfere with that of the closing spring.

Mining Share Market.

While "indications" continue good at important points on the Comstock, the mining share market here languishes because the indications have so far led to no special rich development. The prospect on the 3100 level of the Hale & Norcross is considered of promise and merit. There is one there, but they want to find it more concentrated. The Virginia Enterprise in this connection says: "One thing is very evident, which is that the ore indications and actual developments in those lowest levels of the Comstock are far better than they have been for the last six months or more, and in fact fully as good as preceded the finding of the richly productive bonanzas of the Crown Point and Consolidated Virginia, at the south and north ends of the great lode. All who have lived through the the wonderful changes and booms of the past on this slope of old Mt Davidson will agree in saying that 'it is foolish for any one to say that because the rich ore indications have not thus far materialized or concentrated into a genuine old-time bonanza, there is nothing to be found in those lowest levels. The experience of the past teaches that there is no limit to the possibilities of the Comstock.'"

Bullion Shipments.

Germany, 13, \$9327; Utah, 13, \$2357; Hanauer, 13, \$9000; Stormont, 13, \$3150; Queen of the Hills, 13, \$3720; Honerline, 14, \$5153; Hanauer, 14, \$2900; Crescent, 14, \$3700; Vienna, 15, \$1890; Hanauer, 17, \$5615; Germany, 17, \$5216; Ontario, 17, \$29,507; Hanauer, 18, \$2710; Queen of the Hills, 18, \$1810; Blue Jacket, 13, \$6000; Lexington, 13, \$35,320; Alice, 13, \$17,600. The total silver bar shipments from Butte, M. T., for the week ending 17th aggregate over \$100,000. The Salt Lake ore and bullion output for last week was twenty-six cars, 624,542 pounds; thirty-seven cars ore, 994,320 pounds, and one car copper ore, 26,400 pounds.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes S M Co.	Nevada.	27.	25. Sept. 3. Oct. 8.	Oct. 23. B. Burris.	309 Montgomery St.
Chollar M Co.	Nevada.	13.	20. Oct. 21. Nov. 21.	Dec. 16. C. E. Elliott.	309 Montgomery St.
Del Norte M Co.	California.	1.	20. Oct. 8. Nov. 14.	Dec. 7. J. B. Cronan.	230 Montgomery St.
Excelsior M Co.	Nevada.	22.	20. Aug. 31. Oct. 7.	Oct. 29. C. E. Elliott.	309 Montgomery St.
Excelsior Water & M Co.	California.	8.	1.00. Sept. 23. Oct. 24.	Nov. 12. W. G. Stewart.	215 Sansome St.
Equitable Tunnel M Co.	Utah.	32.	1.00. Aug. 3. Nov. 15.	Dec. 1. G. J. Collins.	512 Montgomery St.
Golden Fleece M Co.	California.	2.	30. Aug. 31. Oct. 14.	Oct. 31. F. Schumacher.	Phelan Block
Hale & Norcross M Co.	Nevada.	87.	50. Oct. 8. Nov. 12.	Dec. 3. J. F. Lightner.	309 Montgomery St.
Holmes M Co.	Nevada.	10.	1.00. Sept. 23. Nov. 2.	Nov. 27. C. T. Bridge.	224 California St.
Johnson Gravel M Co.	California.	2.	05. Sept. 3. Oct. 15.	Nov. 20. G. White.	318 Front St.
Mexican G & S M Co.	Nevada.	39.	25. Sept. 21. Oct. 27.	Nov. 18. C. E. Elliott.	309 Montgomery St.
Martin White M Co.	Nevada.	20.	25. Aug. 22. Oct. 7.	Nov. 4. J. J. Seville.	309 Montgomery St.
Mountain Tunnel G M Co.	California.	1.	10. Sept. 23. Nov. 2.	Nov. 20. A. B. Paul Jr.	328 Montgomery St.
Navajo M Co.	Nevada.	12.	30. Aug. 31. Oct. 5.	Oct. 27. J. W. Pew.	310 Pine St.
Potosi M Co.	Nevada.	20.	40. Sept. 28. Nov. 4.	Nov. 25. C. E. Elliott.	309 Montgomery St.
Savage M Co.	Nevada.	64.	50. Oct. 5. Nov. 9.	Nov. 30. E. Holmes.	309 Montgomery St.
Sierra Nevada S M Co.	Nevada.	83.	25. Sept. 30. Nov. 4.	Nov. 24. E. L. Parker.	309 Montgomery St.
Sulphur Bunk Q M Co.	California.	4.	50. Aug. 29. Oct. 9.	Dec. 3. T. Wint ingham.	336 California St.
Tuolumne Co.	California.	1.	05. Sept. 15. Nov. 15.	Dec. 15. H. J. Hyland.	309 Montgomery St.
Union Con M Co.	Nevada.	1.	25. Sept. 14. Oct. 19.	Nov. 9. J. M. Huntington.	309 California St.
Virginia Creek M Co.	California.	2.	10. Sept. 1. Oct. 15.	Nov. 6. J. M. Quay.	406 Montgomery St.
Willow Creek M Co.	Nevada.	2.	1.00. Oct. 12. Nov. 16.	Dec. 14. R. E. El on.	310 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Cou Amador M Co.	California.	F. B. Latbam.	327 Pine St.	Annual.	Nov. 2
Contention Con M Co.	Arizona.	D. C. Bates.	309 Montgomery St.	Annual.	Oct. 26
General Lee M Co.	Nevada.	C. E. Gillett.	328 Montgomery St.	Annual.	Nov. 3
Happy Valley Hyd M Co.	California.	D. M. Kent.	330 Pine St.	Annual.	Oct. 24
Plum Creek M Co.	Nevada.	J. J. O'Connell.	420 California St.	Annual.	Oct. 26
Summers Con M Co.	Nevada.	S. Gardner.	330 Pine St.	Annual.	Oct. 27

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Jackson M Co.	California.	D. C. Bates.	327 Pine St.	10.	Oct. 5
Kosuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	25.	Mar. 16
Maubattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept. 1
Mt Diablo M Co.	Nevada.	R. W. Heath.	313 Pine St.	20.	July 30
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	25.	Feb. 13
Plymouth Con G M Co.	California.	W. Van Norden, Pres.	22 Nassau St. N. Y.	50.	Apr. 6
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Oct. 5
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Sept. 8

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 1.	WEEK ENDING Oct. 8.	WEEK ENDING Oct. 15.	WEEK ENDING Oct. 22.
Alpha.	1.15	1.27	1.15	1.20
Alta.	1.15	1.27	1.15	1.20
Andes.	1.05	1.25	1.10	1.20
Argenta.	1.05	1.25	1.10	1.20
Belcher.	1.05	1.25	1.10	1.20
Belding.	1.05	1.25	1.10	1.20
Best & Belcher.	1.35	1.60	1.25	1.30
Bullion.	1.35	1.60	1.25	1.30
Bonanza King.	1.35	1.60	1.25	1.30
Belle Isle.	1.05	1.25	1.10	1.20
Bodie Con.	1.05	1.25	1.10	1.20
Bentley.	1.05	1.25	1.10	1.20
Bodie Tunnel.	1.05	1.25	1.10	1.20
Bulwer.	1.05	1.25	1.10	1.20
California.	1.35	1.60	1.25	1.30
Challenge.	1.15	1.27	1.15	1.20
Champion.	1.15	1.27	1.15	1.20
Chollar.	1.15	1.27	1.15	1.20
Consolidated.	1.05	1.25	1.10	1.20
Con. Imperial.	1.05	1.25	1.10	1.20
Con. Virginia.	1.35	1.60	1.25	1.30
Con. Pacific.	1.05	1.25	1.10	1.20
Crown Point.	1.05	1.25	1.10	1.20
Day.	1.05	1.25	1.10	1.20
Eureka Con.	1.05	1.25	1.10	1.20
Eureka Tunnel.	1.05	1.25	1.10	1.20
Excelsior.	1.05	1.25	1.10	1.20
Grand Prize.	1.05	1.25	1.10	1.20
Gravel & Curry.	1.05	1.25	1.10	1.20
Goodsbaw.	1.05	1.25	1.10	1.20
Hale & Norcross.	4.50	5.37	4.30	4.90
Holmes.	4.50	5.37	4.30	4.90
Independence.	4.50	5.37	4.30	4.90
Julia.	1.05	1.25	1.10	1.20
Justice.	1.05	1.25	1.10	1.20
Martin White.	1.05	1.25	1.10	1.20
Mono.	1.45	1.60	1.30	1.40
Mexican.	1.35	1.60	1.25	1.30
Mt. Diablo.	1.05	1.25	1.10	1.20
Northern Belle.	1.05	1.25	1.10	1.20
Navajo.	1.05	1.25	1.10	1.20
North Belle Isle.	1.05	1.25	1.10	1.20
Occidental.	1.05	1.25	1.10	1.20
Opbir.	1.05	1.25	1.10	1.20
Overman.	1.05	1.25	1.10	1.20
Potosi.	1.05	1.25	1.10	1.20
Practical Con.	1.05	1.25	1.10	1.20
Savage.	1.05	1.25	1.10	1.20
Seg. Belcher.	1.05	1.25	1.10	1.20
Sierra Nevada.	1.05	1.25	1.10	1.20
Silver Hill.	1.05	1.25	1.10	1.20
Silver King.	1.05	1.25	1.10	1.20
Scorpion.	1.05	1.25	1.10	1.20
Syndicate.	1.05	1.25	1.10	1.20
Tioga.	1.05	1.25	1.10	1.20
Union Con.	1.05	1.25	1.10	1.20
Utah.	1.05	1.25	1.10	1.20
Yellow Jacket.	1.75	2.00	1.70	1.95

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 22.	50 Mexican.	80c
250 Alta.	1.25	4.50
100 S. & B. E. B.	1.25	4.00
150 Bodie Con.	2.75	360
100 Belcher.	1.70	300
100 Bulwer.	50c	500
300 Con Va & Cal.	1.25	1.50
300 Chollar.	1.05	150
50 Confidence.	1.00	300
50 Champion.	1.00	150
200 Gould & Curry.	.95c	100
200 Hale & Nor.	3.80	100
100 Yellow Jacket.	2.00	2.00

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Oct. 22, 1885.		
ANTIMONY—Per pound.	12	@
BALLET'S.	12	@
COOKSON'S.	13	@
BORAX—Refined.	62	@
IRON—Glengarnock ton.	24	@
EGHTON, ton.	22	@
American Soft, ton.	24	@
Oregon Pig, ton.	23	@
Clippin Gap, Nos. 1 & 4.	23	@
Clay Lane White.	24	@
Shot, 20 lb.	24	@
STEEL—English, lb.	16	@
Black Diamond, ordinary sizes.	13	@
Flow.	13	@
Sanderson Bros.	13	@

COPPER—		
Braziers sizes.	20	@
Fine box sheels.	20	@
Bolt.	20	@
Yellow Metal.	12	@
Ingot.	13	@
LEAD—Pig.	42	@
Pipe.	40	@
Sheet.	40	@
Shot, discount 10% on 500 bag.	8	@
Buck, 7 lb.	2	@
Chilled, do.	2	@
TINPLATE—Coke.	5	@
Charcoal.	6	@
ZINC—German.	9	@
Sheet, 7 lb. 7 to 10 lb. less the cask.	20	@
QUICKSILVER—By the flask.	30	@
Flasks, new.	1	@
Flasks, old.	85	@

MECHANICS' MILLS.

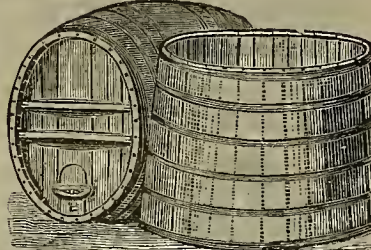


Water Tanks. Wine Tanks.

Our well-known TANKS are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

WELLS, RUSSELL & CO.,
 Proprietors Mechanics' Mills
 Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS! CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,
 30 to 40 Spear St., - San Francisco.
 ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

American Exchange Hotel, SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50
 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

CATARRH CURED

A wonderful medicine. Instantaneous and lasting in its effects. Convenient of application. One bottle will cure any case. Ask your druggist for it, and if he does not keep it, order from the undersigned, who will forward it, post-paid, to any address, on receipt of \$1.00. If not found as represented the money will be refunded.

Pacific Electric Co.
 Sole Proprietors
 330 Sutter Street
 San Francisco, Cal.

SAN FRANCISCO CREMATION CO.

[INCORPORATED SEPT. 5, 1885.]
CAPITAL STOCK, \$25,000, divided into 500 shares of the par value of \$50 each.

217 Shares Have Been Taken.

The remaining shares are now offered for sale and may be subscribed for at the office of GENERAL H. A. COBB, 321 Montgomery St., where further particulars may be obtained; also at the office of the Secretary, 103 Battery St. By order of the Board of Directors.

HEALD'S BUSINESS COLLEGE,
 24 Post St. S. F.
 Send for Circular.

Complimentary Samples.

Persons receiving this paper are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

POSITIVE fact! Muller is the leading optician, 135 Montgomery street, near Bush.

ASSESSMENT NOTICE.

Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley, Nevada county, Cal. NOTICE is hereby given, that a meeting of the Directors, held on the 17th day of September, 1885, an Assessment (No. 12) of Five (5) Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 934 and 936 Mission street, San Francisco, Cal. Any stock upon which this Assessment shall remain unpaid on the second day of November, 1885, will be delinquent, and advertised for sale in public auction; and unless payment is made before, will be sold on Monday the twenty-third day of November, 1885, to pay the Delinquent Assessment, together with costs of advertising and expenses of sale.

GEORGE P. THURSTON, Secretary.
 OFFICE—934 and 936 Mission St., San Francisco, Cal.

THE CELEBRATED

Woodbury Oils.

Pure, Perfect, Uniform!

The WOODBURY OILS are in use on the Central and Southern Pacific Railways, and on nearly every railroad and steamship line on the coast. We are not agents for other manufacturers, but have our own works, and adapt here all our Oils to the requirements of home machinery and our climate. We can show recommendations and records of tests, showing a saving to our customers of 50 per cent on their lubrication last year. Address

CHARLES J. WOODBURY,
 123 California St., San Francisco.

WORKS: Cor. Fifth and Townsend Sts.

METALLURGIST.

A Graduate of the Mining School of Clausthal, with some experience on this coast in Assaying, Amalgamating, and general metallurgical work, is desirous of employment in Milling or Smelting. Speaks English, German, French, and Spanish, and will go to Mexico, South America or elsewhere. Address

ROBT. F. LETTS, Mining Engineer,
 328 Montgomery St., San Francisco.

VALUABLE CHROMIC IRON MINE.

Within 2 miles of Railroad.

Thousands of Tons on Surface.
 CAPITAL WANTED TO DEVELOP.
 Half share as equivalent, or will send outright. Address
G. W. SPAWFOORD, Lang Station, Cal.

THE JENKINS STANDARD PACKING



THOMSON AND EVANS, STEAM PUMPS.

The Best and Cheapest,
Most Economical and Reliable
FOR ALL PURPOSES.

COMPOUND PUMPS, DUPLEX PUMPS, DOUBLE-ACTING
DEEP WELL PUMPS, ETC.

C. H. Evans Machine Works,

Successor to THOMSON & EVANS.

110 and 112 BEALE ST., SAN FRANCISCO, CAL.

SEND FOR CATALOGUE.

THE PACIFIC COAST ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE 40 NEVADA BLOCK

WORKS AT UNION IRON WORKS.

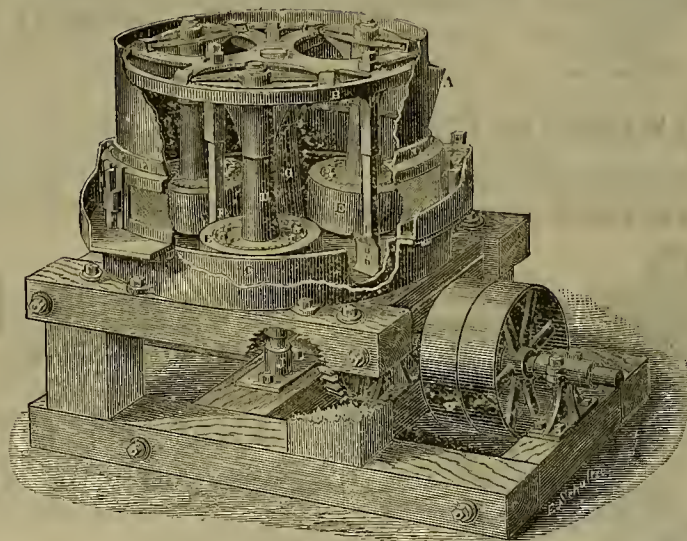
San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. **THE BEST LIGHT FOR MILLS AND MINES.**

SEND FOR CIRCULARS GIVING FULL INFORMATION.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

.....MANUFACTURED BY.....

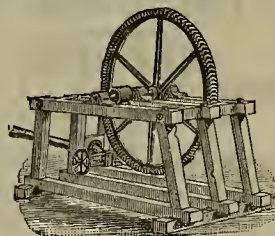
F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ill.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

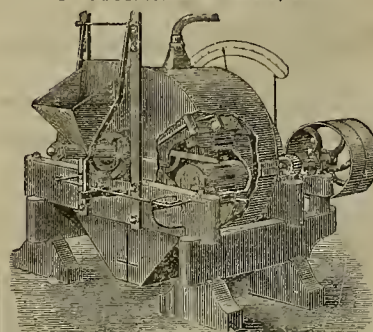
EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

Tustin's Pulverizer WORKS ORE WET OR DRY.

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINOKLY, SPIERS & HAYES,

FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,

ROOM 43,

NO. 2 WALL ST.

PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

Denver Office:
No. 248
15th Street,
Denver,
Colo.

Mexico Office:
No. 11
Calle de San Francisco,
Mexico.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made.

WINSOR HOUSE, KELSEY HOUSE,

S. W. Cor. 9th and Washington Sts.,

Two Blocks from Cars.

OAKLAND, CAL.

FIRST-CLASS HOTEL.

Transient and Regular Boarders.

C. C. WHEELER,
Proprietor.

Cor. Telegraph Ave. and 24th St.,

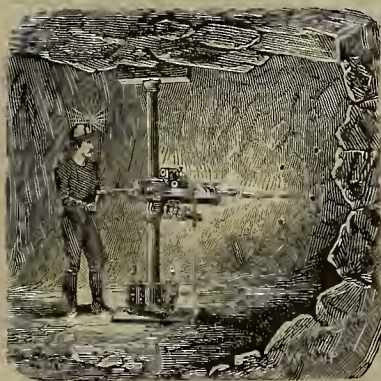
OAKLAND, CAL.

Four Cottages. Large Grounds.

Low Rates to Families by the Month.

C. C. WHEELER,
Proprietor.

The Kelsey House and Cottages are situated on large and beautiful grounds. The Billiard and Reading-Rooms have been handsomely fitted up for ladies and gentlemen. In close proximity is the Perry Seminary for young ladies, the Sackett School, the Misses Field's Home School for Young Ladies, California Military Academy, Hopkins Academy, Pagoda Hill Kindergarten, and many other schools. Cars pass the house every seven minutes from Broadway Station to State University. Ten minutes from Broadway and forty minutes from San Francisco. Special rates to regular boarders and families. Telephone communications to local points free.
P. S.—Correspondence invited from tourists; also from families in the interior having children whom it is desirable to have educated in the best of schools.



INGERSOLL ROCK DRILLS

AND...
AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

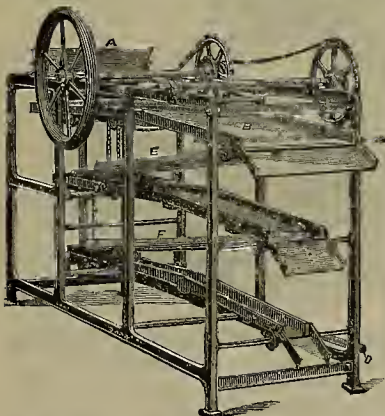
BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. **TATUM & BOWEN, San Francisco and Portland, Agents.**
Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of
all kinds of
Chemical Stoneware

—FOR—
Manufacturing
Chemists.
Also Chemical Brick
for Glover Tower.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flat from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires. Plow Steel, Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

Geo. W. Prescott, President.
Irving M. Scott, Gen'l Manager.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. Dickie, Manager.
J. O'B. Gunn, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

—BUILDERS OF—

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine).
Orders Promptly Executed.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

The most Complete Compound
manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid
and Alkali-Proof.



Property Owners are interested
personally

In seeing that their roofs are painted or
repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing
and Preserving Canvas, Rope, and
Leather.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.

Iron and Machine Works.

H. OMAS THOMPSON

THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

—BUILDER OF—

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery
constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt
Metal Castings, Brass Ship Work of all kinds, Spikes,
Sheeting Nails, Rubber Braces, Hinges, Ship and Steam-
boat Bolts and Gongs of superior tone. All kinds of Cocks
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-
plings and Connections of all sizes and patterns, furnished
with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post
street, where students have all the advantages of elegant
buildings, new furniture, first-class facilities, and a full corps
of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Even-
ing Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN & ROBINSON, Prop'rs.

ANNOUNCEMENT.

The Clayton Air Compressor
Works, of Brooklyn, have opened
an office at No. 43 Dey Street, New
York, for the sale of the Clayton Im-
proved Air Compressors, Rock Drills
Mine Pumps, Hoisting Engines,
Rock Crushers, Blasting Batteries,
Wire, Fuse, and Mining Machinery
in General. For Catalogue—August
1885—estimates and general in-
formation call upon or address,
Clayton Air Compressor Works,
Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a
New Illustrated Catalogue and Price List. Every
Mine Manager and Engineer should have a copy for
reference, for none can afford to be without the in-
formation there given concerning the unsurpassed
Clayton Air Compressors and other Machinery.

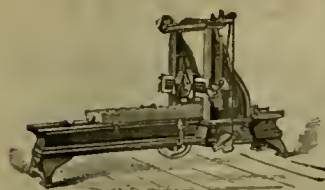


252 MARKET ST. S. F.
ELEVATOR 12 FRONT ST. S. F.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

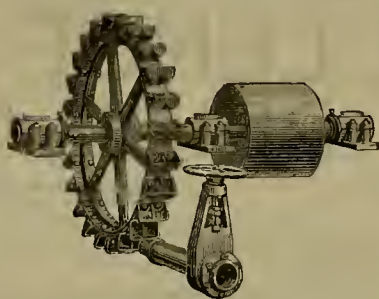
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turbulent Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ling Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

WIRE FENCING Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.



1850.

1885.

RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
embracing machinery of LATEST DESIGN and
MOST IMPROVED construction. We offer our cus-
tomers the BEST RESULTS OF 35 YEARS' EX-
PERIENCE in this SPECIAL LINE of work, and
are PREPARED to furnish from SAN FRAN-
CISCO or CHICAGO, the MOST APPROVED
character of MINING AND REDUCTION MA-
CHINERY, adapted to all grades of ores and SU-
PERIOR to that of any other make, at the LOWEST
POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-
LIVER in COMPLETE RUNNING ORDER,
in any locality, MILLS, CONCENTRATION
WORKS, WATER JACKET SMELTING
FURNACES, HOISTING WORKS, PUMP-
ING MACHINERY, ETC., ETC., of any DE-
SIRE CAPACITY.

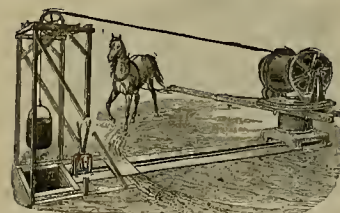
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
ores of NEW and ORIGINAL DESIGNS, covered
by LETTERS PATENT. No other Furnace CAN
COMPARE with these for DURABILITY, and in
CAPACITY for uninterrupted work. MORE
THAN 150 of them are now RUNNING in various
parts of THIS COUNTRY, as well as many in
FOREIGN COUNTRIES, giving results NEVER
BEFORE ATTAINED as regards CONTINUOUS
running, ECONOMY of fuel, AMOUNT and QUAL-
ITY of BULLION produced. These CLAIMS have
been PROVEN BY RESULTS in ANY NUM-
BER of INSTANCES, and the GREAT SUPE-
RIORITY of this SYSTEM of smelting ores DE-
MONSTRATED BEYOND QUESTION. COM-
PLETE PLANTS furnished to order of any CA-
PACITY, with ALL IMPROVEMENTS that ex-
perience has DEMONSTRATED as VALUABLE
in this class of work.



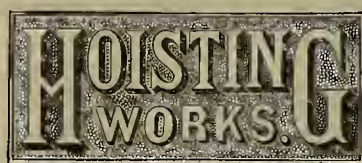
Beyond question the cheapest and
most effective machine of the kind
now in use adapted to all grades and
classes of ores.

This machine has been THOROUGHLY TESTED
for the past TWO YEARS, under a GREAT VA-
RIETY of CONDITIONS, giving most EXTRA-
ORDINARY results FAR IN ADVANCE of
anything EVER BEFORE REALIZED. A re-
cent COMPETITIVE TEST at the Carlisle Mine in
Mexico, showed an ADVANTAGE OF OVER 30
PER CENT in favor of THE DUNCAN. The
amount SAVED OVER THE TRUE being suffi-
cient to PAY THE ENTIRE COST of the ma-
chines EVERY MONTH OF THE YEAR. One
of its MOST VALUABLE features is as an AMAL-
GAMATOR. It saves all THE AMALGAM GOLD
and SILVER that ESCAPES the BATTERIES,
PANS or SETTLERS, making the machine worth
MORE than ITS COST for THIS PURPOSE
ALONE.

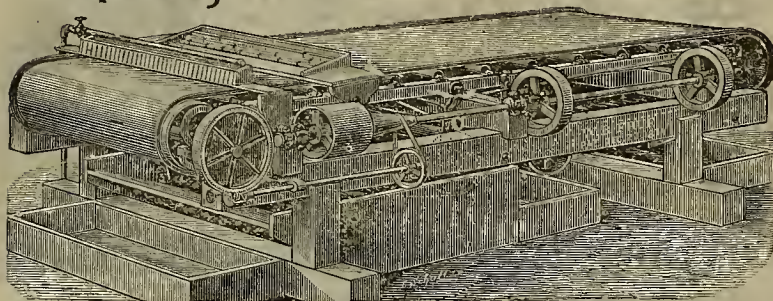


Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist
and affording means for the continuous operation of a
Pump or Blower, without interfering with a hoisting ap-
paratus. It is made entirely of iron, no piece weighs
over 200 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

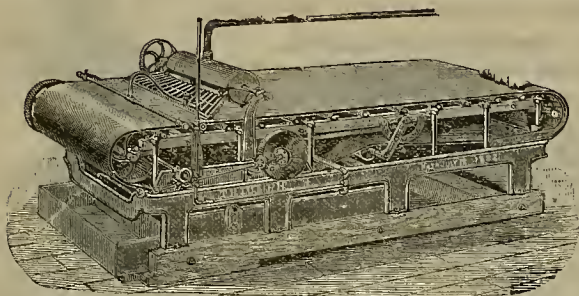
Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED

**PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.**

THE "TRIUMPH" TRIUMPHANT!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test, which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

JOSHUA HENDY MACHINE WORKS,

Nos. 49 and 51 Fremont Street,

San Francisco, Cal.

— DEALERS IN —

NEW AND SECOND HAND BOILERS, ENGINES, AND MACHINERY OF EVERY VARIETY.



PULLEY.

Stationary,
Portable, and
Hoisting Engines
and Boilers.

Improved Single and Double
Circular Sawmills.
SHINGLE MILLS.

Steam Pumps of all Makes.
Centrifugal Pumps.
MINING PUMPS.

BLOWERS
— AND —
Exhaust Fans.
Leather and Rubber

BELTING.



UPRIGHT ENGINE AND BOILER.

MACHINISTS' TOOLS

— COMPRISING —

LATHES,

DRILL PRESSES,

PLANERS, Etc.

WOODWORKING

MACHINERY

— COMPRISING —

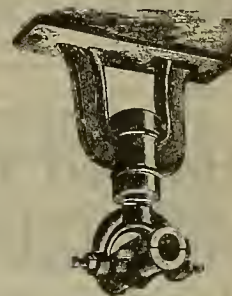
Band-Saws,

Stickers,

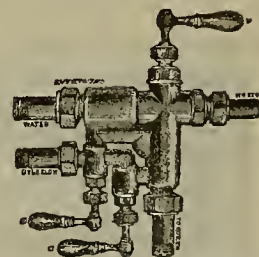
Planers,

Shapers,

Etc., Etc.

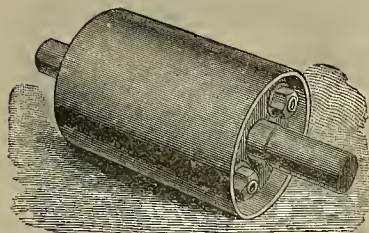


HANGER.



DUPLEX INJECTOR.

PATENT COUPLING.



MINING, QUARTZ, AND SAWMILL MACHINERY.

AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.

— AGENTS FOR THE SALE OF —

Baker Rotary Pressure Blowers, Akron (Ohio) Hot-Polished Shafting,

Wilbraham Rotary Piston Pumps, Blaisdell & Co.'s Machinists' Tools.

MICA MINE.

Capital Wanted to Develop.

Half Share offered as equivalent.

ADDRESS

G. W. SPAWFORTH, Lang Station, Cal.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tanned Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBES & CO.

611 and 613 Front St., San Francisco.

AN EXPERIENCED ASSAYER,

Speaking Spanish Fluently,

Desires an Engagement.

Address A. R., this Office,

California Inventors

Should consult DEWEY & CO. AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circular of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RAILROAD PRESS, No. 252 Market St., S. F. Elevator, 12 Front St.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 31, 1885.

VOLUME LI
Number 18.

The Russell Furnace.

At West Point, Calaveras county, in this State, Mr. Russell, of the Russell Reduction and Mining Company, has erected a plant of about 10 tons capacity, which, we are informed, has been doing successful work. The roasting is done in a peculiar furnace, and after roasting the ores can be amalgamated in a pan or by chlorination. Some results of the work are given in the letter of a correspondent in another column in this number of the Press.

We give engravings of the Russell furnace on this page. In the furnace at West Point there are eight chambers, our drawing showing but five of them. The length is 50 feet, width 8 feet and height 6 feet. The inside diameter of each chamber is two feet one inch. The sectional view given shows the end of the chambers where they open into the heat passage.

The furnace was recently patented. It is peculiarly constructed with a number of chambers placed transversely across the heat passage. The ends of the chambers are open at each side of the furnace, as shown in the diagrams, with openings on top of the chamber to regulate the amount of oxygen for roasting ores. The ores in each chamber are heated by radiation, so that the gases from the burning fuel do not come in contact with the roasting ores. While these deleterious gases are excluded, the oxygen from the air is admitted from the outside. This gives complete control over the ores, and the length of time for roasting is shorter than in ordinary furnaces. The advantages claimed for the furnace are as follows:

1st. Base ores may be oxidized in this furnace that would slag in those of ordinary form, where the gases from the burning fuel come in direct contact with the ores while roasting.

2d. The combustion chamber, as shown, equalizes and stores heat, saves fuel, burns the gases from the fuel and also from the roasting ore. The gases are drawn off from the ores in the chambers as fast as said gases are evolved.

3d. The process of oxidizing bases goes on, with the gases being constantly drawn off (and none others admitted) until the bases are oxidized thoroughly and the precious metals are free to amalgamate, or chlorination may follow if preferred.

4th. In operating a furnace the workmen are free from the deleterious fumes of arsenic, sulphur, etc., etc., while attending to their duties in roasting.

5th. The roasting ores do not come in contact with the strong current of air in the heat passage from the fire, and the loss of fine gold or silver is very small.

At West Point, where the furnace is in operation, the ores are base. At or near the surface the gold was free, the sulphurets being decomposed; but on reaching the water level the ores became so hard to work that the mines were generally abandoned. Since this furnace was put up there has been a general revival in the district, so we are informed.

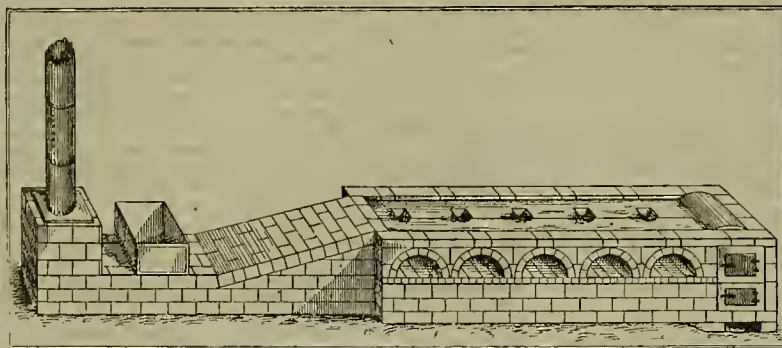
A DISPATCH from Fresno says: H. Dutertre, representing a syndicate of San Francisco mining capitalists, has concluded the purchase of a group of mines on the Harlow lode, in Mt. Raymond district, in the northern part of this county. The price paid was \$40,000. The mines are known as base metal, carrying silver and lead. The ore works as high as 67 ounces of silver and 30 per cent of lead per ton.

Mining Affairs in New Mexico.

We had a conversation this week with Mr. James A. Shedd, an assayer, from Santa Fe, New Mexico. He does not speak very encouragingly of mining affairs generally in the Territory, saying that the Mexican land grant system has been a great hindrance to prospecting. When he went to Santa Fe, three years ago, there were seven assayers. Now there are none, and what work of this kind is done is performed at the Brothers College. There is not much doing around Santa Fe. At Cerillos, 24 miles distant, there are many "gopher hole" claims that they ask a good price for. The Cash Entry is one of the few good mines. The ore in the region is very rebellious. Konemann has put up a large concentrator at the Cash Entry, and it is considered very successful. He has also



END VIEW OF RUSSELL FURNACE.



THE RUSSELL ROASTING FURNACE.

started a plant at Socorro, to which place he sends the concentrates.

There are not many new men coming into the country. Capital is badly needed. There is no use in prospecting on the land grants which cover so large an area, especially the "fraudulent grants." The people who own them keep others off. Lake Valley and Socorro are doing very well in mining matters. Around Santa Fe, however, the country is much broken up in the foothills, and there does not seem any certainty of finding continuations of the leads. Some assays Mr. Shedd has made have run high, but not very much of the rich ore was found. He has assayed very rich ore from Southern New Mexico, but there was no telling how much there was of it.

To illustrate how irregular the deposits are, he states that he tested ore brought in by a Mexican which was said to yield a white metal, presumably silver. On analysis it was found to be tin, and analyses made by others verified it. The percentage of tin was large. But the deposit petered right out when worked like others of the precious metals in that vicinity.

The first shipment of gold bullion from the Lapanta mine, near Hawthorne, was made to San Francisco last week. It was a little bar worth \$3,099.92. This is not bad for so new a discovery, and in fact, may safely be considered a pretty good starter.

Local Whaling Interests.

San Francisco is now one of the most important "whaling ports" in the United States. There has always been more or less whale-fishing carried on at the stations along the coast, the product of which was marketed in this city, and this port has been an outfitting station for some few whaling vessels. But in the past few years the whaling fleet which is outfitted here has grown very materially. A number of the vessels are now owned here, among them the steam-whalers, the best of the fleet. The Arctic Whaling Company have built large tanks for their oil on the bay shore, and the product is all handled here. The whalers that formerly outfitted at the Hawaiian Islands now come to this port. Oakland creek is now a favorite wintering place for the Arctic whaling fleet. Some of

Inaccuracies in Mining Surveys.

The case of St. Lawrence and Richmond Mining Companies vs. the Albion Con. M. Co., involving the right of the latter to proceed with its application for patent for the claim known as Albion No. 1, at Eureka, Nev., has been under consideration by the Secretary of the Interior. This application was filed as long ago as July, 1878, and stayed by the adverse claim of the St. Lawrence. Suit was duly commenced and is still pending. No adverse claim was filed by the Richmond, and its objection is based on a patent filed in May, 1881, alleging that the stakes to mark the claim, as surveyed, do not correctly bound the tract or the ground, but includes a small portion of the patented ground of the Tip-top mine, belonging to the Richmond Co.

The Land Office declared in April, 1883, that the protest was sufficient to authorize a hearing before the local office as to the fact of discrepancy; but later in the same month that ruling was modified and the protest dismissed, on the ground that further examination did not disclose a *prima facie* showing of conflict, and the allegation was not sufficiently clear to justify such order for hearing.

From this modified ruling the Richmond Company appealed to the Secretary of the Interior. In his decision he states that it is only necessary to suggest in disposing of this question, without deciding as to the status of the company as a proper contestant on such an issue, that it is a matter of ordinary administration relating to the question of possible error in the survey, and may be corrected by proper examination through the office of the Surveyor-General if any inaccuracy shall be discovered. In other words, the decision is to the effect that inaccuracies in surveys of mining claims may be investigated through the office of the Surveyor-General—not by a hearing.

MINERAL RESOURCES OF THE UNITED STATES. This valuable publication of the U. S. Geological Survey for 1883 and 1884—the report of the Division of Mining Statistics—has not yet been issued. The summary of production by statistics was given to the newspapers in June, and the entire report was stereotyped in August, but the Government printing office is evidently not to be hurried. These publications are not scattered broadcast among members of Congress, but may be purchased by any one desiring them. The price is 60 cents, which should be sent to the Director of the U. S. Geological Survey, at Washington, D. C. The last report, by Albert Williams, Jr., was one of the most useful Government publications ever issued, and this one will doubtless be even fuller of information concerning the mineral resources of the country. It is too bad that the publication is so long delayed.

MINING PATENTS.—Information has been received at the office of the Surveyor-General in this city that patents to the following mining claims in this State have been issued: No. 10,161, Columbus quartz lode claim; No. 10,162, Rochester quartz lode claim; No. 10,163, Aena ledge quartz claim; No. 10,187, Boudurant quartz lode claim.

ARTICLES have been filed incorporating the Portland Metallurgical Works, with a capital of \$30,000, to build and operate smelting works in that city.

the vessels leave here every fall to go to "the line" fishing and then work up to the Arctic when the ice breaks up, returning here with their cargoes. The high price of bone of late has made the business very profitable.

The bulk of the oil is re-shipped from here to the East, most of it going around Cape Horn in vessels. Of late, however, the railroad company has placed the freight rates at such a point that oil is shipped East by rail. One day last week the first shipment of whale oil for the season was sent from here. There were 17 carloads, or 460,000 pounds of oil. The train was a special one and it was intended to make the unusual time of 12 days to New Bedford, Mass., the destination of the consignment. No transfers were to be made. The whaling business of this port is now very important. There is a great deal of money invested in it. The steam whalers were some of them built here. The business is one which adds greatly to San Francisco's industrial importance.

CONSIDERABLE prospecting is being done on the west side of Mount Davidson. Float quartz carrying free gold is found in many places, and many locations have been made. Some of the rock exhibited is very good.

THE National Museum at the Smithsonian Institution, Washington, is overcrowded, and a new building is needed.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eps.

Hassayampa District.

EDITORS PRESS:—This district lies south of Prescott, in Yavapai county, and embraces the best wooded and watered portions of the Sierra Prieta ranges. The ores of this district are a free gold quartz on the surface which usually changes into sulphurets and a high percentage of silver as depth is reached.

This part of Yavapai county has produced more gold than all the rest of the Territory put together. The great richness of some of the deposits found here is something phenomenal.

Quantities of chlorides and sulphide ranging from \$5000 to \$25,000 per ton have been taken from this and adjoining district of Weaver, and ores assaying \$500 to \$1000 per ton are of common occurrence.

The rich placer mines of Governor Tritel, Secretary Van Arnam, "Old G. izleys," are in this district, and all have been successfully worked this year.

Over \$1,000,000 have been taken out of the gold mines of Weaver district, which bounds Hassayampa on the west, and the Marcus mine of Weaver is to-day being very profitably worked.

Montgomery Group.

Among the quartz mines of Hassayampa district, none have maintained a better reputation, if as good, than the Montgomery.

Discovered several years ago, by Chas. Genung and others, it was worked for four years under great disadvantages. Neither the Southern Pacific or Atlantic and Pacific railroads were built, and supplies had to be hauled about 200 miles. As high as \$1.75 cents per pound had to be paid for sugar, bacon, flour, and other materials for the mines in the same proportion.

The owners were poor men, and all the funds for development of the property were taken from this mine, which aggregated \$50,000. Owing to a disagreement among the owners of this property, work of important character was suspended until 18 months ago, when new owners took possession, and work since then has almost continuously been prosecuted.

There have been three extensions located, and work on each, as on the original mine clearly shows three distinct ledges.

One new 200-foot tunnel has been run in one of the ledges, the vein being from six inches to two feet, which reveal large bodies of ore that averages to assay \$200 to this ton, and careful assays on the entire ledge assays \$12.

There seems to be an almost inexhaustible quantity of free milling ore. Some estimate it at millions of tons of pay ore, and this property now bids fair to rival the Marens, Antelope Creek and Rich Hill of the Weaver district.

Besides a number of the territorial officers and of the army who had recently invested their means in the vicinity of the Montgomery mines, capitalists, through them, from Kansas and Ohio and New York have visited various properties within five to ten miles and invested in the Montgomery group.

A splendid belt of good pine lumber commences within one and a half miles of these mines and stretches for twelve miles north. A good road can, with but little expense, be built from this timber to the mines and the Hassayampa creek, where splendid mill sites are on the property.

Water for nearly eight months in the year can be secured in the creek for milling purposes, and if wells were dug for the entire year.

Work on other mines on the Hassayampa this season is showing good bodies of ore, shipments from which have been made to Pueblo, Colorado, and the returns are highly satisfactory to the owners. I will make reference to some of them in a future communication. G. W. I.

South Hassayampa, Sept. 20, 1885.

West Point, Calaveras County, Ores.

EDITORS PRESS:—During a recent visit to West Point I had occasion to examine some of the so-called "rebellious mines" of that district.

The district was discovered in early days by Mexican "Cambusinos," and worked by them in their peculiar style—steel bar, horn spoon, hatea and arastra being their implements for retracting and reducing the ore; and the burro or mule, their means of transportation. The English ton of 2000 pounds is unknown to them. The "carga" of 300 pounds makes a load. They assort their ore to \$10 the "carga," and 300 "cargas" make a "grind"; with the results the Mexican is happy until his money is gone. West Point was his happy, happy home, and he still remains—or what there is left of him—gray headed and gray headed, master of the situation.

To the average American this district has been and is a "terra incognita"—owing to the supposed difficulty of treating the ores and he has let it severely alone. The Mexican previous to his advent exhausted the free or decomposed ores for 30 feet in depth to the water level, the ores became sulphureted and "baso" and the

free gold coated, so that it would not easily amalgamate. So he, the American, hunted free ores.

The Metalliferous Domain

Of this district comprises an area of some 30 miles, and is composed of feldspathic granite, greenstone trap (diorite) and metamorphic slates. The veins are of quartz, and from three inches to four feet in width. They lie in groups of from 3 to 8, a short distance apart, and parallel with each other coursing N 15 W. The pay chutes are long but not continuous, as their dikes, varying from several inches to as many feet frequently cross the veins, but do not disturb, throw them or change the character of their mineral contents. They were evidently formed subsequent to the filling of the vein fissures. They serve as dams, and effectually bar the passage of the water, as a shaft can be sunk and pumped dry a few feet from a point where a dike crosses a vein, and water can be obtained by sinking on the other side, a few feet in depth. Each individual group, regardless of the formation, seems to be governed by a law of its own. In one, tellurides predominate as a base, another—grey copper ore (a fahlerz,) another—mispickel, (arseniferous) and another a simple sulphuret of iron, all, however, carrying an unusually large percentage of gold—seldom less than \$100 per ton, ranging to \$500 (the concentrated stuff). The sulphurets often occur massive with little or no gangue. During my examination of the mines referred to, I noted some points of marked interest to the miner, and will note them for his benefit.

My tests were taken in this usual way, from all parts of the mine in from 50 to 100 samples—53 in all, which I granulated and reduced by halving and quartering, etc., to three feet, two-thirds of which I pulverized—one-third for assay and one-third for horn spoon tests; one-third of granulated ore for a working test.

My results of one of the samples of a highly sulphureted ore from below the water level were as follows: The pulp when washed in a horn spoon yielded in free gold \$75 per ton. This I put in a horn spoon with quicksilver, and found that I could only amalgamate two-thirds of the remainder though bright, and to all appearances would not amalgamate. One-third ground in a pan and amalgamated yielded \$45. This fire assay value of this pulp was \$225 per ton.

I then took a portion of the same pulp and roasted it on a tile in the open air until I obtained a dead roast. My result washed in a horn spoon was \$196.50 per ton, but this gold would not amalgamate, or but a very small portion of it, showing that it was coated by some substance.

I related the circumstance to Mr. E. F. Russell, of the Russell furnace, whom I met at West Point. He said that he would like me to try his small portable furnace similar to the one he was using on a large scale at his works. I assented and he sent me one and some bricks. I soon had it in working order. I roasted a portion of the same pulp washed it in a horn and obtained at the rate of \$220 per ton, the gold with a slight tribulation in the spoon with quicksilver amalgamated instantly.

Many years of experience has taught me "to go slow" on new and untried processes, mills and patent inventions, but my experience with the Russell furnace on these ores has so much interested me that I would like to see it tested on a few hundred tons of "rebellious ore." Mr. Russell claims the furnace will work telluric ores with good results. If so he has solved a problem that will greatly benefit the gold mining interest in California, as many of our ores carry tellurides which hitherto has been a dead loss to the miner—the gold with the tellurium volatilizing with ordinary furnace.

I. H. CROSSMAN.

WATER RIGHTS AND CONTRACTORS.—A decision has been rendered in Department 2 of the Supreme Court, which involves a nice point of law in regard to water rights and the obligations of contractors in mining districts. In November, 1883, the Sierra Union Water and Mining Company brought suit against G. F. Baker in the Superior Court of Sierra county, to recover a judgment in \$16,000, claimed to be due for water supplied according to contract for that season. The contract was originally made between Morgan and Donahue and the defendant, and stipulated to carry the water of Trainor ditch and all its tributaries, together with the "tail water," from Table Rock township to Sawmill ravine, in Sierra county, for his use at the Pioneer mine, for \$16,000 a year. Morgan and Donahue subsequently transferred this part of the contract to the plaintiff, who failed to comply with its condition, and commenced suit on failure to collect the \$16,000 of the defendant. The plaintiff argued that it was not compelled by law to run the "tail water," of Table Rock township into Trainor ditch, as specifically set forth in the contract, so long as the natural bed of Trainor ditch was above the level of the "tail waters." The Court held that the letter of the contract must be obeyed, and rendered a judgment of \$800 and the costs of the suit in favor of the defendant. The Supreme Court has affirmed the judgment of the lower Court.

A LOAD OF ORE, in Grass Valley district, is about two tons minus two or three hundred pounds. The word ton ought to be adhered to by our miners and millmen. A "load" is too much like "the size of a lump of chalk."—*Foot-hill Tidings.*

Sulphurets and Sulphuret Sharps.

A correspondent of the Tuolumne Independent says: The great unknown quantity in gold quartz mines, is the value of the sulphurets, and the number of companies who have been ruined by them, is very large. They are often fair to look upon, but as often prove deceptive—

"Like Dead Sea fruits that tempt the eye,
But turn to ashes on the lips."

They are of many kinds and colors. Some are docile, some are rebellious. The sulphurets found in gold quartz mines are chemical compounds of sulphur, with iron, lead, zinc, copper, arsenic and antimony. The common pyrites, or sulphurets, are composed of iron and sulphur. Galena is composed of lead and sulphur. Zinc blende, or black jack, is zinc and sulphur, with a little iron and lead, generally. The brassy looking pyrites, which are technically called chalcopryite, are composed of iron, copper and sulphur; and, other kinds of sulphurets, are composed of one or more of the metals mentioned above, and sulphur.

When much lead, zinc, arsenic and antimony are present, the sulphurets are called base or refractory, and are very troublesome, requiring roasting, as a preliminary step, and the use of chemicals in the subsequent grinding processes. The gold which occurs in sulphurets, is held there mechanically, and is not chemically combined, like the other elements, and is held just the same as the gold in the quartz, with the exception that sulphuret gold is smaller and lighter. It can be set free from the pyritic matter containing it, either by dissolving the pyrites with acids, or, in the chlorination process, by chlorine gas, which dissolves the gold, or by roasting or burning them, thus driving off all the sulphur, arsenic, antimony or zinc, that may be present, and brightening the gold and leaving it in a good condition to amalgamate in pans or arastras; or, lastly, by grinding the sulphurets raw, in pans or arastras, with quicksilver. Which one of these processes any mine needs, has to be determined by the value per ton of the sulphurets, and by their docility or their rebelliousness.

Some mines produce sulphurets which yield their gold when worked raw, by a grinding process; others hold the gold closer, and require chemicals, or else roasting. The problem is, how to get the most net profit out of them; for, while the chemical processes yield a better percentage of the assay value per ton, they are so expensive that they will not pay as much profit as the cheaper processes, which do not yield as high a percentage of the assay value, and the tendency of the times is now toward the cheaper, or grinding processes. In cases where they are base, a preliminary roasting is necessary.

Pyrites, or sulphurets, are spotted, just as quartz is. Some are rich, some are poor, in the same ore, and no eye can tell rich from poor; and, any one who pretends to do so, either deceives himself, or is a humbug. "A man may smile and smile, and yet be a villain;" and so can the bright shining sulphurets be of no value, or the dark, gloomy ores be rich. The only way to test them is by fire assay, or by roasting them and panning out; and here is where many people are deceived, for they are inclined to think their sulphurets all alike, and if one chute or chimney of ore contains rich sulphurets, all their other chutes are likewise rich, which may or may not be the case, and it can be laid down as a rule, the sulphurets want as careful prospecting as the quartz, before any correct idea of their value can be found.

About as uncertain as the sulphurets themselves, and often as stubborn and rebellious, is the sulphuret sharp—the man who has a process or processes to get more gold out of sulphurets than is in them. He is a man with a hobby, and often with a crank, as well, and is always finding some wonderful process which turns out to be sound, proved, tried and everything but true or useful. Processes which look well on paper, or work well on a small scale, fail when tried commercially or practically. They are sound in theory, but ruinous when used practically. Every few years a new sharp finds the true process, and the mining world goes mad over the man who has found the great secret, but somehow or other he fizzles out, and we all go back to first principles, until another new sulphuret meteor flashes across our horizon, and then we all are agog with renewed excitement until he flashes out of sight again.

Simplicity and cheap handling of sulphurets is what we are tending to, and the simple processes, which do not yield as high a percentage of the assay value of the sulphurets, yield a better net profit to the miners than the costlier processes, which save a larger percentage of gold. The sooner the whole matter is robbed of the air of mystery that surrounds it the better. To hear one of these deeply, darkly mysterious sulphuret men talk, reminds one of the days of alchemy, and carries us back down the centuries, to the age of superstition—to the time of magic elixirs of life, and the philosopher's stone, and the humbuggery of the ancient magicians. Let us look at mining in the full daylight of modern science and practical business, and have no more humbug mystery, worthy only the dark ages and the childhood of mining. Let us return to the blanket-sluice for a concentrator, and work the blanket tailings in a pan or arastra, raw, if they are docile, or roast them, as a preliminary, if they are base, and be content with the result; for by

striving to get the last cent out of the sulphurets we lose rather than gain. The great army of concentrator and sulphuret sharps, who have afflicted this coast, have caused the loss of millions of dollars with their new-fangled plans and experiments, and want to be sent to pot to await the coming of their brothers—the mischievous, gay, deceiving patent quartz mill men—who are now reaping the harvest of the mining greenhorns, which the concentrator and sulphuret men used to look on as theirs. Ruin follows in the wake of all these mining humbogs, and almost every quartz mill, from San Diego to Alaska, shows some of the marks of these new processes and machines which generally get more gold out of the miner's pocket than out of the sulphurets.

THE BANKERS AND SILVER.—In terse and most expressive language the Chicago Current says: "The Chicago (bankers') convention was Belshazzar's feast." We believe that is true. A band of men who do not represent anything but the aggression and soullessness of aggregated capital, met there and prescribed rules through which the millions of producers in this country might be placed under perpetual tribute to them, and the interest-bearing debt of the nation might be made perpetual. So bungling, too, was they work, that their purpose shows plainly through the cracks in the structure which their upreared. The people will not accept their edicts for many reasons. They represented, intellectually, a low order of men. They treated their own theories as established facts, and supported them with false testimony. They indulged in prophecies which had no mors divinity in them than a Mormon elder. They tried to take advantage of their own wrongs to gain sympathy for their designs from the country. They painted pictures which left the impression that the five per cent of foreign trade which this country enjoys, is of more importance than the 95 per cent of domestic trade. They spoke from a position on the seashore with their eyes longingly straining toward foreign lands, with their backs turned to their own country and its real interests. The majority of them have no conception of the place which their country occupies among the nations, and a stranger, listening to them, would have thought that this Republic, if not confined to Wall street, was certainly indebted to Wall street for its license to do business. When that convention laid down its plan to cure existing evils by striking a death blow to the ruling industry of a great section of the country—an industry, by the way, more necessary than any other—they revealed plainly the fact that even if their motives were good they lacked the intelligence necessary to give their motives dignity or to command respect. We believe it will prove a Belshazzar's feast to them indeed, for the offense people read of their proceedings this more indignant their grow. We believe that when Congress meets the battle-cry will be, "Free coinage of silver," and "Precisely such laws governing silver as govern gold."—*Salt Lake Tribune.*

NEW GOLD SAVING MACHINE.—A newly-invented gold-washing machine is now being used at some of the placers along the Arkansas river, between Granite and Salida, which is said to produce phenomenal success. This machine is described as follows by the Denver Journal of Commerce: The machine is composed of three sections, about 8 feet in length, overlaying each other at the lower end, 16 inches wide and 10 inches in depth. There are three gratings, one at the end of each section, made of three-eighths inch half-round iron, beveled at almost a point at the top, and with 25 one-sixteenth inch openings in width, through which the water carries the sand into the pockets underneath and following the gratings. There are 12 pockets in each section, with openings or plugs, which allow the withdrawal of any or all of the different pockets. These pockets are of light sheet-iron, 15 inches long, placed almost on a level with the bottom of the section, with an opening of an inch or more, and the double flange that creates a rotating current of water, carrying off the surplus sand and leaving the gold within an inside pocket or at its bottom. The sand is carried by the water to the top of the next grate to the following 12 pockets of the second and third sections. The process is so perfect and the fine gold so surely saved that it is very seldom that they clean up the pockets of the last section. They claim that the first four or five pockets of the first section will save at least 90 per cent of the gold. The cleaning up is done by a miniature machine of the same description, containing six pockets, and without the use of quicksilver, it being placed within the flume at any point. The inventor of the above described machine is E. W. Stouffer, who, last spring, started a small assay office in Redding, in this State.

THE YUKON COUNTRY.—A dispatch from Victoria, B. C., says: The steamer Idaho arrived from Alaska to-day, and brings the following additional news: Frank Dunsinuir and Joe Hughes, Yukon prospectors, have arrived at Juneau from the Yukon country. They made down the Yukon river 600 miles and then up the Salmon river 425 miles to its headwaters. They found very good diggings on the bars. They left 20 men in that country who are going to remain all winter. Some are in Yukon, some on White river and some on the Salmon river. All are making from \$7 to \$8 a day to a man on the bars.

Silver or Gold.

"Advocates of the free and unlimited coinage of silver," says the *Denver Times*, "will find a strong argument in the table of statistics given below, which is taken from the report of the United States silver commission. The table gives the names and the populations of the countries which use the single silver, the double and the single gold standards. Here they are:

SILVER STANDARD.		Population.
Russia.....	4,500,000	76,000,000
Austria.....	3,600,000	36,000,000
Egypt.....	1,000,000	4,500,000
Mexico.....	2,000,000	8,000,000
Central America.....	2,000,000	2,000,000
Benalor.....	1,000,000	1,000,000
Peru.....	3,400,000	3,400,000
China.....	400,000,000	400,000,000
British India.....	237,141,450	237,141,450
Total.....		705,911,450
DOUBLE STANDARD.		
Greece.....	1,400,000	1,400,000
Romania.....	4,000,000	4,000,000
Colombia.....	2,000,000	2,000,000
Venezuela.....	1,600,000	1,600,000
Chile.....	1,000,000	1,000,000
Paraguay.....	400,000	400,000
Paraguay.....	1,200,000	1,200,000
Japan.....	33,000,000	33,000,000
Holland.....	3,700,000	3,700,000
France.....	36,000,000	36,000,000
Belgium.....	5,100,000	5,100,000
Switzerland.....	2,500,000	2,500,000
Italy.....	26,800,000	26,800,000
Spain.....	16,400,000	16,400,000
United States.....	50,000,000	50,000,000
Total.....		157,300,000
GOLD STANDARD.		
Great Britain.....	32,000,000	32,000,000
Canada, Cape of Good Hope and Australian colonies.....	7,000,000	7,000,000
Germany.....	42,000,000	42,000,000
Norway.....	1,780,000	1,780,000
Sweden.....	4,300,000	4,300,000
Total.....		87,080,000

"These tables show conclusively," continues the *Times*, "the popularity of silver as a coin, and stand out strongly in support of the representation that silver is the money of the masses. The facts are worth studying. The aggregate population of the countries mentioned in the table is about one billion, of which fewer than 100,000 million, or less than one-tenth, use gold exclusively as money. Less than one-fifth use both gold and silver, while three-fourths use silver exclusively as their standard of value and medium of exchange. Furthermore, the figures plainly demonstrate the tendency of silver to crowd gold out of circulation, and especially is this true in the old and most densely populated countries. The three countries of largest population on the globe, China, India and Russia, are all represented in the list of countries which employ the silver standard. From this table there is a gradual tapering through the list to the gold standard table in which only two countries of considerable population are represented, these being Germany and Great Britain, with a combined population of 74,000,000 people. Even in these two countries small silver coins are used. The point of the whole exhibit is that silver is rapidly pushing to the front as the money of the people."

Con. California and Virginia.

On the first of November a year ago the two most famous bullion-producing mines on the Comstock, and in the United States—the California and Con. Virginia—were consolidated in one company, called the Consolidated California and Virginia. This consolidation was effected from motives of economy, in saving salaries of double sets of offices, etc. Most people have an idea that these mines are producing nothing at all, but they are mistaken. During the last 11 months—since the consolidation—\$610,463 have been produced from the ore extracted. Superintendent W. H. Patton reports to the President of the company that between Nov. 1, 1884 and Oct. 1, 1885, there have been extracted from the old 1200 and 1300 levels, under the terms of the Jones lease, 13,487,855 2000 tons of ore, all of which has been milled—yielding bullion of the assay value of \$310,109.69—of which \$134,939.12 was in gold and \$175,170.57 was in silver, being at the rate of \$16.77 per ton. According to the terms of the contract the Con. California and Virginia company has received, at the rate of 50 cents a ton, the sum of \$9,243.71 as royalty on the whole quantity of ore extracted and milled.

There have been extracted by the company itself on its own account during the same period of time from the 1750 level 20,442 tons of ore, of which 19,677 30 2000 tons have been milled, producing \$330,354.28 in bullion, of which \$223,995.78 was gold and \$106,358.50 silver, the average yield being \$16 78.8 per ton.

The northwest drift on the 1750 level in the California mine has been extended to a point 580 feet from the main west drift, reaching the old California north stopes. A large portion of the low-grade ore which has been extracted from the mine during the past year has come from these old stopes, this part of the mine having been drained and cooled off so as to enable them to carry on the work of extraction at a much less expense than in former times. In March last a drift was started from the main west drift in a southwesterly direction, and it has been extended to the old Consolidated Vir-

ginia south stopes. They here found, on cutting into the old workings, that fire and gas still existed, but by careful management some low-grade ore has been taken out from this part of the mine, and more may be extracted in the future.

In January last, in accordance with a resolution passed by the Board of Trustees, all work was suspended below the 2000 level, and the machinery and material were removed from the various drifts and winzes, and the pumping machinery on the surface was stopped. At this date, October 1st, the water is up to the 2000 level, and is rising at the rate of about two feet per week.

To show where the money comes from and where it goes to in running a big mine like this, the following statement of receipts and disbursements of the company from Nov. 1st, 1884, to Oct. 1st, 1885, are given:

Cash on hand brought from Consolidated Virginia Co's account.....	\$ 1,008 35
RECEIPTS.	
Salaries and wages.....	12,517 70
Mine supplies—	
Wood.....	\$ 513 00
Timber and lumber.....	14,470 37
Ice.....	217 25
Oils and lubricants.....	73 50
Candles.....	298 40
Powder, caps and fuse.....	74 75
Iron and hardware.....	1,796 65
Pipe and fittings.....	2,221 77
Drill fittings.....	626 51
Miscellaneous supplies.....	3,425 52
Transportation and hauling.....	23,426 72
Hoisting.....	209 00
Compressed air furnished to adjoining mines.....	167 20
Assay office expense.....	3,193 19
Assaying.....	1,016 10
Bullion melting.....	466 32
Net proceeds of bars of bullion from blue sweepings.....	1,037 50
Team expense.....	3,110 92
Office expense.....	622 17
Sutro tunnel royalty.....	1,505 30
Mine royalty.....	18,487 44
Superintendent's drafts Nos. 2 to 93, inclusive.....	9,243 71
	310,085 02
	\$385,067 78
DISBURSEMENTS.	
Salaries and wages.....	\$106,040 43
Mine supplies—	
Wood.....	\$30,450 00
Timber and lumber.....	29,571 72
Ice.....	3,853 63
Oils and lubricants.....	2,280 00
Candles.....	2,369 00
Powder, caps and fuse.....	3,481 75
Iron and hardware.....	2,905 63
Pipe fittings.....	1,544 34
Drill fittings.....	554 75
Miscellaneous.....	4,849 37
Water rent.....	56,860 10
Transportation and hauling.....	6,000 00
Hoisting.....	911 55
Surveying.....	315 20
Compressed air furnished by adjoining mines.....	10 00
Labor and supplies.....	5,700 50
Team expense.....	6,721 71
Office expense.....	818 47
Legal expense.....	1,806 94
Reduction of ore.....	497 49
Sutro tunnel royalty.....	137,739 10
Taxes on net proceeds.....	29,206 71
Interest.....	421 86
Exchange on Superintendent's draft, amt., \$225,350.....	11 70
Balance cash on hand.....	1,116 75
	1,229 18
Total.....	\$385,067 78

THE MINES OF NEVADA COUNTY.—Bodie, some six or eight years ago, was a town of 6000 inhabitants and it boomed. It had rich mines and the shares of its mines sold at the stock boards of San Francisco. Bodie has now a population of 500. This reminds us to say that Grass Valley, which is a mining town, has never gone back since the day it was founded. Grass Valley is not a county seat, but has had to depend on her own bottom. She was a quartz-mining town from the start, her gravel mining never amounting to anything. Mining excitement have sprung up all over the coast and mining cities have been built up which were larger and made much more fuss in the world than Grass Valley, but this town kept ahead slowly but surely, and has to-day a larger population than she ever had at any other day. And Grass Valley has the mines to keep the population and to increase. It is true that this place has fruits and trees, and can grow grasses and forage crops, and can have the best of garden truck grown right within her borders, yet without her mines she would only give occupation to some dozen or two of families. It is a still further illustration of the excellence of the mines of this region when it is a fact that four miles away there is another town almost as large as is Grass Valley, and that, too, depends mostly upon its quartz mines for permanency. That other town is Nevada City and it has the county seat business, which is some help to it, but the county business alone would not make it have necessarily more than 10 or 12 people. The two largest gold mining towns in the world are in Nevada county, California, and they are only four miles apart, and they are both growing and not decreasing. Yet both towns have growlers who are every day predicting that this part of the country is going right straight to the "demonition bow-wow."—*Foothill Tidings*.

SMALL MINES BUSY.—There has been more quiet, systematic development going on among mines, so far as number go, during this season than at any time in the history of Eureka county. While it is true that some of our largest and best properties have been—well, almost idle, the owners of small mines have been busy.—*Eureka Sentinel*.

Draining Wet Shafts.

Innumerable instances are on record in this district, says the *Leadville Herald*, of the errors made by mining men in attempting to drain wet shafts. Frequently when new shafts and workings or old mines are to be drained, a great flow of water is encountered and the pumps employed are run up to an unreasonable and unsafe speed. In nine out of every ten such cases the machinery will give way under the strain and great expense in repairs and loss of time are sure to follow.

The porphyritic rocks of this district are quite porous, and contain a great deal of water. To drain the accumulated water of this rock it is far more practical to proceed in a steady, sure manner, than with undue haste. The permeability of the rock is not very great and consequently, after the workings have been drained, the flow will continue for some time to an extent that precludes economical working, and nothing is gained by hasty work.

The opinion that much of the water encountered in the deeper shafts about Leadville comes from caves and fissures is entirely erroneous, but that such a belief exists among the miners is proved in the frequently repeated statement that a lake of water has been encountered.

It is true that occasional channels are encountered underground, carrying streams of considerable magnitude, but if followed up they dwindle down and soon prove to the observer that they are fed entirely by drippings from pores in the rock along their course. The interstices and pores of the Leadville porphyry are capable of holding more water than one who has not observed this characteristic of the rock would believe. The permeability of the porphyry varies largely, and where in one section the surrounding country is comparatively drained in a short time, in another it will take two and three times as long.

That the bulk of the water encountered in the Leadville mines is stored in the minute openings and pores of the rock is demonstrated by the past experience of the wet mines of the district. For six months or a year the flow of a wet shaft continues almost unaltered; after that time a gradual decrease is noticeable, until finally the minimum is attained and the flow is regular, being influenced only by capillary action.

Two years ago large pumps in the Wolfstone, Brookland, Clontarf and Big Chief shafts, failed to keep the mines in this portion of the hill sufficiently free of water to permit their steady operation. Months of pumping has, however, liberated the hill of its accumulation of water, and now less than two pumps control the entire flow. And it is safe to say that within two years one pump will be able to do the work which four failed to accomplish in the early days of these mines.

ANOTHER OLD MINE.—Peter Woolcock, of Mill City, recently returned from Denver, Colorado, where he went with a carload of ore from the Sheba mine, in Star district, Nev. The ore assayed over 800 ounces of silver to the ton, and yet the Sheba mine, which produced it, has been lying idle for years, Mr. Woolcock being the only person who would risk what money was necessary to get it in working order.

At Manchester, England, a meeting of the delegates of the various miners' associations throughout Great Britain was held, when a resolution was adopted approving the demand of the miners for an advance of 15 per cent on their present wages, but it was decided to take the halo of the whole of the operatives on the question before ordering a general strike. The delegates represented 109,000 men.

A SEATTLE dispatch says: "The Chinese have all been discharged at the various coal mines in this vicinity. Many of the mills are also displacing the Chinese in their employ by white laborers. The trouble at the Franklin mine, which promised to be a violent outbreak, was avoided by the Chinese taking the alarm and leaving the mines, as requested by the white miners."

LIEUTENANT GOVERNOR DAGGETT, of the Black Bear mine, will shortly commence the construction of an incline railway to convey quartz from the mine to the mill, dispensing with teams and wagons which have been used heretofore. It will require 11 tons of iron for the track, all of which will have to be packed over Salmon mountain on mules.

THE Belmont (Nev.) *Courier* says: Now that the ranchers have harvested their crops, they are troubled to find a market for their produce. As the stagnation in mining continues, they will discover that when the main industry of the State is under a cloud, farming is bound to suffer.

EXPLORERS to Queen Charlotte's Islands, in their report to the British Columbian Government, state that they found resources of timber, arable land, coal and fisheries enough to support a million souls. The islands will probably be colonized.

OVER 400 delegates attended the annual session of railway conductors, at Louisville. The question of establishing permanent headquarters at some suitable place is being discussed.

Manufacturing Sulphur.

Utah, among its many valuable mineral deposits, is destined to become noted for its product of sulphur. As early as 1869 F. Dickert made locations of sulphur claims at Cove Creek, which is now reached by the Utah Central Railway to Black Rock, Beaver county, and by wagon road 26 miles eastward. In all, Mr. Dickert has 23 claims aggregating about 460 acres. After making the locations, he traveled to various countries, and among others, visited the sulphur manufactories of Sicily, from whence comes most of the sulphur used in this country. It took long years of study and experiment to get cheap processes for refining sulphur, and this has been accomplished by Mr. Dickert. He has secured patents on his claims and erected machinery ample for the production of 42 tons per week and in a short time this will be doubled.

The process is simple and cheap. Two large iron tanks are employed. These are made steam tight, and consist of upper and lower sections, the upper being the largest and for the reception of the sulphur rock, a charge amounting to about 21 tons. The lower section is simply a big kettle, having a spout at the bottom to draw off the sulphur in a molten state. A perforated partition separates the upper and lower chambers. After a charge is placed in the upper chamber it is closed tightly, and steam at a pressure of 70 pounds is turned on to heat the mass to a temperature of 111 degrees, when the sulphur becomes melted and finds its way down into the lower chamber. When all is driven out of the rock by heat, a side door is opened and the residue is drawn out and thrown into a waste dump, while the pure sulphur is either run into large cones of brimstone or ground in a mill to make flour sulphur, and then shipped in sacks.

The sulphur rock has been explored in the claims to a depth of 20 feet in numerous places, through rock that runs from 60 to 99 per cent sulphur. We are sure that at no sulphur mines in the world is the rock so pure. Two new tanks, weighing in the aggregate 27,000 pounds, have just been procured to be added to the works, bringing the daily product up to 16 or 18 tons, instead of seven or eight as now. It was only last July that the works began sending out their product, and up to date 25 cars of 14 tons each have gone to market. The question naturally comes up, what is all this sulphur used for? end this question can be easily answered. In 1884 this country imported about 200,000 tons, which found a market for use in the arts, for manufacturing sulphuric acid, etc. In the vast country west of the Missouri river, during the past year, it required over 20,000 tons of sulphur, so estimated, to furnish dip for the vast sheep herds. This is the great remedy known for scab or kindred diseases in sheep, and the demand is increasing. The Cove Creek works employ 18 men and several large teams, the latter to haul the product to the railway. The supply is simply unlimited. Refined sulphur is worth in various markets from \$45 to \$80 per ton.—*Salt Lake Tribune*.

NATURAL GAS IN LOS ANGELES.—The Los Angeles *Mirror* says: "It has been but a few weeks since workmen engaged in boring a well in the western portion of the city, near the new Sisters' Hospital, struck a flow of natural gas. We are not advised as to the quantity of the flow, or whether the well is to be utilized or not, but the fact that such a discovery has been made is very significant. Gas wells are found in defined belts, just as artesian and oil wells are found. Indeed, it is a well-established principle that gas wells are an adjunct of petroleum deposits, the oil being volatilized by the heat in the depths of the earth and confined in caverns and crevices, until given vent by the horer's drill. It is not a great wonder that gas has been found in our western hills, since petroleum has long been known to exist there. As far back as seven or eight years ago Mr. Chandler bored for oil on his place on the Temple street extension, and found it, though not in paying quantities. As a further evidence, there are considerable deposits of breia in the neighborhood, which it is well known is the solidified residuum of petroleum after evaporation. A few miles to the southwest is the Brea ranch, from which thousands of tons of this substance has been derved, and thousands of tons yet remain. But if petroleum and its concomitant, gas, exist under the western hills, it is probable that gas may be found where oil is found, in other portions of the county; notably the petroleum regions of Newhall and the Puente. If gas wells are opened in this county they may be worth more than all the oil yet developed; they may solve the manufacturing problem and add millions of dollars to our taxable wealth."

THE DUNCAN CONCENTRATOR.—Our interior exchanges make frequent mention of the introduction of the Duncan concentrators into various mills in different parts of the country, with most favorable comments as to the satisfactory work they are doing. It is evident that this machine is attracting wide interest and is filling the demand for a cheap and effective method for eliminating and separating the valuable minerals contained in every variety of base ores. The manufacturers report constant orders from many of the most prominent mills of the State, as well as large shipments to Central and South America, and many other distant localities.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (space)..... 25 .80 \$2.20 \$5.00
Half inch (4 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Oct. 31, 1885.

TABLE OF CONTENTS.

EDITORIALS.—The Russell Furnace; Mining Affairs in New Mexico; Local Mining Interests; Inaccuracies in Mining Surveys, 239. Fasting Events; Who Invented Hydraulic Mining; Tunnel Work; Mining and Metallurgy at the University, 292. Cheap Milling; New Design for Small Steamers; The Rowell Safety Stove; Copper, 293.

ILLUSTRATIONS.—End View of Russell Furnace; The Russell Roasting Furnace, 289. The Rowell Safety Stove, 293.

CORRESPONDENCE.—Hassavampa District; West Point, Calaveras County, Ores, 290.

MECHANICAL PROGRESS.—The Mechanic of To-Day; Corrosion; Testing Lubricants; American Mechanics Complimented; Water Gas Steel; New Process for Producing Steel; Making Razor Blades; For Welding Iron; Measuring for Belts; Hot-Blast and Cold-Blast Pig Iron; A New File Cutting Machine; Spring Power for Sewing Machines, 294.

SCIENTIFIC PROGRESS.—Colors, Large and Small; The Recession of the Falls of Niagara; Quartz Deposits; Science Accepts Nothing but that Which is True; The Number Habit; Zinc in Plants; The Discovery of Aniline Colors; Supposed Map of the Lost Atlantis; Earthquakes; Solid Carbonic Acid, 294.

ENGINEERING NOTES.—The Ship Railway; Building Stone; Tide Mills; India Rubber Defense, 295.

USEFUL INFORMATION.—How to Manipulate Glass; Death from Carelessness; To Clean Glass and Silverware; Paraffine Stoppers; A Tea Company's Instructions; Curious Facts in the Consumption of Copper; Soluble Glass as a Preservative; The Wire Fence in an Old Story; Paper for Wrapping up Silver; Cleaning Powder for Show Windows; Strange but True; Insoluble Cement from Glue, 295.

GOOD HEALTH.—Risks and Their Relation to Disease; Swiss Treatment of Consumption; Cigarette Smoking; Temperature of Rooms; Nervous Toothache; Treatment of Boils; A Valuable Invention; For Erysipelas; Glycerine in Acute Nasal Catarrh, 295.

MISCELLANEOUS.—Sulphurets and Sulphuret Sharps, 290. Silver or Gold; Con. California and Virginia; The Mines of Nevada County, 291.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 296-97.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 300.

Business Announcements.

Cornish Rolls—Risdon Iron Works, S. F.

See Advertising Columns.

Passing Events.

There is considerable interest manifested down about Hawthorne district, Nevada, and a good deal of prospecting is going on. The principal mine of the region has commenced to ship hullion and others will soon follow. It is predicted, too, that Aurora will for the third time revive, and some of her best mines once more be brought into active development. A curious feature in strikes has occurred in this city, where Chinese cigarmakers have quit work because white men were employed in the factory. This is the first instance of the kind on record, and has caused much excitement among the industrial classes in this community.

The rivers continue low. This has been a most favorable season for river mining, on account of the small column of water flowing. The California river-hed miners have been reaping rich harvests this fall.

Mr. C. A. MOREING, the agent for the English syndicate, which has been working the Blue Jacket property for several months, has come into Tuscarora from Blythe City. He informs the *Times-Review* that the entire works are closed down, the men discharged and that the company will forfeit the first payment which was made, and abandon the property.

Who Invented Hydraulic Mining?

The process of hydraulic mining, so long conducted in this State, originated here. When the miners first came to California they used the pan, rocker, tom, sluice, ground sluice, etc., and with the most primitive appliances took out millions of dollars worth of gold. The gulches, hars, flats, low banks and river beds held the concentrated golden sands and nuggets which had been deposited there during the disintegration carried on by Nature. But as these spots became worked out and scarce it was necessary to adopt more rapid systems than those in vogue to obtain the gold. About this period the system of hydraulic mining came into use. Its first conception has generally been credited to E. A. Matterson. Another claimant for the honor was A. Chahot, who is said to have had a hose at work some months before Matterson. Chahot is generally credited with using a hose to bring the water from the top of the bank to the bottom of his diggings, but he used no pipe or nozzle. Matterson is said to have first used his hose and nozzle in April, 1853, at American Hill. We recently heard that Mr. George R. Warren, of this city, was really the first one who devised the plan of turning a stream against a bank through a hose and nozzle. Mr. Warren feels confident that he really was the first to do this, and upon being interviewed told the story to us in the following words:

"There were four of us, John McCargo, Ben Halsey, Samuel McRaider and myself, mining on Selby Hill, Nevada county, near Nevada City in the summer of 1852. We were sinking four shafts, and run a tunnel to tap the shafts to drain the claims, and after we got the drain in we found the claims below were owned by other parties. We then got permission to run our drain tunnel under their ground. Finally we bought their ground and the ravine below with the intention of ground sluicing. This was after the parties below worked out their claims. When we could not get plenty of water we drifted our ground and worked on the surface with a small quantity. When we found that the ground below us, having been worked out, began to come down we had to put in some boxes to drain it for fear it would come down before we got through, but we got our drain in before it did fall. We were huying water from Rock Creek Ditch Company at the time. The claims were small in those days—about 30 feet square. We got water nights and Sundays free, because the company had no reservoirs to save the water. In running the water over the ground we found it loosened the bank. I said to the boys, 'Boys, we can put up something here in the way of water pressure and we can knock this dirt all down out of the way.' They were all in favor of the plan. I went over and got some duck or canvas, twine, needles and a palm, as one of our number understood sail making and could therefore make the canvas part; and we got the tinner, John Kinney, to make the nozzle which was three feet in length, three inches at the butt end, and 1½ inches at the small end.

"I sent the things over by the hutecher, as I wished to keep our plans dark, and said nothing to the tinner as to what I wished the nozzle for. The next morning we commenced to make the flume for carrying the water to the edge of the bank. We then took a sluice and cut it in two crosswise, and took the two parts and fastened them together like a box, to connect with the flume. This box was set on end up from the ground. The water came in at the top end from the flume and we fastened our hose at the bottom end. The lower end of this box stood about three feet above the ground, so as to give us room to attach the hose. We had it done on Saturday at noon. The tinner's bill was five dollars. He wanted to know what I was going to do with the horn or nozzle, and I told him it was to call the boys to dinner. I stopped to see Horton who was running the water office, and told him we wanted to get water from Saturday night to Monday morning, and he let me have it free. We got pine knots so as to have plenty of light to work by at night and started this 'hydraulic.' People below did not know what so much running water meant and about 500 miners visited the work before Monday morning. It just took the bank right down. It was not a week before they had one on Oregon Hill. Some put up sluice boxes and just attached a nail keg; afterwards improvements were made."

"Matterson was working on the other side of the ridge a mile and a half down; he may have seen our rig that Sunday. We laughed at the idea of Matterson getting a patent on that. The dirt we got before running the 'hydraulic' was pretty rich, and it paid a great deal better after the 'hydraulic' was put in. We got about \$2800 from just the top dirt. Afterwards I sold out and went to Dutch Flat in about 1855."

Tunnel Work.

The Big Bend Tunnel, Butte county, in this State, is now in 10,197 feet, and will be 12,000 feet long when completed. It is intended that the river shall be turned through the tunnel when completed, so that about 14 miles of the river bed in the Big Bend may be worked. The tunnel will cost about \$600,000 when complete, though the original estimate was between \$500,000 and \$1,000,000. The ground and tunnel are owned by a Buffalo, N. Y., company, Dr. R. V. Pierce now having four-fifths of the stock. Dr. Pierce, who is President of the company, is now in this city, and in conversation with him this week we gained some facts concerning the operations on the tunnel.

It is expected that the tunnel will be completed in April, and the river will be turned through as soon as it is low enough. The tunnel was commenced three years ago, and has only been driven from one face, but very rapid work has been done. They have been lucky in not meeting much soft rock, which would necessitate timbering.

Last month they made 405 feet progress. A 30-foot grade is the minimum in the tunnel, and where the water is first taken in it is quite steep. The superintendent does not think there will be any use in trying to save gold in the tunnel itself, as the current will be so swift. The river bed that is left dry by the turning of the river itself will be worked by pick, shovel and sluices. There is no very great depth of slickens, as the mining which has been done above has been mainly drift and bar work. They will work the river bed in half a dozen places at once. There are some rapids and falls in the 14 miles of bed, and plenty of places to get rid of the tailings. Some water will be brought from the head dam as far as French creek, and below that this creek will give about 400 inches. The bed of gravel is not very heavy, the current at the Bend being pretty swift. Tests have been made at different parts, where they have used coffer dams to get at the bottom, and rich prospects have been found. All the exposed portions of the bed have been worked thoroughly in years past.

They have lately made a horse trail entirely around the Bend, which has been quite a difficult job, since it is in a deep canyon, the sides in some places being very precipitous. A telephone line will soon be constructed.

Dr. Pierce attributes the rapid work accomplished to the fact that their drilling machinery is very perfect and that they have had good men to manage the work. The rock has been hard and only two places have had to be timbered. Mr. N. A. Harris, formerly superintendent of the Spring Valley mine, and then of the Miocene, is superintendent, and is a very competent man. The company is highly pleased with his services. The tunnel foreman, who was recommended to the company by Parke & Lacy, agents of the Burleigh Drill Co., has also proved himself a good man. He has had considerable experience, having worked in the Hoosac tunnel, and in the tunnels built by the C. P. R. R., on this coast. Dr. Pierce also states that the Burleigh drills and compressors have been very satisfactory in every way. Two compressors are in use, one a Burleigh, and the other a Clayton. The drills are of the largest tunnel size, and there has been very little breakage or delay compared with what other companies have experienced in drilling work.

They have a very perfect system of ventilation in this tunnel, so that the men work as comfortably now as when in only a couple of thousand feet. The powder fumes and bad air are exhausted by a large Baker blower acting as an exhaust. Fresh air is, of course, sent in by the compressors to the drills at the face. Therefore a good current of air is kept flowing in and out, and the temperature at the face of the tunnel is kept at about 62 degrees.

The Drum Lummon mine uses compressed air entirely for hoisting and drilling.

Mining and the University.

At the last meeting of the Board of Regents of the University of California, a Professor of Mining and Metallurgy was appointed—Mr. S. B. Christy who has been instructor in those branches being selected for the position. Wm. Ashburner has been for some years, and still is, Honorary Professor of mining, but has taken no active part, owing to his other business requiring all his attention.

The new Professor of Mining and Metallurgy, S. B. Christy, graduated from the college of chemistry at the University of California in 1874, having taken in addition all the principal studies of the engineering course. After graduation he pursued these studies of mining under the direction of Prof. Ashburner, metallurgy under Dr. Becker, and mechanics under Prof. Hesse. In 1879 he was appointed Instructor of Mining and Metallurgy, Dr. Becker having resigned to take charge of the Nevada Division of the United States Geological Survey.

During the last few years Professor Christy has had charge of the work in mining metallurgy and assaying, having also designed and superintended the entire equipment of the assaying and metallurgical laboratories of the University. In order to make himself familiar with the actual needs of the coast he has visited and studied the best examples of silver mining and milling, gold mining, amalgamation and chlorination, silver lead melting, hydraulic and drift mining, and the reduction of quicksilver ores. The courses of instruction in all the technical branches are framed to meet the actual needs of these important mining industries of the Pacific Coast.

Professor Christy was for some time associate editor of the *MINING AND SCIENTIFIC PRESS*, translating for it the "The Mines and Works of Almaden" (afterwards published separately by Dewey & Co.), and contributed many articles on other subjects, such as "Oakland Harbor Improvements," "Low Water Gas," "South Pacific Coast R. R.," etc.

Prof. Christy has been for some years Corresponding Secretary of the California Academy of Science, and has read before that body papers on "Ocean Placers of California," "Mount Diablo Coals," "Genesis of Cinnabar Deposits," "The Mines and Works of Idria, Austria" (published by J. B. Randol). He has also read the following paper before the American Institute of Mining Engineers, which were published in their transactions: "Miners' Fund of New Almaden," "Quicksilver Reduction at New Almaden," and "Quicksilver Condensation at New Almaden." Prof. Christy is a student who keeps abreast of the times with the improvements in his special branches, and brings to his new position energy and experience which will be of benefit to those in his charge.

The Mining College at Berkeley now offers excellent facilities for students. Besides the assaying laboratories, now excellently equipped, and the new metallurgical laboratory, now in process of equipment, its students have the advantage of the mechanical laboratories and machine shops, under Professor Hesse, the physical laboratory, under Mr. Slate, the chemical laboratories, under Professor Rising, the fine collection of surveying instruments, under Professor Soule, and the well-arranged collection in mineralogy, petrography and economic geology, under Mr. Jackson. The mining course is necessarily one of the most difficult at the University, but has always been a popular one. Some of its students have come from Mexico and South America, and some from the Eastern States. The graduates are already taking responsible positions in the practice of these professions. The assaying laboratories are fitted for all sorts of work in that branch. A building has been constructed for the metallurgical laboratory for experimental purposes. They have a 15-horse-power Westinghouse engine, a 15-horse-power Babcock & Wilcox boiler, and orders are out for other machinery. As soon as the appropriation of \$10,000 becomes available this department will be completed.

AUSTRALIAN COPPER.—United States Consul Griffin, at Sydney, has sent to the State Department a long report on the Australian copper mines. He says that the copper mines of Australia are among the most famous in the world. They are so rich that they produce a metal in many respects quite equal to the best Lake copper of the United States.

Cheap Milling.

In speaking of the operations at the Alaska mine, Sierra county, in last week's *Press*, the cost of mining was given at \$5.70 per ton, and of milling at \$6.64. This \$6.64 really represented the combined cost of mining and milling, as the cost of treatment at the mill is really only a little over 93 cents, or, to be accurate, 93.5 cents. The milling has been done with 20 stamps, kept in almost constant use, crushing on an average nearly 50 tons every 24 hours. One valuable feature of the ore from the mine is its free milling qualities. The higher grade ore is remarkably free from sulphurets, and when they do occur in greatest quantity they are of so low grades as not to meet the cost of shipment and treatment. Thorough tests in this particular were made during the year, and the fact abundantly proved that unless great changes occur with greater depth in the mine, it will be unprofitable to purchase concentrating machinery for saving them.

The milling at the Sierra mine is conducted on a plan as adopted by Mr. J. M. Davis, the experienced amalgamator and millman, using mortars with high discharge, amalgamating as much as possible in the battery. Over 80 per cent of the gold saved never leaves the mortars. The only other appliances used are the ordinary silver-plated aprons and sluice plates, extending from the battery and a series of riffle boxes extending from the mill, to gather any amalgam that may escape the plates. The mine now being able to furnish 100 tons of ore a day, and the engine and boiler being of capacity to run 40 stamps, 20 more stamps are being added.

Mill supplies last year cost \$2372.10, which included shoes and dies, cams and tappets, quicksilver, screens, chemicals, etc. The mine produced in the 11 months between Oct. 1, 1884, and Sept. 1, 1885, in bullion, \$175,456.07. The milling account in detail is as follows:

Fuel (wood).....	\$ 3,575.00
Labor.....	6,875.00
Wear shoes and dies (including freight).....	1,561.00
Loss in quicksilver and chemicals.....	80.00
Oil (light and lubricating).....	165.00
Screws.....	129.75
Repairs (including boiler).....	700.00
Total.....	\$13,085.75
Ore milled.....	14,000 tons
Cost of treatment per ton.....	93.5
Ore extracted.....	14,300 tons
Cost of mining per ton.....	\$5.709
Cost of mining and milling per ton.....	\$6.644

New Design for Small Steamers.

A steamer has just been completed by Capt. Matthew Turner of this city (whose shipyard is at Benicia, Carquinez straits), which is of a rather peculiar form. She is intended as a dispatch boat for use on the Gulf of California, where she will carry passengers and water. The vessel is 82 feet long over all, 18 feet beam and 13 feet depth of hold.

The peculiarity in the design consists in the reversed shear given the hull. The shear is 2½ feet reversed from a straight line. Vessels built on the ordinary form have more or less shear. The shear of a vessel is the longitudinal curve of her deck or sides, causing it to look lower in the middle than at the ends. This new steamer has the shear reversed. That is, she is higher in the middle than at the ends. The ordinary shear would be in one of her size 2½ feet, but with the 2½ feet added above the straight line, it gives her five feet more height amidships than if she were built in the common way.

The object of this peculiar construction is to give more room and height below deck, and do away with the necessity of building cabins, etc., on deck. In so narrow a boat the deck-houses would have to be narrow to have a passage around them, which would give cramped accommodations. As built, the deck is perfectly free, nothing but a low pilot-house projecting above. This pilot-house is a "hanging one," the floor being three and one-half feet below the deck, and roof three and a half feet above. The reversing of the shear of the vessel gives room for 24 tons more coal than could be carried had she had the usual form of shear. The "free-board," or height of deck-line above water-line is eight feet. The appearance of the steamer is rather novel, but the new form is one which admits of strength of construction, and gives much more room below and on deck. It makes a "big little boat," looking something like a turtle-back torpedo boat.

A speed of ten miles an hour is guaranteed under steam, but masts and sails are provided

also. The whole deck can be utilized, and awnings spread during the hot weather that prevails where the steamer is to be used. In the bottom of the steamer, forward and aft, are fitted tanks which carry 3874 gallons of water. The vessel carries water to islands in the gulf where there is no natural water supply.

The cabin floor is dropped two feet below the line where it would naturally come in an ordinary vessel, giving five feet eleven inches head-room aft and six feet forward. There are four state-rooms. The cabin is 15 feet wide and 20½ feet long. The peculiar form of the vessel gives a truss shape above, so that she is unusually strong. It would seem that this style of construction would be useful in many small steamers. Being high-sided, she will be dry in a sea-way, and the whole deck is free for use, being inclosed by a high open rail. The steamer is called the *J. Romero Rubio*, and was built on the order of Captain Bruce, of this city.

The Rowell Safety Stove.

We examined this week, at the office of Dr. Charles Rowell, 426 Kearney street, in this city, a peculiar safety stove for railway trains which he has patented. As an improvement in heating apparatus for such purpose, and an im-

provement in the direction of providing safe and economical stoves for special uses of this character, it is claimed for this invention that the two features of absolute freedom from danger of overturning and breaking in time of accident, and a large heating power in proportion to fuel consumed, are secured in a most complete manner, and without adding to the general expense of manufacture, or creating difficulties in the management of the stove when in use.

The accompanying engravings give a good idea of the appearance of the stove with some of its details of construction. Stout wrought-iron bands encircle the stove, and suitably connected with them is a peculiarly constructed skeleton frame constituting a perfect fender to prevent contact of the heated stove surfaces with surrounding objects and surfaces, and with the bodies of persons when thrown against the stove, as well as an absolute guard against rupture or breaking in of the body by crushing forces under the most extreme conditions of pressure to which it may be subjected. Casualties arising from the escape of burning coals, and the terrible experiences of death by burning that are not uncommonly associated with railroad disasters in all countries at the present day, may be prevented by the application of this improved armor on the Rowell stove. This frame or armor consists of strong rings encircling the stove and upright rods connected to them so as to form really an independent structure which encloses the stove proper. These upright rods four in number, cross under the stove so that through them it is bolted immov-

ably to the floor. The method of securing to the floor is shown in Fig. 2. This gives security against overturning, while at the same time the fastenings are of such a character that by removing the washer and nut the stove may be removed and reset as occasion may require.

In regard to the burning and heat producing qualities of the Rowell stove, these are secured and increased over stoves of like character, by the application and peculiar construction of a combustion chamber in the upper part of the stove body above the fuel space, in which the smoke and other partially decomposed and imperfectly consumed particles and the gases and vapors from the fuel are subject to further and more complete combustion, so that instead of being carried off by the draft, this matter is converted into heat by undergoing final reduction within this space through which it is compelled to pass. This chamber is formed at the upper portion of the stove directly over the fuel space, by means of a peculiar arrangement of perforated diaphragms placed between the fuel space and the smoke outlet, and by the use of adjustable dampers, the communication of this chamber with the smoke and draft passages, and its connection with the fuel space or chamber, are regulated in such manner as to secure the most effective action and results.

In this feature the construction is designed to



Fig. 2—Fastenings of Stove to Car Floor.

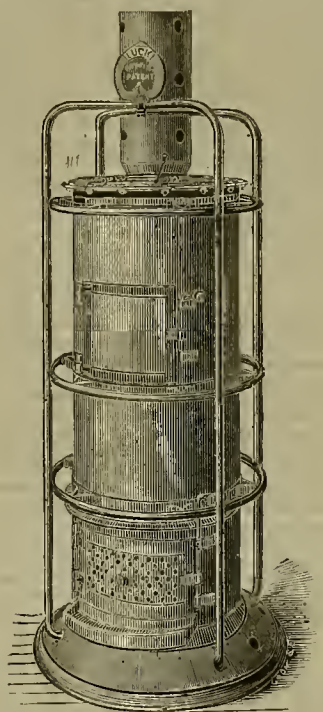


Fig. 1.—Fastenings to Doors and Covers.

THE ROWELL SAFETY STOVE.

give complete control of the gases, and imperfectly consumed matter from the fuel, and at the same time to secure full and efficient draft. All the openings in the body for the supply of fuel, for draft and for cleaning purposes are protected by guards that confine the fuel and flames without interfering with the special functions of the openings, and special locking devices to the guards or covers of the openings form fastenings that are readily operated but will not release the covers or doors unless so moved by hand. This latter feature is quite ingenious and is shown in Fig. 3. By means of the lugs on the locking-bar and a series of irregularly set grooves on the hinges or pintles, the locking-bar must be turned back and forth four times before it can be withdrawn to open the doors. No accidental overturn could accomplish the peculiar movements being required.

These improvements have been perfected without effecting the symmetrical appearance of the stove or materially increasing its size. The frame is strong enough to bear a weight of eight or ten tons on any part. The fender rings are secured to the circular flanges by V-shaped wrought-iron lugs in a very strong manner, and the whole skeleton frame acts as a radiator. The rods run across the top and bottom as well as at the sides. The arrangements for regulating the draft without leaving exposed openings are ingenious and practical. Dr. Rowell states that he is able to utilize all the heat from the fuel and allow no waste. The invention presents no difficulties in the way of manufacture. The stove appears to be a very perfect contrivance for the use for which it is intended, and

give complete control of the gases, and imperfectly consumed matter from the fuel, and at the same time to secure full and efficient draft.

All the openings in the body for the supply of fuel, for draft and for cleaning purposes are protected by guards that confine the fuel and flames without interfering with the special functions of the openings, and special locking devices to the guards or covers of the openings form fastenings that are readily operated but will not release the covers or doors unless so moved by hand. This latter feature is quite ingenious and is shown in Fig. 3. By means of the lugs on the locking-bar and a series of irregularly set grooves on the hinges or pintles, the locking-bar must be turned back and forth four times before it can be withdrawn to open the doors. No accidental overturn could accomplish the peculiar movements being required.

These improvements have been perfected without effecting the symmetrical appearance of the stove or materially increasing its size. The frame is strong enough to bear a weight of eight or ten tons on any part. The fender rings are secured to the circular flanges by V-shaped wrought-iron lugs in a very strong manner, and the whole skeleton frame acts as a radiator. The rods run across the top and bottom as well as at the sides. The arrangements for regulating the draft without leaving exposed openings are ingenious and practical. Dr. Rowell states that he is able to utilize all the heat from the fuel and allow no waste. The invention presents no difficulties in the way of manufacture. The stove appears to be a very perfect contrivance for the use for which it is intended, and

the general design of the structure may be said to have considerable merit from an artistic point of view. Various sizes may be made; the one we examined being the largest size railroad car stove. The invention is one that entirely obviates the chances of fire when railroad accidents occur, without changing in any degree the ordinary heating appliances.

Copper.

Liverpool and Swansea have imported during the first nine months of this year 22,246 tons of copper from Chili, and 18,742 tons from the United States. In 1882 those two cities imported 20,150 tons from Chili and 521 tons from the United States. These comparative figures will show how we have increased our copper product. From sending 521 tons of copper to Liverpool and Swansea in the first nine months of 1882 we increased to 6000 tons in 1883, and 12,752 tons in 1884, and 18,742 tons in a corresponding period this year. The imports from other countries than Chili into Liverpool and Swansea for the first nine months of the year aggregated 37,890 tons, including that from this country.

James Lewis & Sons' reports give the stocks of Chili produces on hand now as 28,948 tons fine, and the total visible supply of copper as 56,625 tons. Latest English quotations are £40 10s. for Chili bars. Ore of 25 per cent, 7s. 6d. to 7s. 9d., and regulus or matte, 7s. 9d. to 8s. per unit.

Statistics show that the excessive import of copper into England and France during the past nine months has been almost entirely from America and Japan. The import from Chili has been 3973 tons less than last year, that from Spain 502 tons less, and from other countries 686 tons more. From the United States the increase has been 10,130 tons, and from Japan into London 2450 tons, the import of Australian there showing an increase of 150 tons, but a decrease of 273 tons into Liverpool and Swansea.

Lewis & Sons' Liverpool report says: The market has been adversely affected by the decline in silver to 47½d. per ounce, and the consequent withdrawal of orders for India, and by the large arrivals here and to France, causing an increase in the stock of 1755 tons, and by the negotiations pending for the renewal of a contract for a large quantity of American matte. Early in the month, sympathizing with the advance in iron, Chili bars improved 10s. per ton, but have since steadily declined from £42 17s. 6d. for cash on the 8th ultimo, to £40 2s. 6d. on the 25th. This low figure induced considerable buying, but we close with sellers of cash bars at £40 10s., and of three months, at £41 2s. 6d. per ton; 4000 to 5000 tons (2000 pounds) of Lake Superior ingots have been sold to American manufacturers, for delivery during the remaining months of this year, at 11 cents per pound, equal to £53 12s. 6d. per English ton, less two and a half per cent. discount, or about £7 above the present value of English best selected here.

QUICK BRIDGE BUILDING.—A week ago last Saturday the railroad bridge over the Colorado river burned down, as we stated in the *Press* at the time. Since then a temporary bridge has been built, and mails and passengers are enabled to come through on time. The erecting of the temporary structure is one of the quickest pieces of work on record, and was done under the supervision of Arthur Brown, superintendent of bridges for the company. When it was known that the bridge was burning, timbers that are kept in readiness in Oakland and at the yards in Sacramento were run out. A large number of bridge builders and carpenters were summoned, and before the smoke of the charred timbers had floated away the men were at work on a temporary bridge with the above result. The old bridge will be rebuilt at once.

MINERALS ON SCHOOL LANDS IN TERRITORIES. In reply to an inquiry of the Commissioner of the Land Office respecting the Interior Department order instructing him to "suspend all action relative to mineral applications for school lands in the Territories until further notice," the acting Secretary of the Interior advises the Commissioner that the same was not intended to refer to claims initiated upon unsurveyed lands which may possibly by subsequent survey be found to lie in a school section, but was directed to a possible question as to whether or not mineral lands, as such, are exempt from the reservation of 16th and 36th sections for the support of schools.

MECHANICAL PROGRESS.

THE MECHANIC OF TO-DAY.—Lahor, to day, is not what it was two generations ago! modern improvements have made workmen more of a machine than an intelligent artisan. Instead of a long apprenticeship and the mastery of a whole "trade" one gets, in a short time, a proficiency in one thing, and that is all he learns to do. The truly skilled mechanic is becoming a rare bird. The fault is not alone in the present style of manufacturing; the workman himself is partially to blame. It is impossible to secure apprentices. The boy who wishes to learn a trade refuses the best chances offered when not accompanied by wages far exceeding any possible value he can be to his employer. If, perchance, he engages to work, excesses in tobacco, liquor and similar vices so unnerve him that hard work "hurts him," and his health is affected. He is indolent, his leisure hours are occupied in any way but beneficially, and every parade and excitement must find him a spectator. The offer of a few cents more per week causes his abandonment of his place without notice to his employer, and he grows up full of expensive habits, unfit to support or care for himself, to say nothing of marrying or rearing a family. The war made many tramps, but the degeneracy of our boys is making more.

CORROSION.—The *Locomotive* says that "leakage at the tube ends is one of the most frequent and annoying defects to which the ordinary horizontal and upright tubular boilers are subject." It adds that the corrosion which this leakage induces speedily brings about a dangerous condition of affairs. This statement of the case is undoubtedly correct, but when our contemporary argues for the pound of cure we must part company, because our preference is decidedly for the ounce of prevention. The one thing better than to be continually tinkering with boiler head and tubes is to manufacture the boiler of a material that is the least liable to corrode. Such a material is refined iron, and its use insures the greatest possible immunity from corrosion and its attendant annoyance and dangers. The manufacturers of steel plates have of late been using a magnesia "physic" in their crucibles, and thereby greatly increased the tendency of their product to rust out. But they do not dare leave the magnesia out, for then the gas cells in the ingot will be found as great flaws in the plates that come from the rolls. To grasp either horn of the dilemma seems fatal. Without magnesia steel plates are full of flaws; with magnesia the plates corrode. Refined iron is free from either fault.

TESTING LUBRICANTS.—It is a matter no doubt often overlooked in testing lubricants that experiments made upon the nicely fitted journal of a testing machine are not conclusive as to the fitness of a lubricant for use on a similar journal which is not well fitted. As the latter hears only in spots or along lines of contact, it is subjected on such surfaces of contact to pressures which may be enormously heavier than that affecting the same journal when wear or refitting has given it a good bearing. Could its magnitude be known, a good testing machine would determine which of any collection of oils is the best fitted for use upon it. The testing machine determines the behavior of an oil upon its own journals, and only if those on which the lubricants is to be used are similar will its behavior be the same. While the machine does not usually serve to select oils for badly made lubricated surfaces, it exhibits the intrinsic qualities of the oils tested, and every mechanic and engineer endeavors to get all journals into as good condition as those of the testing machine, and thus fit them to do good work with good oils.

AMERICAN MECHANICS COMPLIMENTED.—In his late address before the Mechanical Section of the British Association, Mr. C. E. Baker said: "The magnificent steel wire rope suspension bridge of 1600 feet span, built by Roebling across the East river at New York, well marks the advanced state of mechanical science in America, as regards building. It is worthy of note that, at the second meeting of the British Association, held in 1832, there was a discussion on suspension bridges, and the author called the attention of the scientific world, and particularly of civil engineers, to the serious consideration of the question: How far ought iron to be hereafter used for suspension bridges, since a steel bridge of equal strength and superior durability could be built at much less cost? 'I earnestly call upon the iron masters of the United Kingdom,' said he, 'to lose no time in endeavoring to solve this question.' In this, as in many other engineering matters, Americans have given us a lead. America is indeed the paradise of mechanics."

WATER GAS STEEL.—Bull's patent process of steel manufacture by means of water gas—converting ore into steel without first making pig—is thus described: The gas producers are similar to the Strong and Lowe, or the quasi recuperative type. The coal is forced by a hot blast of air into partial combustion, the resultant heat of which is collected into separate recuperators. An interval follows, during which the air is turned off, steam is forced in a reverse direction through the recuperators, and becoming highly superheated, is decomposed or transformed into a powerful reducing gas. This is led through conduits to the tuyeres of the

blast furnace. It is expected from the careful arrangement of the crucible of the blast furnace, which is of the cupola form, that a bath of pure iron can be maintained in a fluid condition. When the metal is tapped it will be carried by ladle, and run into a Siemens open hearth steel furnace.

NEW PROCESS FOR PRODUCING STEEL.—The *Boston Journal of Commerce* says: A new process of producing steel has been invented by Harry Oliver and J. P. Witherson, of Pittsburgh, by which steel is manufactured about \$5 a ton less than puddled iron can be put in the form of muck bar. At a recent meeting of the Board of Mining Engineers in New York city, a paper was read on the new process by Captain Robert W. Hunt, of Troy. The paper demonstrated that from actual experiments pig iron containing from five to six-tenths of phosphorus produced steel that did not break until it showed 74,000 tension strain, with 25 per cent of elongation. Experiments have been made which seem to show conclusively that instead of phosphorus being a dangerous and weakening element in iron or steel it could be made an element of much value in their manufacture. The new process of utilizing phosphorus does away with puddling and produces fine steel ingots at the blast furnace at a cost of not more than \$4 above the cost of the production of ordinary pig iron. Should the new process prove to be all that is claimed for it there will be a great revolution in the iron industry in the near future.

MAKING RAZOR BLADES.—Razor blades are forged from cast steel, and are ground and scorched to take off the black scale, being heated in a coke or charcoal fire and dipped obliquely into water. After being drilled and stamped they are hardened and tempered. In tempering they are laid on their backs on a clear fire and are removed as their edges attain a pale straw color. Shavings of leather added to the fire prevent cracking when the blades are put into water. After tempering they are ground successively on stone, a lap charged with fine emery and a second lap with finer emery. The final polish is given on a soft leather wheel charged with crocus, both razor and wheel being heated. It is then honed, working from the point to the heel, being laid flat for the purpose. Wire edges are rubbed off on a horn.

FOR WELDING IRON, as is well known, the pieces are heated to whiteness. When iron is to be welded to iron this plan answers well, but if iron is to be welded to steel the white heat often destroys the steel. To prevent this—according to a newly-invented process—the surface of the metal to be welded is moistened with water, and on the wet surface there is sprinkled a compound of one pound each of pulverized calcedonite, horax and iron filings, and four ounces pulverized prussiate of potash, intimately mixed. The two surfaces are then wired and raised to a red heat, or about 600 or 700 degrees Fahr. When subsequently subjected to rolling or hammering, the joint is completed, while the steel is not sufficiently raised in temperature to be at all injured by the operation.

MEASURING FOR BELTS.—A prominent firm gives these directions: When convenient, measure the distance round the pulley with a piece of marine or tarred rope (it will not stretch as a tape line or string will), and cut your belts, if to be butted, about $\frac{1}{2}$ inch short for every 10 feet in length of marine; if endless, allow for lap. When not convenient to measure the length round the pulleys, add the diameter of the two pulleys together, divide the result by two, and multiply the quotient by three and one-quarter; add the product of twice the distances between the centers of the shafts and you have the length required.

HOT BLAST AND COLD-BLAST PIG-IRON.—They are named from the temperature of the blast used in smelting the iron. Hot-blast generally is more economical, but the metal is not considered to be so strong. Difficult to distinguish the two varieties, but, other circumstances being equal, hot-blast iron has rather a finer grain, duller fracture, with sometimes patches of coarse grains, and usually more impurities. Increasing the blast or reducing the supply of fuel makes the iron whiter, harder, and less suitable for remelting, but better for conversion into wrought-iron or steel.

A NEW FILE CUTTING MACHINE.—There is being built at the Chicago Die and Machine Works, Chicago, a new file-cutting machine, the patent for which has just been issued to H. F. W. Liehmann, of Chicago. In this machine the file-blank rests on a platform or table, the chisel is brought down to the file and given a blow by the hammer, and this process is repeated automatically, the chisel and hammer being raised sufficiently. The movement is by hand.

SPRING POWER FOR SEWING MACHINES.—By using a cone spring, sewing machines are now driven without the aid of foot or hand power. A few turns of a handle winds up sufficient power to keep a machine going at full speed over half an hour. It is completely under control as to the rate of stitching and stopping, and can be applied to any existing machine at moderate cost.

SCIENTIFIC PROGRESS.

Colors Large and Small.

It has long been known that size is an attribute of color, at least so far as the object is presented to the eyes. A white object appears larger than a black, etc., but it has recently been stated that Prof. Huxley has discovered that there is something more than mere appearance in this phenomenon—that colors are really large or small. It is stated that Prof. Huxley's attention was called to the matter quite accidentally through the medium of stockings. He had bought six pairs of stockings of the size known as No. 10. Three of them were red and three blue. On trying them on he found that the blue stockings were too small and the red rather too large. As they were all No. 10 stockings, it was evident that the difference in size between the red and the blue pairs was due to their respective color. Pursuing his investigations in connection with stockings, Prof. Huxley found that white stockings are larger than either red or yellow; that black stockings are smaller than blue ones, and that, in short, there is a regular scale of size in colors reaching far back up to white. The reader will probably receive this announcement with some degree of credulity; but, at all events, it is quite evident that color has much to do with the size of objects as they appear to the eye, whether the measuring sale will confirm such impressions or not.

White is the largest of colors. White letters on a black ground can be seen much further than black letters on a white ground. A woman in a white dress is larger than she would be in blue, and very much larger than she would be in black. Women long ago intuitively grasped the fact that black is the proper wear for a fat woman. Dressmakers have been accustomed to say that a black silk dress makes a stout woman appear reasonably small, but we know now that it actually and literally reduces her apparent size. Nearly everyone has met in summer time a fat German dressed entirely in white, but a thin white-clad German is something entirely unknown. Of course, it is the white dress which makes the German fat. Dress the same man in black clothes and he would be a man of ordinary size. The world has long known that the red-coated British soldier is a larger and braver man than the blue-coated Frenchman, but it has never hitherto occurred to any one that the difference in size is due to the difference in color. Time and space would fail to allude, even in the most cursory manner, the various ways in which colors may thus deceive the eye.

THE RECESSION OF THE FALLS OF NIAGARA.—Sir Charles Lyell, in 1841 and 1842, estimated the gradual recession of Niagara Falls by the undermining of its brink at the rate of about one foot per annum. Recent investigations of the subject by a commission for the establishment of a State reservation at this Falls have, however, shown that this and other estimates are more or less erroneous. A map, based on surveys of the Falls made in 1883 by Mr. Thomas Evershed for the New York State Surveyor, has shown that in the 41 years ending 1883 the annual rate of maximum recession has been 6.16 feet. For the eight years ending 1883 this rate is given as 16.5 feet, so that the rate of recession has been higher of late. These results were obtained from the Canadian Fall, while the American Fall was found to have receded at the rate of 10 inches per annum during the 41 years ending 1883. It has been shown by the surveys that these two falls were once united; and that, supposing the rate of recession to continue, the Niagara gorge will be cut through in some 10,000 years. Lyell's estimate was 35,000 years. Of course these attempts to calculate the cutting of the entire gorge, which terminates at the heights near Lake Ontario, assume that the hardness of the shale and lime rocks, volume of water, and height of the fall, continue much the same as they are now.

QUARTZ DEPOSITS.—The crystalline form of quartz grains in some sandstones has been seen by many observers, while especial attention was called to these forms in the Wisconsin sandstones by Rev. John Murrish in 1870 and later. Mr. H. C. Sorby, in 1880, showed that such crystal forms were produced by the deposition of secondary quartz upon the irregular rounded surfaces of worn quartz grains. For the Wisconsin sandstones, the subject was taken up by Rev. A. Young, and later by Messrs. R. D. Irving and C. R. Van Hise, who have published an extended and valuable paper (*Bull. U. S. geol. surv.*, No. 8), with full illustrations, relating to the enlargement both of quartz and feldspar grains; and for this the thanks of all micro-mineralogists and lithologists are due. Our authors conclude that their results prove that most, if not all, of the ancient quartzites, as well as many of the quartziferous schists, are composed in the main of fragments cemented together by a secondary siliceous cement.

SCIENCE ACCEPTS NOTHING BUT THAT WHICH IS TRUE.—In science nothing can be permanently accepted, but that which is true, says *Popular Science Monthly*, and whatever is accepted as true is challenged again and again. It is an axiom in science that no truth can be so sacred that it may not be questioned. When

that which has been accepted as true has the least doubt thrown upon it, scientific men at once re-examine the subject. No opinion is sacred. "It ought to be," is never heard in scientific circles. "It seems to be," and "we think it is," is the modest language of scientific literature. In science all apparently conflicting facts are marshalled, all doubts are weighed, all sources of error are examined, and the most refined determination is given with the "probable error." A guard is set upon the bias of enthusiasm, the bias of previous statement, and the bias of hoped-for discovery, that they may not lead astray. So, when scientific research is a training in observation and reasoning, it is also a training in integrity.

THE NUMBER HABIT.—In a carefully written paper read by Dr. C. S. Minot before the late American Association at Ann Arbor, the author referred to numerous experiments made under the auspices of the American Society for Physical Research, to determine, if possible, whether the so-called mind-reading had any basis in fact. In the course of these experiments, numbers were used, one person thinking of a number and another trying to guess what it was. On the doctrine of chances, the percentage of numbers rightly guessed should have been 10; but actually it was 18. The difference was explained by the author, by the fact that many persons formed what he called a number habit; i. e., they were much more likely to think of some number than of others; and two persons having the same habit would guess more frequently the numbers usually thought of than chance alone would account for. So far as the experiments of the American Society went, they did not supply any reason for a belief in mind reading; but the English Society had obtained results that seemed to show that it was possible, so that judgment should, for the present, be reserved.

ZINC IN PLANTS.—The presence of zinc in plants has been repeatedly observed, and not only in such as grow near deposits of zinc ores, but also, though in minute quantities, in plants where no zinc could be traced in the soil. From a number of experiments the author found that the injurious action of zinc sulphate in solution was more considerable than it had been assumed. In solutions of 1 mg. zinc per liter all plants vegetated undisturbed, while with 5 mg. per liter all perished. Old plants of any kind died more rapidly than young plants. Insoluble compounds of zinc in the soil—such as zinc oxide, sulphide and carbonate—have no perceptible action. The poisonous action of zinc on plants seems to depend on the destruction of the chlorophyll. —Anton Baumann.

THE DISCOVERY OF ANILINE COLORS.—Aniline colors were discovered in 1857 by a chemist experimenting with coal tar refuse, at that time looked upon as a nuisance. He took coal tar naphtha, and boiling it in a retort, obtained a chemical action, which resulted in benzols and nitro-benzole. Adding water to this, the nitro-benzole was deposited in the form of a thick, oily mass. This he experimented with in various ways, and finally by the addition of acetic acid and iron filings, produced a colorless fluid which is aniline. This liquid he treated with different chemical salts, and the result was green crystals of a metallic luster. These he found were capable of producing, under different chemical reactions, the most brilliant and gorgeous hues—the aniline colors of to-day.

SUPPOSED MAP OF THE LOST ATLANTIS.—It is stated that Mr. Meyer, a noted archeologist, has recently made a very interesting discovery on the island of Ziperata. Writing from Nicaragua, he says: "About 42 feet under the surface of an ancient cemetery I discovered a rock, which, judging from the figures it contains, has served in remote times for astronomical observations. On this rock I have found two stone tablets, one of which contains a representation of the world, part of Africa and Asia, united Europe, and this continent. A large continent is situated in the Atlantic ocean, which I consider the mythical lost Atlantis mentioned by some of the ancient authors. The other tablet contains inscriptions of which part is undoubtedly Phœnician."

EARTHQUAKES.—M. Perry, a French astronomer, attributes earthquake disturbances, to the same cause which produces tides—the attraction of the sun and moon. He argues that it is only natural that the great molten mass in the interior of the earth should obey the same laws as the ocean on its surface. He has investigated 5400 different shocks of earthquakes, and finds that such occurrences are much more frequent during the periods of full and new moon, than at other times, and that such shocks are always most violent when the moon was in the meridian at the time of the occurrence.

SOLID CARBONIC ACID.—The manufacture of solid carbonic acid has been carried on for some time by a company at Berlin, Germany. Bottles of steel containing eight kilos of liquid carbonic acid are sold. From these, by allowing the liquid to escape into a cloud-vessel, a quantity of solid acid is obtained which, by pressure into a wooden tube with a wooden piston, can be kept in the form of a small cylinder for a considerable time. A cylinder of about 1½ inches in diameter and two inches long, will take five hours to melt away into gas. The more it is compressed the longer it will last as solid.

ENGINEERING NOTES.

The Ship Railway.

Mr. E. L. Corthell, at the recent session of the American Association for the Advancement of Science delivered an address on the proposed Tehuantepec ship railway, in which he says the time has passed when it is necessary to prove to practical men the feasibility of the ship railway method, therefore he devotes the greater part of his address to the superiority of the ship railway over the ship canal, both in construction and operation. The strategic advantages of the ship railway are very important. Mexico and the United States together can protect the railway against any foreign powers. Our navy can hold the approaches to the Gulf, or in case of a superior force appearing upon one side, that fleet might be speedily supported by ships from the opposite side. There is a capacious and protected harbor in the Coatzacoalcas on the Gulf and one in Lake Superior, on the Pacific, and the railroads leading into Mexico from the United States could quickly concentrate a large army at the Isthmus. Seven million tons of freight are in sight for transportation over the railway in 1889. The railway can be built and equipped in four years' time. Fifty million dollars in cash will complete everything ready for business. The estimate in stock and bonds, allowing for all possible contingencies, is \$75,000,000. Even with only 4,000,000 tons, the net profit would be 14 1/2 per cent. The beneficial results cannot be overestimated. Industry, commerce, society and religion, in fact, in all his relations will man be benefited. The success of the projector of the ship railway in his important works—iron-clads during the war, the magnificent bridge at St. Louis, the Mississippi jetties, and other works, gives standing to this new work, and leads to confidence in the ability of Mr. Eads to carry it through to a successful conclusion.

LARGER ENGINES, faster time and longer runs are the order in England as well as in this country. The Northeastern Railway Company is having 20 new engines built solely for express service, which, in several respects, will be unequalled in the world. These are some of the characteristics: drivers—four wheels coupled—7 feet 2 inches in diameter; leading wheels, 4 feet 6 inches in diameter; wheel base, 16 feet 8 inches; cylinders, 18x24 inches; capacity of tender, 2800 gallons of water and 3 tons of coal; weight of engine with steam up, 42 tons, weight of tender, 28 tons, total, 70 tons. These engines will each be capable of running express from York to Edinburgh in one journey, thus doubling the length of run, two now being required. As for their speed, it is stated that on a trial trip one already built made the extraordinary time of 80 miles per hour. However, if American drivers 5 feet 8 inches in diameter can make 72 1/2 miles per hour for 36 miles, as was recently done on the West Shore road, we can believe that wheels 18 inches larger can run still faster.—*Railway Age*.

BUILDING STONE.—Quite an interesting experiment was lately made by the Board of Capitol Commissioners at Atlanta, Ga., to test the relative ability of marble, granite and limestone to resist the effects of heat. Pieces of oolitic Indiana limestone, granite and Georgia marble were placed in a furnace and allowed to remain there for an hour, subject to a white heat. They were then taken out and suddenly cooled with water. The limestone was found to be harder than ever, but the granite and marble crumbled like dirt between the fingers.

TIDE MILLS.—A correspondent at Norwalk, Conn., writes that there are four tide mills within 15 miles of there, and that in dry times this unfauling source of power is greatly appreciated by the farmers, long lines of wagons being seen waiting to have the grist ground. Two of these mills are said to have single-acting turbine wheels, with a simple flap gate to admit water to the pond. Our correspondent suggests that there are, probably, many more tide mills in use in the country than is generally supposed.

A BALLOON RAILROAD is to be constructed in the Austrian Tyrol. The balloon will have grooved wheels on its car, and these will run on nearly perpendicular rails, the gas providing the lifting power. Gravitation will be utilized on the down trips.

PETROLEUM residue is now hurned in locomotives on all the Russian railroads. This form of fuel is likely to be largely used in the future in the place of coal, not only for locomotives, but for steamships.

INDIA RUBBER DEFENSE.—One of the large English war vessels, the Resistance, is to be coated with India rubber to a considerable thickness, to see how that material will repel projectiles.

COKE as a locomotive fuel is now being tested on two locomotives of the New York, Lake Erie & Western railroad that take express passenger trains over the Eastern division of that road.

USEFUL INFORMATION.

HOW TO MANIPULATE GLASS.—Take a twelve-inch mill-file, single cut, and wet it with turpentine saturated with camphor, and the work can be shaped as easily and almost as fast, as if the material were brass. To turn glass in a lathe, put a file in the toolstock, and wet with turpentine and camphor as before. To square up glass tubes, put them on a hard wood mandrel made by driving iron rod with centers through a block of cherry, chestnut or soft maple, and use the flat of a single cut file in the tool post, wet as before; run slowly. Large holes may be rapidly cut by a tube-shaped steel tool like a file on the angular surface, or with fine teeth, after the manner of a rose-bit, great care being necessary, of course, to back up the glass fairly with lead plates or otherwise, to prevent breakage from unequal pressure. This tool does not require an extremely fast motion. Lubricated as before, neat jobs of boring and fitting glass can be made by these simple means. The whole secret is in good, high steel, worked low, tempered high, and wet with turpentine standing on camphor.

DEATH FROM CARELESSNESS.—Two instances within a week have been reported of men being killed while walking on railroad ties in the East. One of the victims was so deaf that he could not hear the approaching train. The other was reckless enough to take the chances of being run over. Both suffered death for their temerity. Some people will never gain wisdom, nor profit by the experience of the past. So it is with those who snap guns and pistols at others, in the belief that the weapons are not loaded, and discover how fatal has been their error when they see that the person aimed at has been killed. And so, also, with those who pull loaded guns from wagons, with the muzzles toward them, and receive the contents of a discharge in their bodies. These fatal accidents are recorded by the press as items of current news, but not with the expectation of always preventing them. This same sort of incaution has been the subject of notice time out of mind, and will probably continue through generations to come.

TO CLEAN GLASS AND SILVERWARE.—Eggshells crushed into small bits and shaken well in decanters three parts filled with cold water will not only clean them thoroughly, but make the glass look like new. By rubbing with a damp flannel dipped in the best whiting, the brown discoloration may be taken off cups in which custards have been baked. Again, all of us are aware that emery powder will remove ordinary stains from the white ivory knife-handles, or that the luster of morocco leather is restored by varnishing with the white of an egg. Nothing, it is said, is better to clean silver with than alcohol or ammonia, finishing with a little whiting on a soft cloth. When putting away the silver tea or coffee pot which is not in use every day, lay a stick across the top under the cover. This will allow fresh air to get in, and prevent the mustiness of the contents familiar to boarding house sufferers.

PARAFFINE STOPPERS.—Mr. Kirster, a German pharmacist, has recommended, in the *Pharmaceutische Zeitung*, the use of paraffine in place of corks or other stoppers for the hermetic sealing of bottles containing liquids which are prone to ferment or otherwise deteriorate by coming in contact with the air. This, he says, is particularly applicable to syrups or saccharine juices of all kinds. They are poured, while hot, into perfectly dry bottles, which are filled nearly up to the lip. Then they are allowed to stand and rest until cold, during which time all air bubbles will rise to the surface. Finally, a small quantity of melted paraffine is poured over the top, when it forms a firm, solid coat on cooling, about the tenth of an inch thick. Such a paraffine stopper is easily removed when the contents of the bottle are required for use, and by collecting the paraffine it can be used again.

A TEA COMPANY'S INSTRUCTIONS.—"To make tea to perfection, boiling water must be poured on the leaves directly it boils. Water which has been boiling more than five minutes, or which has previously boiled, should on no account be used. If the water does not boil, or if it be allowed to overboil, the leaves of the tea will be only half opened, and the tea itself will be quite spoiled. The water should be allowed to remain on the leaves from 10 to 15 minutes." This is in a direct line with the Delmonico wisdom about the proper way to cook water, and its solemn warning that water which was boiled too long was loaded with mineral impurities and unfit to drink.

CURIOUS FACTS IN THE CONSUMPTION OF COPPER.—It is a curious fact, which is not widely known, that the heavy copper consumption of India is due largely to a religious rite of the natives. At certain seasons of the year small cups of sheet copper about an inch in diameter and an inch and a half deep are filled with rice, and are thrown into the rivers as an offering, with religious ceremonies. The quantity of copper thus annually consumed is very heavy, India sheets being an important article of commerce.

SOLUBLE GLASS AS A PRESERVATIVE.—Three coats of soluble glass, each applied at an inter-

val of a day, the *Pottery and Glassware Reporter* says, are sufficient to preserve porous materials indefinitely at a cost of about 15 cents per square yard. When applied upon old materials it is necessary to wash them thoroughly with water first. The degree of concentration of the solutions to be used varies with the materials. For hard stones the solution should mark 7 deg. to 9 deg. Baume; for soft stones with coarse grit, 5 deg. to 7 deg.; for calcareous stones of soft texture, 6 deg. to 7 deg. The last coating should always be with a dilute solution of 3 deg. to 4 deg. only.

THE WIRE FENCE AN OLD STORY.—The general public is under the impression that wire fences have only lately been introduced. This is a mistake, for as far back as 1816 fence wire was manufactured by White & Hazard, at the Falls of Schuylkill, near Philadelphia. A letter from this firm, dated January 2, 1816, is in existence, addressed to Richard Peters, President of the Agricultural Society, recommending wire fencing, and an elaborate calculation was given to show the economy there would be in the adoption of such a durable material in place of perishable posts and rails.

PAPER FOR WRAPPING OF SILVER.—Six parts of caustic soda are dissolved in water until the hydrometer shows 20 B. To this solution are added four parts of oxide of zinc, and boiled until dissolved. Sufficient water must next be added to reduce the solution to 10 B. Next dip paper or calico into this solution and dry. This wrapping will very effectually preserve silver articles from being blackened by sulphuretted hydrogen, which, as is well known, is contained in the atmosphere of all large cities.

CLEANING POWDER FOR SHOW WINDOWS.—A good cleaning powder which leaves no dirt in the joints, etc., is prepared by moistening calcined magnesias with pure benzine, so that a mass is formed sufficiently moist to let a drop appear when pressed. The mixture is to be preserved in glass bottles with ground stoppers, in order to retain the easily volatile benzine. A little of the mixture, when to be used, is placed on a wad of cotton and applied to the glass plate. It may also be used for cleaning mirrors.

STRANGE BUT TRUE.—This is one of the curious things floating about. Take a piece of paper, and upon it put in figures your age in years, dropping months, weeks, and days. Multiply it by two; then add to the result obtained the figures 3768; add two, and then divide by two. Subtract from the result obtained the number of your years on earth, and see if you do not obtain figures that you will not be likely to forget.

INSOLUBLE CEMENT FROM GLUE.—In order to render glue insoluble in water, even in hot water, it is only necessary, when dissolving glue for use, to add a little potassium bichromate to the water, and expose the glued part to the light. The proportion of bichromate will vary with circumstances; but for most purposes about one-fiftieth of the amount of glue will suffice.

GOOD HEALTH.

Flies and Their Relation to Disease.

It is a common belief that the absence of flies for a season is a precursor of an epidemic. The process of reasoning on this subject is given substantially as follows, by a writer more rational than superstitious, which we find in the *Midland Industrial Gazette*. The absence of flies does not exactly preface an epidemic—that is, the flies are not killed by the poison in the air, as many superstitious persons who have noticed the coincidence between disease and a small fly crop believe—but their absence is in itself a cause of sickness and epidemics. The fly is a vulture, a buzzard on a small scale. It is the most important, because the most numerous destroyer of pest-breeding material. It gets in on foul and decaying matter that can be reached by no other insect or animal, and destroys it. The quantity of this pestilential matter thus removed cannot be estimated, because the fly is always getting away with it in summer, while in winter the cold prevents its evil influences being felt. When, therefore, there are too few flies to thoroughly consume all the forms of the dead and decaying substance that fills the earth, the surplus pollutes the air, the soil and water, and creates and propagates disease.

In contradistinction to the above, Doctor Grassi, in an article in the *British Medical Journal* in 1883, on danger from flies, claimed to have made an important and by no means pleasant discovery in regard to flies. It was always recognized, said the learned Doctor, that these insects might carry the germs of infection on their wings or feet, but it was not known that they are capable of taking in at the mouth such objects of the ova of various worms, and of discharging them again in their feces. This point has now been established, and several striking experiments illustrate it. Dr. Grassi exposed in his laboratory a plate containing a great number of the eggs of a human parasite, the *Tricocephalus dispar*. Some sheets of white paper were placed in the kitchen, which stands

about 10 meters from the laboratory. After some hours, the usual little spots produced by the feces of the flies were found on the paper. These spots, when examined by the microscope, were found to contain some of the egg of the tricocephalus. Some of the flies themselves were then caught, and their intestines presented large numbers of the ova. Similar experiments with the ova of the *Oxyuris vermicularis* and of the *Tenia solium* afforded corresponding results. Shortly after the flies had some mouldy cream, the *Oidium lactis* was found in their feces. Dr. Grassi mentions an innocuous and yet conclusive experiment that every one can try. Sprinkle a little lycopodium on sweetened water, and afterward examine the feces and intestines of the flies; numerous spores will be found. As flies are by no means particular in choosing either a place to feed or a place to defecate, often selecting meat or food for the purpose, a somewhat alarming vision of possible consequences is raised.

SWISS TREATMENT OF CONSUMPTION.—An interesting report is given of the experiments made by Dr. Albrecht on consumptive patients in a hospital at Berne, Switzerland. These experiments were made with a view to ascertaining the effect of oxygen inhalation upon the development of phthisis, and whether by increasing the rate of organic combustion by this means the bacterium of phthisis had been discharged with certainty on several occasions. The patients were first submitted to an appropriately high nutritious diet, consisting of milk and peptone, and twice a week they were weighed with great care. It was observed that, as soon as the oxygen inhalations began, the daily loss of weight was checked, and in some cases the weight increased, dyspnea diminished, and the microscope showed fewer bacteria.

CIGARETTE SMOKING.—Cigarette smoking has become such a general nuisance, says a New York letter, that small signs have been printed and kept for sale, which read: "No smoking allowed in this office." A man who sells these says: "The greatest demand for them comes from the banks. The young men who make deposits and carry messages for business firms are mostly all addicted to the vice of smoking cigarettes. There is something about the smell of burning paper and poor tobacco that is excessively annoying to some men. It is almost poison to them, and I found that when I began printing these cards they had a ready sale. Now nearly every bank, lawyer's office and railroad office has one of them prominently displayed. If I could have patented the idea, I might have made a fortune out of it."

TEMPERATURE OF ROOMS.—The ventilation of rooms in which human beings must remain hours at a time is a very important matter. Separate rooms can only be kept anywhere near reasonably ventilated by raising the window-sash one inch from the bottom and lowering it a like distance from the top. By this means the air in the room is constantly renewed and drafts are avoided. In the sitting-room, see that the mercury remains about 70 degrees, rather below than above this. In the sleeping apartment 60 degrees is a very comfortable temperature. A higher degree of heat than this would be quite admissible where there are young children.

NERVOUS TOOTHACHE.—For ordinary nervous toothache, which is caused by the nervous system being out of order or by excessive fatigue, a very hot bath will soothe the nerves that sleep will naturally follow, and upon getting up the patient will feel very much refreshed and the toothache will be a thing of the past. For what is known as "jumping" toothache, hot, dry flannel applied to the face and neck is very effective. For common toothache, which is caused by indigestion, or by strong, sweet acid or anything very hot or cold in a decayed tooth, a little piece of cotton steeped in strong camphor or oil of cloves is the best remedy.

TREATMENT OF BOILS.—Halle recommends the following application in furuncle: Tannic acid, one part; powdered gum acacia, one part; tincture of arnica flowers, two parts. This is to be painted over the boil and for a little distance around it, several coats being applied until it forms a thick and firm covering. Halle states that this mode of treatment quickly relieves the pain and diminishes the swelling. When taken in time the boil disappears without the formation of pus; and when this has already occurred the application causes the extrusion of the core and prompt healing of the furuncle.

A VALUABLE INVENTION.—Edward Keeler, of Hokah, Minn., has invented a device to prevent accidents from people having their feet caught in the frogs of railroad tracks. The device consists of a piece of steel, so curved as to fit tightly in the crevices in the frog.

FOR ERYSIPELAS.—Dr. Sydney Thompson suggests the following formula in erysipelas: Fluid extract of jaborandi, twenty-four parts; laudanum and glycerine, each four parts. This mixture is to be painted over the affected surfaces every four hours.

GLYCERINE IN ACUTE NASAL CATARRH.—Cotton saturated in glycerine and introduced into the nares relieves the congestion at once.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador Ledger, Oct. 21: I have to report this week the closing of the Eureka or Amador Consolidated mine. They have been prospecting for six or seven years without any development of importance. Supplies of all kinds were exhausted, and winter close at hand; something had to be done. Last week word was sent from below to stop work. Only two men are kept for the purpose of keeping out the water. Matters are likely to remain this way at least until a meeting of stockholders is held. At the Lincoln only two or three men are employed, owing to the scarcity of water. They have plenty of ore, and it is said to be of paying grade. The stamps of the Iowa are also idle, waiting for rain. The Mahoney remains at ease, with the long expected operators still invisible. The Red Cross mine, situated about six miles east of here, was brought to a standstill a few days ago. The hands are manifesting some anxiety about their wages.

Kern.

THE TEHACHAPI MINES.—Kern Co. *Californian*, Oct. 21: We received a call this week from P. D. Greene, one of the oldest and best known of the residents of Tehachapi, who gave us some interesting facts respecting the mining interests of that part of the country. He estimates the number of distinct gold-bearing leads, which have thus far been found at not far from 20. They are located in the mountain chain that forms the southern boundary of the great depression in the Sierras, known as Tehachapi Pass, not far from the summit. The principal one, which is of great size, known as the Pine Tree, has many claims located upon it and affords ore of about uniform quality along an extent of a mile and a half. These claims, or several of them, have been profitably worked, without penetrating to any depth to speak of, for three years, and lately the lead has attracted the attention of parties from abroad who have bought interests, paying considerable sums for them. The ore is decomposed and taken out without blasting. Two tunnels are being run to strike the vein at a great depth, one of them having been pushed the distance of 400 feet. If the lead is found of the size it is on top and carrying the same amount of gold the owners will feel assured that they have a property of great and permanent value and the owners of those more recently discovered will be encouraged in the same degree. Mr. Greene feels confident that these leads will be found just as good, if not better, at great depths than on the surface, because the formation is similar to that in which the most noted mines in Amador county are situated. One of the recently discovered leads is as large as the Pine Tree and the ore is about the same grade. The rest are smaller, but some of them richer. Below these leads, at the edge of the plain, are placer diggings which have been worked to a greater or less extent since 1856, which evidently derived their gold from them and are a favorable indication of their value. Three mills are in operation; one of them was erected to do custom work. The miners and prospectors on the ground are quite numerous, and all busy and full of hope. But new life will be infused into operations if the tunnels make good strikes. Then more mills will go up, and one of the liveliest mining camps result which this country has ever had.

Mono.

STANDARD CON.—Bodie Free Press, Oct. 24: The retimbering of shaft continues favorable. Ore shipped to mill 323 tons. Bullion valued at \$10,525 shipped on Tuesday 20th.

MONO.—The drift south from No. 1 winze 550 (Lent shaft) level is in 80 feet. We find good ore in this drift. Fifteen men employed.

BODIE CON.—At the Bodie mine the report for the week is as follows: The east crosscut 700 (Lent shaft) level, is in 121 feet. North drift No. 1, 400 (Mono) level, is in 20 feet; north drift No. 2, same level, is in 128 feet. The joint upraise on same level, is up 102 feet. Thirty men employed.

CON. PACIFIC.—Since last report winze No. 2 has been sunk to a depth of 27 feet. Will resume work in winze No. 1, next week, and will connect the two for air, at or near the 50-foot level.

Nevada.

NORTH STAR MINE.—Grass Valley Union, Oct. 21: The North Star mine is beginning to justify the expectations of those who reorganized the company and put the mine again on a working basis, and at the present time there is a steady output of ore from various levels as tribute and company rock, and the yield is very satisfactory. Since the first of the present month, the ten stamps of the Larimer mill, which is under lease to the company, have been running steadily upon the rock, and the intention now is to put a force in the mine that will supply the full head of twenty stamps constantly with ore. Two clean-ups have been made since the mill started, for two weeks' run, the yield being \$6400, and the total for the month will be sufficient to leave a handsome margin of profit over expenses. This is doing very well for an old mine that the former company considered was worked out, and who shut it down for want of pluck in expending sufficient money for needed development. There is every probability that the North Star will again yield as profitably as at any time in its previous history.

MANZANITA GRAVEL MINE.—Nevada Transcript, Oct. 24: Superintendent Gowell of the Manzanita gravel mine in the northern edge of the town went below recently for the purpose of endeavoring to make arrangements for working the claim extensively by the drifting process. Two of the heavy stockholders are widows, and it is necessary to secure their consent before going ahead. Just after his arrival at the Bay, Mr. Gowell was taken sick, and this has delayed negotiations, but he is expected back here soon with authority to begin drifting. A number of men are now cleaning bedrock in the claim and getting considerable gold. All idea of further hydraulicking having been abandoned, the paving in the bedrock tunnel was taken up a short time ago, and quite a quantity of amalgam was realized in so doing.

THE COE MINE.—Grass Valley Union, Oct. 21: The Coe mine, situated at the head of Hill's Flat, on the Nevada road, has been bonded by the owner, E. W. Roberts, to George Murphy, in the interest of young John Robinson, the well known circus man. Mr. Robinson has already been engaged in mining prospecting here, and has so much confidence in the district that he is willing to make further investments. It is understood that the bond is only for a brief period, and that there was a cash payment upon the making of the agreement. The Coe was formerly worked with variable success under different ownerships, and although yielding good ore, and proving to be a strong vein, there was a good deal of unskilful underground work as well as false economy in the management, and thus, what was considered a meritorious mine by practical miners failed to be remunerative. The shaft is down 500 feet, but no stopping has been done at that depth. Under intelligent management and with such investment of money as the property will justify, there is no doubt that the Coe will prove a profitable gold producer.

Placer.

ANOTHER IMPORTANT DEVELOPMENT.—Placer Herald, Oct. 24: We learn from Mr. Jas. Laird, of Pmo, who made us a call Tuesday, that an important development has recently been made in the Geo. Lee mine, on the old Bradley place, east of Rocklin. It seems that Mr. Lee has been working off and on, on a gravel channel which is known to traverse that neighborhood, for some time, and with varying results. Not long ago he bonded his claim to a Mr. Burlston for 90 days. The latter at once put a force of men to running a drift up the channel. He has proceeded several hundred feet, and the gravel, from being one or two feet deep is now five or six feet deep, and is very rich, paying in some places nearly a dollar to the pan. Enough has been done to prove the existence of a big mine and a rich mine. That section has already yielded a great deal of gold, first and last, but Mr. Laird thinks there is \$100 there yet for every dollar that has been taken out.

FOREST HILL.—One of the main pumps in the famous Mayflower mine, near Forest Hill, gave out on Wednesday a week ago, which caused the mine to fill considerably with water, and seriously interfered with the work of taking out gravel. After working two days in the endeavor to repair the damages, it was finally concluded to put on bigger pumps and heavier machinery, and to secure these Superintendent Chappell went below last Saturday.

CRUSHING.—Placer Argus: The "Thirty-one mine," situated near Danville, was to have started work crushing rock last Monday. The mine, formerly owned by J. C. Crosby, is now run by a company of San Francisco mining men, who went to work energetically and spent several thousand dollars in erecting various works, including a ten-stamp mill.

PLACER'S MINES.—An item is going the rounds to this effect: "Placer county is having quite a boom in mining matters." This is true. Placer's drift and quartz mines never promised better. Some think from present indications that the gold yield of this county for the current year will exceed the yield of any other county in the State. The channel on the Forest Hill divide, recently located by developments in the Mayflower, contains as much wealth, doubtless, as ever came out of the Comstock, and Forest Hill to-day is one of the liveliest mining towns on the coast.

Shasta.

THE RICHEST YET.—Republican Free Press, Oct. 20: We were shown this morning a veritable curiosity in the shape of a mineral deposit. It was simply a conglomerate mass of lava, quartz and gravel, interspersed with bunches of gold particles about the size of and resembling large grape seeds. Mr. John O. Welsh, who showed us the specimen, says that it came from near Mt. Shasta, and was found about 40 feet from the surface. The discovery is called the "Great Northern Boom," and is the richest yet made, there being acres of this rich strata. There is much excitement regarding this new field of wealth.

NOTES.—Shasta Democrat, Oct. 21: A new pump for the Clark mine at Quartz Hill was taken to the mine yesterday. McCusick, ex-Postal agent, returned here Monday evening on a visit to the mines. We are told that fully 150 men are employed by the Iron Mountain mining company. Mining men are as thick as usual, and we hear several rumors of prospective sales of mining properties. Capt. Vincent, a commercial man, has bought an interest with "Wild Bill" in a quartz claim on China gulch. Dan O'Neal is running his cannon-ball mill on excellent rock taken from the first extension south of the Florida. Whitton & Bassett are running their horse arastra on their Squaw creek mine night and day on ore that averages over \$100 to the ton. Andy Eide and Andy Tilden have out 60 tons of fine ore from their mine on Salt creek and will have the same crushed in Merithew & Co.'s mill at Lower Springs. Hon. Reuben Clark returned to Colusa county last Friday morning, and yesterday evening one of his partners, Mr. Marshall, came up to take charge of the mine and mill at Quartz hill. Mr. Elijah Hickman of Tehama county has discovered a fine body of asbestos in this county, and yesterday went to Shasta and recorded his claim. Mr. Minear, proprietor of the Wiley mine at Deadwood, was in town Friday and Saturday last. He gave a good report of the district in general and says he is doing quite well with his property. He is running a long tunnel to tap the vein several hundred feet deep, and 150 feet more will finish it. A very rich gold quartz vein was recently struck on Jerusalem creek, within a few miles of Bullychoop, by an old prospector named Wheeler, which he has bonded to a company for \$10,000. The vein averages about two and a half feet in width, and we are told every pound of the ore prospects big in free gold and carries a heavy per cent in rich sulphurets. Jack Conant last week effected a sale of one-half of his group of claims on Squaw creek for \$50,000 to a New York company, and the deeds of transfer were filed in the clerk's office last Thursday. The purchasers are said to be a Mr. Reilly of the celebrated Copper Queen silver mine in Arizona, who has made several visits to the county this last summer, and a New York banker, the business having been transacted through a Mr. Matthews, a mining expert, who is at present at Redding. From Mr. Morse, who was up in the lumber regions of Pit River last week, we learn that a four-foot vein of coal was recently discovered near Buzzard Roost. The coal has been tried in a blacksmithing forge and for that purpose does as well as the best. It is the intention

of the parties making the discovery to develop it. As yet they do not know the extent of the deposit. This is the second discovery of coal in that part of the country.

NORTHWESTERN SHASTA.—Cor. Shasta Courier, Oct. 24: We are compelled to say that Sunny Hill mining district has received what we call a blackeye. That very rich company that lately bonded the Spencer lead, at a fair price, after having prospected the mine to their entire satisfaction, have thrown the enterprise up, and pronounced the mine a failure. Mr. Oats, Tim Quinn's "Flower of Sunny Hill" man, has struck his ledge by a tunnel of about 140 feet in length—the ledge is 14 inches in width, but of low grade ore. The vein shows permanency—being in terrible hard country rock. Levi Davis' mine, which was bonded to Spencer, a short time since, is a ledge of about 30 inches in width, and will mill \$100 per ton. In Bullychoop affairs continue encouraging, but Messrs. Potts, Foster, Finch & Co., are doing nothing at present on the Cumberland. That company have paid out a great deal of money this season, in completing the new toll road into Bullychoop, and it is quite likely, owing to the hard times, that they will not do much until another season. Prospects in the Big Central continue favorable, and the company are still taking out good milling rock. The Haskins and Enright Company are pushing their works ahead. The pending lawsuit between them and the Bullychoop Company have given them a little backset. Jasper Davis and brothers, are at work, and these hard-working boys has done a great deal to prove that the mines of the Bullychoop have "roots" for they have gone deep into the bowels of old mother earth and have found their ledge larger and richer than it is on the surface.

Sierra.

PRIMROSE.—Sierra Tribune, Oct. 20: The mine is situated pretty well up at the head of Hog canyon about five miles from Sierra City and on a range with the Sierra Buttes lead. The Primrose is one of the pioneer quartz mines of this county and during the time it was worked ranked as one of the most valuable. Since 1865 not a pound of ore has been taken from the Primrose chimney. However, at a later date a new shaft was sunk down 200 feet on another part of the claim and a tunnel started, which would tap the pay chimney about 150 feet below the old workings. This tunnel has been worked upon at different periods, until now it is in 1400 feet, and is undoubtedly very near the pay chimney. Taking the pitch of the vein where it was worked in former years, it is reasonable to believe that the tunnel will reach pay in 50 feet. The mine is very pleasantly situated and is on a good mineral belt. There is a fine water right connected with the property and any amount of timber close at hand. The milling facilities consist of one 12-stamp mill, having a reduction capacity of 24 tons in 24 hours. The machinery is so regulated that one engine furnishes power for the pumping and hoisting machinery as well as the stamps, and runs the whole with perfect ease. The drain tunnel is some 600 feet in length, and intersects the shaft 50 feet below surface, thus obviating the necessity of pumping water above that level. The mine is at present being operated by a company incorporated in Alameda county last June. They are making preparations to get a new pump, drain the shaft and then drive ahead the tunnel to the old Primrose chimney, which proved so rich in former years.

A LONG TUNNEL.—No. 9 tunnel, at the Sierra Buttes mine, is now in 6200 feet by actual survey. An upraise is being put through from this tunnel to No. 8 tunnel, which is 750 feet higher up.

STRINGER.—T. L. Flannigan was here from below last week looking after the Mead quartz claim, which has recently been purchased by him. The mine is situated in Hog canyon. Sam Baker was sent up there by the new owner to clear out the tunnel and do some other work.

Tuolumne.

LOCAL NOTES.—Sonora Democrat, Oct. 24: It is likely that the Hyde mine will be sold to San Francisco parties in a few days. Parties have recently been looking at the Eureka mine, Summersville, with a view to purchase. It is reported on good authority that \$500,000 was offered and refused for the Buchanan mine last week. The Kanaka mine at Groveland, was sold at Sheriff's sale last Saturday. W. R. Shaw was the purchaser, buying the mine in for \$5100. The Lamphier mill started up last Saturday, with a four months run of rock on hand. The chute in the south ground is showing up finely, the rock being stoped from it averaging \$30 per ton. We learn that the Italian or Onesti mine at Deer Flat, near Groveland in this county, has been bonded for 30 days to parties in San Francisco at good round figure—considerably in advance of what it was formerly held at—with every reason to believe that it will be sold. This goes to show the revival of quartz mining, which this county is sharing in common with all other mining counties of the State, and we can justly say that this county affords as fine a field for the judicious expenditure of effort and money in this line as any county in the State. Its past record and present indications prove this. This mine has been repeatedly brought to the attention of capitalists during the past year by Mr. Louis Blanding, who is now here, after a thorough examination of the mine and numerous tests made of the ores in his own mill in San Francisco and also in the 10-stamp mill on the ground—and he has always stated his decided opinion of its great value, and urged parties to investigate it for purchase. The present negotiations for its purchase were based upon a recommendation of the character and value of the mine made by Mr. Blanding to a gentleman here, who though knowing nothing of the mine personally, was induced by the full description and representations given him by Mr. Blanding to state his favorable impression of its merits and recommend action to the parties in San Francisco, making inquiries of him concerning it.

TELLURIDE.—Tuolumne Independent, Oct. 24: While testing some ore substituted to him yesterday from a vein in the vicinity of this town (Sonora), Mr. Louis Blanding discovered the presence of petzite, one of the forms of telluride of gold, and that it existed throughout the ores of the mine in paying quantities—even the snow-white quartz, though showing not a single indication of mineral or free gold, under a powerful glass, yielding the telluride in small quantity and many of the samples a very considerable percentage. The telluride was concentrated, but not closely, and gave by three separate tests made for verification, the extraordinary large result of \$60,000

per ton in gold—the silver in the ore not being estimated. The ore yields readily to treatment. This and other forms of telluride of gold has been found in Shasta, Sierra, Amador and Calaveras counties, and now Tuolumne county must be added to the list. This ore is the most valuable form of gold ore known to exist.

Trinity.

MORE QUARTZ.—Trinity Journal, Oct. 24: Mr. Nelson Waite tells us that Maxwell & Matthews have recently discovered a four-foot ledge on Squirrel Creek, about seven miles from Trinity Center, which prospects big. There is no free gold found, but the sulphurets are very rich, and the estimates place the rock at \$60 or \$70 per ton. Mr. Waite has several locations in the same neighborhood which show up well. The quartz is black and prospects favorably in free gold.

NEW RIVER.—Cor. Journal: New River still survives, and prospects were never better than at present. There is a scarcity of water which makes crushing ore with arrastras slow work. Messrs. Ladd & Clement are running through some very rich rock at present. They have two arrastras running—one on the Hard Tack and one on the Mountain Boomer. The Tough Nut arrastra started up this morning and will run steady from now on, Mr. Levasseur having opened up the mine in good shape. The Ridgeway Co. made a handsome clean-up, much better than they expected, as they were running on second-class ore. The Buckeye Co. struck a twenty-inch ledge on their lower level. This is one of the most promising mines in the district. The Uncle Sam mill will start up this week under new management, and no doubt will be a success, they having struck a winze on the lower level and struck a two-foot ledge of good ore. The Golden Gate is showing up in fine shape as are several others too numerous to mention. Several mines are lying idle waiting for water.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Oct. 24: There is but little to be said in the way of improvement developed on the 3100 level. The advancement of crosscut No. 3 west continues suspended in order to promote other operations, but will be resumed in a day or two. This crosscut is in about 13 feet, and is a pretty important matter, being 40 feet south of the deep winze and in good ore, which evidently extends southward, and should be intercepted by the two crosscuts further south. Crosscut No. 2, 90 feet from the Chollar north line, is now in about 50 feet in a good solid quartz vein formation, carrying streaks and bunches of ore in its face, some of which give high assays. It is being turned a little more to the northward. Crosscut No. 1 at the Chollar line, is in about 60 feet, and shows strongly mineralized quartz. On the 3000 level the crosscut west from the north lateral drift and about 50 feet south from the face, is now in about 20 feet in a heavy dry clay and quartz formation. Work will be resumed in the face of the north lateral drift Monday, advancing it towards the Savage line, which is something over 100 feet distant.

CHOLLAR.—Crosscut No. 1 west on the 3100 level, being driven jointly with the Hale & Norcross Co., is in about 60 feet in a strong, pure quartz formation. Work has been resumed in the southwest drift, from the main Combination west drift. This will explore the Chollar ground on that level very advantageously, its course taking it diagonally across the ledge to the west wall, which it is expected to reach in a distance of 150 feet. The completed hydraulic pump in the Combination shaft works perfectly with an abundance of reserve power, and giving the Cornish pump little or nothing to do. Quite a force of men under the management of Captain J. B. Overton, Superintendent of the Water Company, are employed in the old upper workings of the mine, preparing for the extraction of ore from that section. Some hundreds of tons which were extracted last spring, have recently been shipped to the Eureka mill, on Carson river, for reduction.

CON. CALIFORNIA AND VIRGINIA.—About 500 tons of ore were raised during the week from the 1750 level on company account, assaying \$24 per ton. About thirty men are employed in the Jones lease section, between the 1300 and 1400 levels, preparing better facilities for ore-extraction when an increase of water in the Carson river shall furnish the requisite motive power to run the Eureka mill. Considerable improvements have been and are being made at the surface works of the old Consolidated Virginia shaft, and a new building is about being erected over the hoisting works.

SIERRA NEVADA.—Work is suspended in the face of the crosscut west on the 520 level, 1000 feet north of the shaft; 436 feet is the full extent of this crosscut from the main lateral drift, and the material in its face indicated proximity to the west wall of the lode. At a point in this crosscut, 250 feet west from the main north lateral drift, a drift has been started north during the week in a favorable quartz-streak, which had been passed through. This drift is already in 30 feet from the crosscut, the material is fully one-third quartz, carrying streaks and bunches of low grade ore.

CROWN POINT.—Sufficient ore is being extracted from this mine and the Belcher to give the Mexican, Vivian and Santiago mills what their present limited capacity will allow them to crush, which, in the aggregate, amounts to about 160 tons per day. The old upper workings of Crown Point still show large amounts of low-grade ore. That from the Belcher is of higher grade, and comes from the 1750 level, above the water surface.

YELLOW JACKET.—About 170 tons continues to be the daily yield from the 1300 level and above. There is a vast amount of low-grade ore in the mine, and while regular extraction goes steadily along, keeping the Bunsnick mill well supplied, considerable prospecting work is being done in the upper portion of the mine, and also on the 1700 level through the Crown Point and Kentuck, above the water level.

UNION CONSOLIDATED.—On the 500 level the crosscut west from the main lateral drift is in a little over 100 feet. Face in vein porphyry and favorable looking quartz. The crosscut east on this same level, 100 feet south of the Sierra Nevada line, also shows very promising vein matter in its face.

OPHIR.—The main drift west on the 400 level continues passing through vein matter on its way to the west wall. The ore known to exist above this drift

will be stoped out by means of upraises. The ore house at the hoisting works has been repaired to receive it.

GOULD AND CURRY.—Crosscut No. 1 west at the Savage line, is now in 550 feet, having been advanced 46 feet during the week. Its face shows no change, being in the same material as last week—hard, dry vein porphyry, with an occasional streak of quartz.

BEST AND BELCHER.—On the 1000 level crosscut No. 2, west, 100 feet south of the old Consolidated Virginia line, is now in 336 feet, having been advanced 42 feet during the week. The face continues in vein porphyry, clay and quartz.

MEXICAN.—The middle crosscut east on the 500 level is being advanced at the rate of over 50 feet per week. The formation is heavy clay, vein porphyry and quartz, the whole looking favorable for the finding of an ore body.

KENTON.—Nothing new. Extracting the usual supply of ore from the old upper workings to keep the Rock Point mill steadily running.

ALTA.—The west drift on the 700 level makes steady and good advancement, and less than 100 feet further will carry it into the ore body.

Aurora District.

THE ENGLISH CO.—Walker Lake Bulletin, Oct. 24: Every now and then somebody interested in Hawthorne district complains that too much has been said about some property situated there. Every now and then somebody interested in the same place complains that too little has been said. The people of Aurora are just as bad as the operators in Hawthorne district. Those who have good information keep it until they can derive a benefit therefrom, and then want plenty of news spread to suit their own views. Those whose interests are the reverse wish the world to believe an entirely different story, and it is only by looking at the signs of the times and patching up a fabric from stray pieces of information that any idea of the exact situation can be obtained. As it is, judging from a few hints, as to date, derived from anxiety to have some other transaction completed at a certain time, and from the action of those apparently best informed, it seems pretty safe to say that the English company is making arrangements to begin operations in Aurora on or about the first of December.

Columbus District.

MOUNT DIABLO.—Candelaria True Fissure, Oct. 24: The incline has been sunk 20 feet during the week. The east drift on the sixth level is in 156 feet, and the west drift on the same level has been driven 10 feet during the week. The east intermediate drift from the winze connecting the fifth and sixth levels, has reached a length of 59 feet, while the west drift from the same winze is in 45 feet, and shows considerable ore, assaying about \$25 per ton. The east and west drifts on the fifth level show no change. The upraise from the intermediate, between the fourth and fifth levels, has attained a height of 44 feet, and shows from 8 to 10 inches of \$75 ore. The winze from the east drift, on the fourth level, is down 27 feet and shows favorable ground for ore. The east drift from winze No. 7 is in 45 feet and shows ledge matter with some low grade ore. The raise from the east drift on the second level is up 28 feet, and shows a few inches of \$40 ore.

Hawthorne District.

ANOTHER RUN.—Walker Lake Bulletin, Oct. 20: The Cat Creek mill, after having crushed about 20 tons of Lapanta rock, was again obliged to shut down for lack of water. The bar resulting from the clean-up last Saturday is valued \$1640, over \$80 to the ton. This is a pretty good return, as the rock worked was second-class. There is about the same quantity still at the mill which will be worked as soon as the water supply permits.

DO SOME WORK.—Everybody is putting up monuments and locating new claims, in the meantime but little work is being done in Hawthorne district. Those who have their mines opened are making money, but those who sit and wait for a purchaser will be likely to wait a long time. In many claims a few good mines will be discovered and the fortunate owners will get rich, and it is better to know whether a claim is worth holding or not; it is better to work it and learn that it is worthless, than to waste time sitting on a location monument waiting for a sale.

Patterson District.

ORE.—White Pine News, Oct. 20: Wm. Warmath, an old Treasure Hill miner, but now in Patterson district, has been in town several days looking for Mormon teams to haul ore to the railroad, either to Frisco or Deseret. From him we get the following particulars in regard to that district. Several locations are being worked and all give promise of proving valuable properties. Mr. Warmath, and John Kreiner are working the Saratoga and Viola, and have out quite a quantity of ore that assays from \$700 to \$700 to the ton. Messrs. Flowers and Peterson, both Hamilton men, are working the Victoria, Bender, and Great Western, and also have a quantity of fine ore awaiting shipment. The Mathewson Bros. own the Grey Eagle and several other locations upon which work is being done. Mr. Warmath believes that if a railroad came within any reasonable distance of Patterson that district would show up as a good bullion producer.

ARIZONA.

PINAL MOUNTAIN MINING NOTES.—Arizona Silver Belt, Oct. 24: From present indications the Pinal mountains are likely to become the best gold producing sections in this district, and to the limited amount of work done, the mines are showing up unusually well. Another good strike was made on the Cleveland mine, owned by Koons & Johnson, last week. The cut is about 16 feet long by 14 feet deep, and shows an ore body of 10 to 14 inches in thickness all the way down. Cut No. 1 is about 40 feet deep, and shows a fine body of native gold ore in the bottom. They have about 1½ tons sacked upon the dump and expect to have five tons ready to mill in a couple of weeks. This company also own the Hendricks claim, which is an extension of the Cleveland, as well as several other good claims near there. The Buena Vista, which is a farther west extension of the Cleveland, is owned by Ochs, White & Co., and is showing up extremely well. The main shaft is down 40 feet; the ledge is 11 to 14 inches wide all the way down, showing well in gold and silver. These parties have cut the ledge in different places, with the same result—each one showing that

the ledge holds out the full length of the claim. They have about five tons of ore on the dump, and intend building an arrastra. One peculiar feature of these mines is the ease with which they are worked; the formation is soft granite, full of slips, and so far has required no powder to blast, but yields readily to the pick and gad.

COLORADO.

LAKE COUNTY MINES.—Leadville Herald, Oct. 21: Dr. S. G. Canfield is working a profitable mine at Alicante, under a lease. The White Cap mine, of the Iron Hill consolidated group, is shipping some very fine ore. Mr. Crowe, as manager for Mr. J. L. Laws, will start up work in a few days on the Montana lode, on Fryer Hill. Mr. Joe Newton has taken a sub-lease on the Four Per Cent lode on Fryer Hill, and is now engaged in putting up a small steam-heating plant. Mr. Charles Pison is working a portion of the Catalpa mine under lease, and by prospecting the ground hopes to open up paying bodies of ore. The Blue Bird, on Sugar Loaf, leased to Wright Brothers, and the Stormy Lode, in the same vicinity, leased to Mr. Wilson, started up work in the past few days. The Amity lode, on Sugar Loaf Mountain, under lease to Messrs. Cohn & Truman, sent ten tons of fine ore to the Leadville smelters last week. The mine is owned by Mr. George O. Keeler. Mr. George A. Jenks has secured a two years lease on the Buckeye lode, situated on the north side of Fryer Hill. Two sub-leases have lately been let and the property is now being actively worked. Mr. Maxwell, who has a lease on the northern portion of the Amie lode, has placed a hoister on No. 5 shaft and is now engaged in straightening out a drift, preparatory to the extraction of ore. The hoisting engine on the Flagstaff shaft, on the north side of Iron Hill, was started up yesterday. Major Wilson and others have a contract to sink this shaft to mineral for a half interest in the lode. Mr. Finn, who has a lease on the extreme northern portion of the Chrysler property, has begun driving a shaft to the eastward. The drift is 82 feet from the surface and following a large body of iron ore. The purchases of ore in this district by Mr. Will Thompson, agent of the Pueblo smelter, during September, amounted to 4200 tons, of which 3700 tons were silver and lead ore and 500 tons silver-bearing iron ore. The Iron-Silver Mining Company, it is generally understood, has abandoned the project of moving the product of its mines by rail, and will continue employing about fifteen teams in the transportation of ore to the smelters. Messrs. Ward & O'Neil, who are working the lower portion of the Catalpa lode under a lease, are meeting with success. About ten days ago they started a new shaft, which, at 15 feet from the surface encountered a body of iron ore of value.

A diamond drill will be moved up to the Patrick shaft, on the Queen Consolidated, on Yankee Hill. The machine will be in operation in a few days, and it is to be hoped will prove more effective and economical in exploring the ground than a shaft with an uncontrollable flow of water.

IDAHO.

MORE GOLD IN THE BIG COPPER.—Houston Press, Oct. 21: Our prediction that this camp will eventually become a gold camp is rapidly proving to be a truism. In addition to the news of new and rich finds of gold quartz in several of the rock bound canyons that trend toward Houston, word came down to-day that another rich gold strike has been made in the Big Copper. The new find is nearly a thousand feet from the place of first discovery and there is every indication that the same ledge has been again tapped. If this theory proves to be correct who can estimate the vast amount of wealth that lies hidden within this mammoth ledge, 27 feet in width by 1000 feet in length and carrying from \$40.00 to \$204.00 in gold to each ton rock.

DOING BETTER THAN EVER.—Wood River Times, Oct. 21: The Queen of the Hills shows more ore than ever; the Climax is showing a bonanza; the Idahoan is yielding enormously; the Narrow Gauges are doing better than heretofore; the Cyclops and Red Cloud are showing a vast quantity of ore; the Pureka is about to be worked again; the Bay State group is doing well; the Homestake Fraction is showing rich ore; the Navaug and Bullwhacker are making regular shipments, while three or four other mines in their immediate vicinity will soon yield shipping lots of ore; on the Gold Belt the reducing capacity is being trebled and will doubtless be enormously increased in the spring; while the Smoky claims are turning out to be very rich and steadily produce ore in carload lots. All the above are mines directly tributary to Hailey. They are doing better than ever, and justify the prediction that time will be quite lively here next year, if Congress does not give silver "a black eye."

ANOTHER MILL.—Wood River Times, Oct. 21: Yesterday afternoon T. E. Ricotte, Idaho agent for the Wiswell mill machinery, received a telegraph dispatch from the works in Boston, stating that the mill just ordered for the Donovan group of claims, on the Camas Gold Belt, would be shipped next week. In 15 days from date of shipping, at the furthest the mill should be here. As Ole Rorem, who has charge of operations at the mines, will in the meantime have the grading completed and the building erected, and as the mill can be put together in three days, no delays should occur in starting. It is therefore safe to look for the starting-up of the mill by the 15th of November. If this mill works successfully, it will give a great impetus to the development of the Gold Belt, as it will be the second in successful operation—the experience of the Camas No. 2 Company having been so encouraging since it started up its mill, about three months ago, that it has already doubled the original number of stamps. Started up last July with 10 stamps, two more batteries of five stamps each are being put in place. This will give the Gold Belt an aggregate daily capacity of 50 to 75 tons. If, as there is every reason to believe, the works make a good all-winter run, there will be a positive boom on the Camas Gold Belt next year.

THE QUEEN OF THE HILLS.—Charles Popper, the principal stockholder in the Queen of the Hills and King of the Hills groups, arrived from New York yesterday, and laid over in Bellevue until this morning, in order to visit the Queen of the Hills. The Queen has been yielding 10 tons of first-class shipping ore the past eight months, that being the

capacity of the concentrating works; but Mr. Popper says that new works having a daily capacity of at least 40 tons will soon be erected, since there is no use in leaving so much ore idle as is in sight in the Queen.

MONTANA.

VARIOUS MINES.—Butte Miner, Oct. 21: The Late Acquisition, which is located on Montana street is worked by Messrs. Ed. Rodda & Co. A very rich ledge has been opened up and considerable high grade ore is being taken out. The Ophir, at the bottom of Colorado street, is being worked by its owners, and important developments are being made. Arrangements are being made to resume operations at the Gray Rock mine. At the Burlington considerable work is being prosecuted with the usual vigor and dispatch that characterizes the hard-working lessees, Messrs. Job, Madder & Co. The shaft is now down about 120 feet and cross cutting for the ledge at that point has been commenced. The stopes in the upper portion of the mine are producing large quantities of ore. The Magna Charta is running along in the usual smooth manner, and the stopes in the mine never looked better. The new hoisting works at the Elm Orlu mine is nearly completed, and a substantial plant of machinery is being put in place. The mine continues to look well and the usual quantity of ore is being extracted. The Moulton never looked better than at present, and there is no difficulty in supplying the mill with sufficient ore to keep it working. The Alice is producing well, and the supply of ore has been so great during the past few days that it was found necessary to lay off the miners a short time in order to give the great mills a chance to work off the surplus quantity of mineral that was piled up almost everywhere around the mines and mills. The Moose is looking well, and recent developments are of a very encouraging nature. It is reported that this mine will shortly pass into the hands of the Alice Co. Messrs. Stevens & Co., who are working the east end of the Rock Island on lease, are sinking the main shaft of that property with all possible dispatch. Tom Sturridge & Co. are working the western portion of the Rock Island, and are taking out considerable high grade ore. Messrs. Tretheway & Co. have given up their lease of the Annie and Ida mine at Walkerville, and that property is now worked by the original lessees, Messrs. Yount & Co., who speak very highly of the property. A large quantity of ore, going high in silver and gold, has recently been extracted from these mines. Messrs. Stoner & Co. are hard at work on the Blank Rock, and they are greatly encouraged in their labors by finding large quantities of good ore. The Narrow Gauge, in Deadwood gulch, is looking well, and large quantities of good ore are being shipped to the mills. At the Mount Moriah Messrs. Oatey & Co. are extracting considerable good ore. The mine is improving daily, and the lessees are very happy. Prospecting is the order of the day at the Union Consolidated mines, and the property is in a very encouraging condition. Some of the richest ore ever seen in this camp is being taken out of the Goldsmith. The mine looks splendid and is increasing in value daily. The Parrot mine was closed down a portion of last week, for the purpose of making some needed improvements to the machinery. The Fredonia mine, at Burlington, is rapidly coming to the front as a great ore producer. Messrs. Tom Rodda & Co. are working the mine on lease and are doing well. The Blue Bird is looking better than ever before, and an immense quantity of ore can be seen on the dump. The Gagnon holds its own. The several stopes are looking well, and large quantities of ore are daily extracted. Some very rich ore is being taken out of the Clear Grit. The general appearance of this property is very encouraging. Jim Cassidy, who lives below the St. Lawrence mine, while digging a cellar back of his house a few days ago, struck a ledge of ore. Jim has located his find, and is now working the ledge. The recent strike in the Rising Star is opening out well. The work of putting up the new building and other necessary work for the new engines at the Lexington mine is going along nicely. The mine is looking very favorable. The mills are running in the usual satisfactory manner, and there is no decrease in the bullion shipments.

NEW MEXICO.

WATER CANYON DISTRICT.—Socorro Bulletin, Oct. 24: Work on the Jane Bowman will be resumed soon. Will Smythe is shooting mineral out of the Fraells lode. Assessment work on the Nameless mine was completed last week. Work was inaugurated in the Jumper mine this week, and a road is being constructed from the mine to the concentrator. J. J. A. Dobbin, M. McLeish and P. Liddy have compromised their difficulties over the Bonaparte mine, which has been a bone of contention for more than a year past, and the title remains in the possession of the two latter. A Radcliff is deepening the shaft in the Ninevah copper mine. The property looks well.

COONEY CAMP.—Cooney Camp of the U. M. of N. M. is steadily increasing in importance. Sheridan's mine is working night and day, and ore is dumped daily in anticipation of a market. The Miller mill is running uninterruptedly on a constant supply of ore, and is shipping steadily via Silver City. Mr. Cooney is grading the site of his new mill. The plant which he has decided to erect without loss of time will be of the capacity of 20 stamps, and will be supplied with all of the recent improvements. This will give a great impetus to the camp, as the mill which he has formerly operated possessed only five stamps.

MISCELLANEOUS.—The Kelly mine is yielding its usual quota of ore to run the Billing works. The Graphic smelter of this city shipped 18 tons of bullion East on Wednesday. The Billing works are running as usual, and will turn out this month their usual amount of bullion. The Merritt mine continues to work night and day shifts, and is shipping mineral daily for the M. M. & N. Co.'s plant in this city. The Graphic M. & S. Co.'s plant is running its two sacks steadily. It is working smoothly, and producing bullion beyond the anticipation of the management. The Graphic is worked by night and day shifts, under the superintendency of Captain Day, and ships daily consignments of mineral to the Graphic smelter of this city.

OREGON.

BULLION.—Bedrock Democrat, Oct. 29: Yester-

day Cabell Bros. brought to town another clean-up from their mine in Granite district. It was 600 ounces of silver, the result of one week's run, and was purchased at the banking house of J. W. Virtue. This mine will produce sufficient ore to keep an extensive mill in operation, and with facilities for successfully working the mine, the output would be \$10,000 per week.

ANOTHER MILL.—We are reliably informed that Neuner will have a 10-stamp mill in the Pine creek district within 30 days. If this mill is properly managed by a practical miner, and not a theoretical crank, there will be some startling developments in a short time. We have not learned who will superintend the enterprise, but hope to see some practical miner in charge.

WOODVILLE.—Cor. Grant's Pass Courier, Oct. 24: The mining interests on Evans creek are assuming considerable importance now. Much prospecting is being done, and from samples of ore shown us by parties interested, we are led to believe some rich discoveries will be the result of further development. Our opinion of this district is, that if one-fourth of the work and capital expended in other localities was put in prospecting this vicinity—we mean both in Josephine county and that part of Jackson county contiguous—capitalists would at once take hold of and develop the discoveries into paying properties. Among the ledges developed may be mentioned as most prominent, the Oliver Boyd, in the vicinity of Woodville, which has a shaft 34 feet, cutting the ledge 20 feet from the surface, showing gold, silver, lead and copper. The vein is 3½ to 7 feet in width. The owners are talking of taking a rest for the purpose of prospecting other ground, with the best of indications. Stephen Beard has discovered a ledge which he deems a good one, from the fact that development thus far shows that the ore carries galena and sulphates. The ledge is cut by Evans creek, fifteen miles above Woodville, and the owner has the best of encouragement in its further development. John Robinson has a very promising prospect five miles above Woodville, on the south side of Evans creek, which indicates richness both in gold and silver. The formation is granite, and the vein is four feet in width. Messrs. Kinney & Lind have four men working on two quartz ledges near Woodville, with favorable prospects. It is only a question of time and further work when they expect to realize a very handsome return for their expenditure of labor and money. Mr. W. Hale is working a good claim on Grave creek, some distance above Leland, Josephine county. This is a placer, and Mr. Hale informs us that he has taken out and saved \$375 with one sluice box. This shows the richness of the diggings, from the fact that he has only worked them but a very short time. Mr. John Blacklock, on upper Grave creek, is working what he claims to be a good deposit carrying silver and copper. He is also one of the first miners of this section, and will do much towards developing this industry in that part of the country.

QUARTZ ON EVANS CREEK.—Several thousand dollars have been expended in the Evans creek mining district, prospecting quartz, during the summer and fall with very favorable results. Every ledge prospected has continued to improve, and if the ore will work to within three-fourths of assays, there are a number of paying ledges in this locality, though there is more or less base mineral in nearly all of them. Among the most promising ledges are the following: The Blacklock ledge on upper Grave creek, twenty miles from Woodville; the Cooper & Garmann ledge on Evans creek, twenty miles from Woodville; Five miles below is Burs & McKane lode and one mile below is another owned by Neathammer and others, Robinson & Rush have brought in some good-looking ore from a ledge some three miles up Evans creek, where there are five other claims within one and one-half miles from the railroad depot. The most of those who have claims have more muscle than money, and they have been at work with energy and determination, and we have no doubt but what some of them, as they well deserve, will meet with success. Nearly all of the ledges mentioned have this year's assessment work done, and some of the boys will try their luck in placers during the winter, and resume work on quartz again in the spring.

UTAH.

PARK NOTES.—Park Record, Oct. 24: Assessment work is being done all over the hills. The Ontario finally paid off for last month on Tuesday and Wednesday. The lessees of the Bonanza expect to make another shipment in a few days. The Daly Company has a force of men at work fixing the roads in good shape up Empire canyon. The owners of the Roaring Lion have four men at work on the property developing. Work on the Black Diamond was suspended a few weeks ago, but will be commenced again immediately. A first-class ore house is being built at the foot of the dump of the Ontario hoisting works No. 3, which will be a great convenience to the ore haulers. The Daly Company have an immense dump of ore alongside of their ore houses that is being held in reserve for shipment to the mill as soon as it is completed. Work on the Sampson drain tunnel which has been suspended for some time past has been resumed and it is expected that the tunnel will now be pushed until it cuts the ledge and drains the water from the mine. If the company succeeds in accomplishing this result the output of the mine will be materially increased as they will then be able to work to a depth of 500 feet without being bothered with water. Work on the Marsae mill is now confined chiefly to the inside, as the building is now completed and the large force of painters are fast completing the job of covering it with two coats of brown mineral paint. The Anchor works are second to none in the camp. The buildings constituting the hoisting works are not entirely finished as yet, but the foreman, Mr. Martin, calculated that by the first of November all the buildings will have been completed, the machinery put in working order and sinking in the shaft resumed and pushed with all possible speed. Their winter supply of provisions is about all in. There is enough cord wood and timbers on the ground to run them for six or eight months, and by the first of the coming month they will be fully prepared for a long winter of uninterrupted development of this valuable property. The hoisting works are especially calculated to resist the heavy pressure of snow that accumulates in that region during the winter, and no anxiety about that score is felt.

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION

Of the City and County of San Francisco.



PREMIUMS AWARDED.

SAN FRANCISCO TOOL COMPANY

WERE AWARDED AT MECHANICS' FAIR, 1885.

GRAND SILVER MEDAL.....	BEST DISPLAY OF TOOLS.
SILVER MEDAL.....	BEST ENGINE LATHE.
SILVER MEDAL.....	BEST DRILL PRESS.
GRAND BRONZE MEDAL.....	CENTRIFUGAL PUMP.
BRONZE MEDAL.....	HIGH SPEED ENGINE.
BRONZE MEDAL.....	BEST SHAPER.
DIPLOMA.....	BEST SHAFT COUPLING.
DIPLOMA.....	BEST CHECK AND FOOT VALVES.
DIPLOMA.....	SACK ELEVATOR.

AND AT SACRAMENTO STATE FAIR:

FIRST PREMIUM.....	ENGINE AND PUMP COMBINED.
FIRST PREMIUM.....	TURBINE WATER WHEEL.
SILVER MEDAL.....	LOFTUS PATENT VALVE.
SILVER MEDAL.....	SINGLE-ACTING ENGINE.
DIPLOMA.....	SACK ELEVATOR.

CORRESPONDENCE SOLICITED.

SAN FRANCISCO TOOL CO., First and Stevenson Sts., San Francisco.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES
FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 127 First Street, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED
For Best Slide Valve Engine
and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street,
SAN FRANCISCO.AUTOMATIC
ENGINES
A Specialty.HORSE POWERS, WINDMILLS, TANKS
and all kinds of Pumping Machinery built to order.
Awarded First Premium for Windmills at
Mechanics' Fair, 1885.

F. W. KROGH & CO.,

51 Beale St., San Francisco.

PATENTS. Thousands of Inventors throughout
the Pacific Coast can and will willingly
attest to the promptness, reliability and success of
Dewey & Co's U. S. and Foreign Patent Agency. No. 252
Market St. Elevator, 12 Front St., S. F.

VALUABLE CHROMIC IRON MINE.

Within 2 miles of Railroad.

Thousands of Tons on Surface.

CAPITAL WANTED TO DEVELOP.

Half share as equivalent, or will send outright. Address
G. W. SPAWORTH, Lang Station, Cal.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope,
Sisal Rope, Tarred Manila Rope, Hay Rope, Whale
Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

THE PACIFIC COAST

ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamoes, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank
Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.



THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

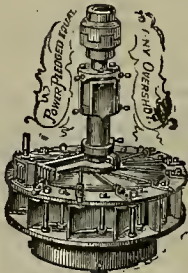
GENERAL AGENTS, SAN FRANCISCO, CAL.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

American Exchange Hotel,

SANSOME STREET.

Opposite Wells, Fargo & Co's Express, one door from
Bank of California, SAN FRANCISCO.This Hotel is in the very center of the business portion
of the city. The traveling public will find this to be the
most convenient as well as the most comfortable and
respectable Family Hotel in the city.Board and Room, \$1.00, \$1.25 and \$1.50
PER DAY, ACCORDING TO ROOM.Hot and Cold Baths Free. None but most obliging
white labor employed. Free Coach to and from
the Hotel.

MONTGOMERY BROS., Proprietors.

METALLURGIST.

A Graduate of the Mining School of Clausthal, with
some experience on this coast in Assaying, Amalgama-
ting, and general metallurgical work, is desirous of em-
ployment in Milling or Smelting. Speaks English, Ger-
man, French, and Spanish, and will go to Mexico, South
America or elsewhere. Address

ROBT. F. LETTS, Mining Engineer,

328 Montgomery St., San Francisco.

Room 18.

THE FAMOUS

DUPLEX

The most wonderful Cur-
ative Agent in the world.

Full Power Belt, for Lady or Gentleman, price \$10.

Cures without the aid of Medicine

General Debility, Nervous Prostration, Rheumatism

Neuralgia, the Liver,

Sciatica, the Kidney or

Paralysis, Constipation, Bladder

Semenal Weakness, Dyspepsia, Female Weakness,

Sick Headache, Insipient Catarrh, Insipient Con-

sumption, Lame Back, and many other diseases.

For particulars and Circulars address

Belt Pacific Electric Co.

SOLE PROPRIETORS,

330 Sutter St., San Francisco.



252 MARKET ST. S.F.

ELEVATOR 12 FRONT ST. S.F.

Remittances to this office should be made by postal
order or registered letter, when practicable. Cost of
postal order for \$15 or less, 10 cents; for registered letter,
in addition to regular postage (at 2 cents per half ounce),
1 cent.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

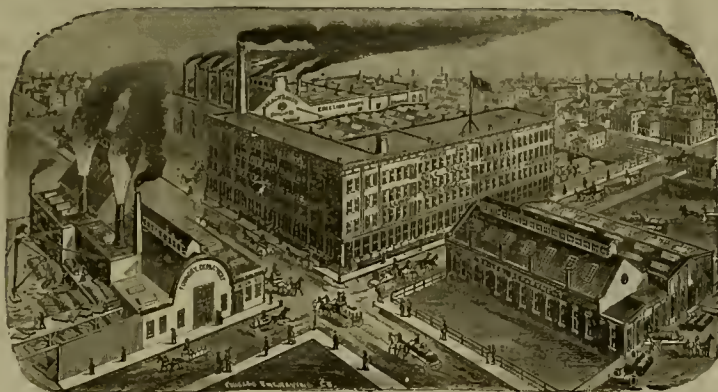
ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.Highest Prices Paid for
GOLD, SILVER and LEAD ORES
AND SULPHURETS.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.113 Leldesdorf Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.
C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL

Location of Works: Melrose, Alameda Co., Cal.
OFFICE: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 up-
ward per ton; Jewellers' sweepings and scrapings bought
or worked for the owners at a fixed rate per ton. Rebell-
ious ores especially solicited. Ores worked and practical
working tests made by any process, to wit: Amalgama-
tion in battery and copperplates for free gold ores. Amalga-
mation in pans for silver and gold ores, with or
without roasting. Leaching of silver ores. Chlorination
of gold sulphurets. Assaying, Chemical Analyses of Ores,
Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
624 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG-
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scoffers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we are
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

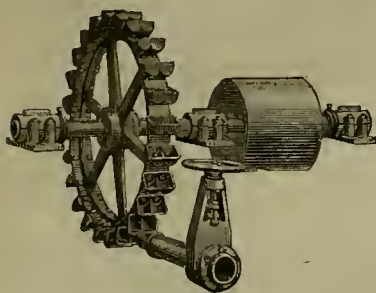
J. KUSTEL. H. KUSTEL.

METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leldesdorf Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MACHINE TOOLS,
PRESSES AND DIES,
PUNCHING and SHEARING
MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

N. W. SPAULDING
SAW COMPANY

Manufacturers of
SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Cata-
logue. 17 and 19 Fremont St., San Francisco.

L. PETERSON,
INVENTORS. MODEL MAKER,

258 Market St., N. E. cor Front, up-stairs, S. F. Experiment-
al machinery and all kinds of models, tin, copper and brass.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven Mfg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matcher Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

Lane and Bodley Saw mills.

H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

DEWEY & CO.'S

Scientific Press



Patent Agency.

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old
experienced, first-class Agency. We have able and trustworthy Associates and Agents in Wash-
ington and the capital cities of the principal nations of the world. In connection with our edi-
torial, scientific and Patent Law Library, and record of original cases in our office, we have
other advantages far beyond those which can be offered home inventors by other agencies. The
information accumulated through long and careful practice before the Office, and the frequent
examination of Patents already granted, for the purpose of determining the patentability of
inventions brought before us, enables us often to give advice which will save inventors the
expense of applying for Patents upon inventions which are not new. Circulars of advice sent
free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

GEO. H. STRONG.

The Debris Question.

The Sacramento Bee has received from Hon. Zach Montgomery the following letter, which is in reply to certain questions touching the debris from hydraulic mining:

DEPARTMENT OF THE INTERIOR, OFFICE OF THE ASSISTANT ATTORNEY-GENERAL, WASHINGTON, D. C., October 18, 1885.

Sir:—I have thus long delayed answering your favor of September ult., touching the debris question, for the reason that I was awaiting the return of the honorable Attorney-General from his much-needed vacation, in order to confer with him on the subject.

He has now returned, and, after a brief interview with him, touching the matters presented in your letter, I am fully confirmed in my previous convictions that, whenever the debris question comes before him in a legal and proper shape, he will not shrink from such action as may be found necessary and proper on his part in order to protect the rights of the Government against the evil to which you refer. Inasmuch, however, as the people of California are themselves the parties most immediately interested in the action they seem to desire at the hands of the Government, it will behoove them to take the initiative by presenting to the War Department a specific statement of the grievances of which they complain, and over which the Federal Government may properly exercise jurisdiction. The matter could then in due course be referred to the Attorney-General for investigation, and, if necessary, for legal action.

Of course there may be many evils resulting from hydraulic mining, affecting the health and property of individuals and communities, which of themselves can only furnish ground for relief at the hands of a State court. But, whenever it is shown to the satisfaction of the proper Federal authorities that the navigable waters of the Government are being seriously obstructed; that her harbors are in the process of destruction; or that the utility of her arsenals or navy yards is being imperiled, it will evidently become the plain duty of those charged with the administration of the general government, as the custodians of the public property and the guardians of the public welfare, to interpose their authority for the prevention of such evils.

As to the real merits of this question, no opinion is here expressed, for the reason that it is not my purpose to prejudge the case. Yet in view of the fact that the courts, both State and Federal, seem to have uniformly adjudged hydraulic mining to be a serious nuisance to those whose property has been made a receptacle for the vast deposits of mining debris, resulting from this peculiar industry, I do not deem it out of place, both as a friend to the miners themselves, and as an advocate of the peace and good order of society, to counsel a strict obedience to the law, as the only course to be thought of for the settlement of this troublesome question. He who pursues a contrary course not only makes himself a public enemy, but blindly rushes to his own ruin. For every one must see that the whole power both of the State and Federal Government must, and will, if necessary, be invoked to enforce the decrees of the courts.

Trusting that the day is not distant when a just, legal—and as far as possible—satisfactory solution of the "debris question" shall be effected, I am as ever the friend and well-wisher of all my countrymen. Respectfully, ZACH. MONTGOMERY.

New Concentrating Plant.

The Tabor Investment Co., of Denver, Col., realizing that mining men in supplying themselves with machinery are guided not only by theoretical calculations, but by facts practically illustrated, have fitted up the old Kimble mill at Twenty-eighth and Blake streets, Denver, with a complete concentrating plant of machinery, the patents of which they control. Their Harris pulverizer contains ten sets of rolls with capacity to pulverize 50 tons per day to 80-mesh. They have also one of the Matchless concentrating tables, called the "New Wonder," on account of its capacity to reach 50 tons per day. They now say to those having concentrating ore, "Bring in a sample as large as you choose to make it and we'll show you exactly what we can do for you."

Last week three runs were made: Boulder county tellurium ore, crude, \$17 per ton; concentrates, \$720 per ton; tailings showing only a trace of gold and silver, running two tons per hour; also \$22-ore from the "Old Lout" mine, San Juan county: Concentrates, \$90; tailings, only trace.

A run on the Col. Sellers ore, at Leadville, made the following showing: Crude ore, 15

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.					
COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ'T.	SALE.
Booker Con M Co.	California.	7.	05.	05.	23.
Con Pacific M Co.	California.	7.	15.	05.	27.
Cal Iron & Steel Co.	California.	7.	100.	05.	27.
Chollar M Co.	Nevada.	15.	50.	05.	21.
Dol Norte M Co.	California.	1.	30.	05.	11.
Excelsior M Co.	Nevada.	22.	20.	05.	21.
Equitable Tunnel M Co.	Utah.	32.	10.	05.	31.
Golden Fleece M Co.	California.	2.	30.	05.	12.
Guadalupe M Co.	California.	1.	05.	05.	12.
Hale & Norcross M Co.	Nevada.	10.	100.	05.	23.
Holmes M Co.	California.	2.	05.	05.	23.
Johnson Gravel M Co.	California.	2.	05.	05.	23.
Mexican G & S M Co.	Nevada.	30.	25.	05.	23.
Martin White M Co.	Nevada.	20.	10.	05.	23.
Mountain Tunnel G M Co.	California.	1.	40.	05.	23.
Potosi M Co.	Nevada.	20.	25.	05.	23.
Russell Reduc & M Co.	California.	1.	25.	05.	23.
Summit M Co.	California.	1.	05.	05.	23.
Savage M Co.	Nevada.	64.	50.	05.	23.
Sierra Nevada M Co.	Nevada.	33.	25.	05.	23.
Sulphur Bank Q M Co.	California.	4.	05.	05.	23.
Thompson M Co.	California.	1.	05.	05.	23.
Union Con M Co.	Nevada.	31.	10.	05.	23.
Virginia Creek M Co.	California.	2.	10.	05.	23.
Willow Creek M Co.	Nevada.	2.	100.	05.	23.

MEETINGS TO BE HELD.					
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bodie Tunnel M Co.	California.	C. C. Harvey.	309 California St.	Annual.	Nov 9
Con Anador M Co.	California.	F. B. Latham.	327 Pine St.	Annual.	Nov 2
General Lee M Co.	Nevada.	C. E. Gillett.	628 Montgomery St.	Annual.	Nov 3

LATEST DIVIDENDS—WITHIN THREE MONTHS.					
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Jackson M Co.	California.	D. C. Bates.	328 Montgomery st.	10.	Oct 5
Kosuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery st.	06.	Mar 15
Manhattan S M Co.	Nevada.	John Crockett.	415 California st.	25.	Sept 1
Mc Diablo M Co.	Nevada.	R. W. Heath.	318 Pine st.	20.	July 30
Navajo M Co.	Nevada.	J. W. Poy.	310 Pine st.	25.	Feb 13
Plymouth Con G M Co.	California.	W. Van Norden.	25 Nassau st.	25.	Oct 15
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery st.	25.	Oct 15
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California st.	10.	Sept 8

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Oct. 21-27																								
Thursday	.00	54	Sy	Cy.	.00	67	E	Cl.	.00	68	SE	Cy.	.00	60	NW	Cy.	.00	73	W	Cl.	.00	63	W	Cl.
Friday	.01	53	NW	Fr.	.00	70	NW	Cl.	.00	67	NW	Cl.	.00	60	N	Cl.	.00	73	W	Cl.	.00	68	NW	Cl.
Saturday	.10	60	S	Th.	.00	68	N	Cy.	.00	66	NW	Fr.	.00	61	NE	Cl.	.00	76	W	Cl.	.00	67	NW	Cl.
Sunday	.17	56	SE	LR.	.00	67	E	Fr.	.00	68	NW	Fr.	.00	63	W	Fr.	.00	76	W	Cl.	.00	67	NW	Cl.
Monday	.12	59	NW	Fr.	.00	73	N	Cl.	.00	70	NW	Cl.	.00	63	W	Cl.	.00	83	W	Cl.	.00	70	NW	Cl.
Tuesday	.01	57	S	Cy.	.00	72	W	Fr.	.00	74	NW	Cl.	.00	66	NW	Cl.	.00	82	S	Cl.	.00	69	NW	Cl.
Wednesday	.24	54	NW	LR.	.00	71	S	Fr.	.00	74	SW	Fr.	.00	62	W	Cl.	.00	78	W	Cl.	.00	65	W	Cl.
Totals	.65				.00				.00				.00				.00				.00			

EXPLANATION.—Cl, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:00 m. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

per cent lead, 30 per cent zinc, \$17 silver; concentrates, 65 per cent lead, 6 per cent zinc, \$90 silver.

As concentrating ore is necessarily low grade and its value principally in its bulk, a machine that will successfully treat large quantities is what mining men have been looking forward to, and the correspondent who sends us the above facts thinks that the "Matchless" plant appears to fill the bill in each particular.

Mining Share Market.

The opening up of the 3100 level of the Hale & Norcross and Chollar through the crosscuts west into the ore vein is making good progress, and is the principal leading feature of the Comstock mining situation at present. Here in the city the stock market is languishing, and will continue to do so until some bona fide development is made in the Comstock mines. None of the crosscuts have yet been advanced far enough west to get into the real merits of the ore vein, except No. 3 in Hale and Norcross, 40 feet south of the deep winze. This cut into the eastern border of the vein, and after passing through two or three small streaks of good ore it was stopped with its face all in good excellent ore, the extent of which can only be obtained by further advancement. Work at this point was temporarily suspended in order to facilitate operations elsewhere, but will be resumed next week. The big hydraulic pump at the Combination shaft being fully completed, all work is now concentrated upon the development of the ore resources of the 3100 level, which will be prosecuted with all due diligence henceforward. Sinking for the 3200 level is not talked of at present, but will eventually be done.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department No. 1, San Francisco.

AUTOMATIC PUMP CO.—Oct. 25th. Capital stock, \$100,000. Directors: W. A. Scollay, E. E. Walker, J. W. Spencer, Porter E. Sanborn, John and E. Lange.

SAN FRANCISCO CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS. Oct. 25th. Directors: George H. Sanders, J. J. Clark, Augustus Laver, J. B. Whittemore and T. J. Welsh.

EQUITABLE BUILDING AND LOAN ASSOCIATION. October 25th. Capital stock, \$1,000,000. Directors: H. Liebes, W. B. Bradbury, J. D. Barr, A. J. Marcus, B. Feigenbaum, Frederick Hess, Charles Alpers and Jacob Goldberg.

RITCHIE CREEK WATER CO.—Oct. 25th. Object: Supplying the towns of Calistoga and St. Helena and intermediate places in Napa county with water. Capital stock, \$25,000. Directors: L. A. Garrett, H. Cramer, M. F. Hitchcock, E. W. Coit and H. N. Clement.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 8.	WEEK ENDING Oct. 15.	WEEK ENDING Oct. 22.	WEEK ENDING Oct. 31.
Alta.	.15	.20	.20	.60
Alta.	.20	.25	.25	.20
Andes.	.30	.35	.35	.30
Argenta.	.10	.15	.15	.10
Belcher.	1.05	1.20	1.50	1.45
Belding.	1.15	1.15	1.40	1.65
Best & Belcher.	1.30	.35	.35	.40
Bullion.	.30	.35	.35	.40
Bonanza King.	.30	.35	.35	.40
Belle Isle.	.10	.10	.10	.15
Bodie Con.	1.55	1.70	1.55	2.75
Bodie Tunnel.	.30	.30	.30	.30
Bulwer.	.30	.30	.30	.30
California.	1.30	1.50	1.20	1.40
Challenge.	.30	.30	.30	.30
Champion.	1.05	1.20	.30	1.15
Chollar.	.30	.30	.30	.30
Confidence.	.75	.80	1.00	.90
Con. Imperial.	1.30	1.50	1.20	1.40
Con. Virginia.	1.30	1.50	1.20	1.40
Crown Point.	1.00	1.55	1.10	1.45
Day.	4.00	3.25	2.75	2.25
Eureka Con.	.30	.30	.30	.30
Eureka Tunnel.	.30	.30	.30	.30
Excelsior.	.30	.30	.30	.30
Grand Prize.	.30	.30	.30	.30
Gould & Curry.	.75	.80	.70	.80
Goodshaw.	.30	.30	.30	.30
Hale & Norcross.	4.30	4.90	3.75	4.50
Holmes.	.30	.30	.30	.30
Independence.	.30	.30	.30	.30
Julia.	.15	.15	.15	.15
Justices.	.15	.15	.15	.15
Martin White.	1.40	1.60	1.85	2.35
Mono.	.35	.45	.40	.65
Mexican.	.35	.45	.40	.65
N. D. Diabolo.	2.90	.40	.40	2.50
North Belle.	.50	.40	.40	.40
Navajo.	.50	.40	.40	.40
North Belle Isle.	.10	.10	.10	.15
Occidental.	.30	.30	.30	.30
Ophir.	.70	.80	.85	.85
Overman.	.20	.20	.20	.25
Potosi.	.25	.25	.25	.25
Pinal Con.	1.30	1.65	1.30	1.50
Savage.	1.30	1.65	1.30	1.50
Sigs. Belcher.	.65	.80	.50	.70
Sierra Nevada.	.65	.80	.50	.70
Silver Hill.	.65	.80	.50	.70
Silver King.	6.25	6.25	6.25	6.25
Scorpion.	.30	.30	.30	.30
Syndicate.	.30	.30	.30	.30
Tioga.	.35	.45	.40	.65
Union Con.	1.15	1.30	.35	.60
Utah.	.40	.40	.40	.50
Yellow Jacket.	1.70	1.75	1.90	2.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Oct. 29.	1375	Hale & Nor.	3.00@3.10
280 Alta.	290	Mexican.	.80@.85
100 Andes.	300	Mono.	3.50@3.00
220 B. & Belcher.	1.35@1.40	Navajo.	.50
250 Bodie Con.	2.50	Ophir.	1.15@1.20
250 Bulwer.	.50	Potosi.	.60
20 Con Va & Cal.	1.35	Sigs. Savage.	1.25@1.30
220 Chollar.	.35@.40	Syndicate.	.35
40 Champion.	.35	Sierra Nevada.	.75
50 Crown Point.	1.15	Union.	.50
550 Gould & Curry.	.35@.40	Utah.	.50

MANY houses are being torn down and removed from Bodie to Hawthorne, Nev., where there is quite a mining excitement.

THE placer mines of Montana, it is estimated, have yielded a total sum of \$150,000,000.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.
Rough—Cargos. Prices are at present as follows: Rough, merchantable, 3/4 M ft., \$13.00; Rough, clear and surfaced, \$24.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x8 V Rustic, No. 1, \$22.00; 1x8, tongued and grooved, \$21.00; 1x4, tongued and grooved, headed, \$23.00; 1/2-in. x 3, Batens (board measure), \$30.00; Shingles, 3/4 M, \$1.65.

Pine—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 50 ft lengths, \$16.00; do 50 to 80 ft, \$17.00; T and C Flooring, 1x6, \$26.00; do do 1x6, \$28.00; do do 1x4, \$23.00; do do No. 2, \$21.00; Vertical Grain T and C Flooring, 1x6, \$30.00; do do do 1x6, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft., 1/4 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:
Pine, Rough, 40 to 50 ft lengths, \$16.00; do 50 to 80 ft, \$17.00; T and C Flooring, 1 x 6, 1 x 8, 1 x 10, 1 x 12, 1 x 14, 1 x 16, 1 x 18, 1 x 20, 1 x 22, 1 x 24, 1 x 26, 1 x 28, 1 x 30, 1 x 32, 1 x 34, 1 x 36, 1 x 38, 1 x 40, 1 x 42, 1 x 44, 1 x 46, 1 x 48, 1 x 50, 1 x 52, 1 x 54, 1 x 56, 1 x 58, 1 x 60, 1 x 62, 1 x 64, 1 x 66, 1 x 68, 1 x 70, 1 x 72, 1 x 74, 1 x 76, 1 x 78, 1 x 80, 1 x 82, 1 x 84, 1 x 86, 1 x 88, 1 x 90, 1 x 92, 1 x 94, 1 x 96, 1 x 98, 1 x 100, 1 x 102, 1 x 104, 1 x 106, 1 x 108, 1 x 110, 1 x 112, 1 x 114, 1 x 116, 1 x 118, 1 x 120, 1 x 122, 1 x 124, 1 x 126, 1 x 128, 1 x 130, 1 x 132, 1 x 134, 1 x 136, 1 x 138, 1 x 140, 1 x 142, 1 x 144, 1 x 146, 1 x 148, 1 x 150, 1 x 152, 1 x 154, 1 x 156, 1 x 158, 1 x 160, 1 x 162, 1 x 164, 1 x 166, 1 x 168, 1 x 170, 1 x 172, 1 x 174, 1 x 176, 1 x 178, 1 x 180, 1 x 182, 1 x 184, 1 x 186, 1 x 188, 1 x 190, 1 x 192, 1 x 194, 1 x 196, 1 x 198, 1 x 200, 1 x 202, 1 x 204, 1 x 206, 1 x 208, 1 x 210, 1 x 212, 1 x 214, 1 x 216, 1 x 218, 1 x 220, 1 x 222, 1 x 224, 1 x 226, 1 x 228, 1 x 230, 1 x 232, 1 x 234, 1 x 236, 1 x 238, 1 x 240, 1 x 242, 1 x 244, 1 x 246, 1 x 248, 1 x 250, 1 x 252, 1 x 254, 1 x 256, 1 x 258, 1 x 260, 1 x 262, 1 x 264, 1 x 266, 1 x 268, 1 x 270, 1 x 272, 1 x 274, 1 x 276, 1 x 278, 1 x 280, 1 x 282, 1 x 284, 1 x 286, 1 x 288, 1 x 290, 1 x 292, 1 x 294, 1 x 296, 1 x 298, 1 x 300, 1 x 302, 1 x 304, 1 x 306, 1 x 308, 1 x 310, 1 x 312, 1 x 314, 1 x 316, 1 x 318, 1 x 320, 1 x 322, 1 x 324, 1 x 326, 1 x 328, 1 x 330, 1 x 332, 1 x 334, 1 x 336, 1 x 338, 1 x 340, 1 x 342, 1 x 344, 1 x 346, 1 x 348, 1 x 350, 1 x 352, 1 x 354, 1 x 356, 1 x 358, 1 x 360, 1 x 362, 1 x 364, 1 x 366, 1 x 368, 1 x 370, 1 x 372, 1 x 374, 1 x 376, 1 x 378, 1 x 380, 1 x 382, 1 x 384, 1 x 386, 1 x 388, 1 x 390, 1 x 392, 1 x 394, 1 x 396, 1 x 398, 1 x 400, 1 x 402, 1 x 404, 1 x 406, 1 x 408, 1 x 410, 1 x 412, 1 x 414, 1 x 416, 1 x 418, 1 x 420, 1 x 422, 1 x 424, 1 x 426, 1 x 428, 1 x 430, 1 x 432, 1 x 434, 1 x 436, 1 x 438, 1 x 440, 1 x 442, 1 x 444, 1 x 446, 1 x 448, 1 x 450, 1 x 452, 1 x 454, 1 x 456, 1 x 458, 1 x 460, 1 x 462, 1 x 464, 1 x 466, 1 x 468, 1 x 470, 1 x 472, 1 x 474, 1 x 4

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT ABSTRACT, 252 Market St., S. F.

FOR WEEK ENDING OCTOBER 20, 1885.

328,560.—GATE.—Jas. Bardin, Jr., Salinas, Cal.
328,762.—BEDSTEAD FOR WIRE MATTRESSES.—T. S. Clark, S. F.
328,663.—WASHING MACHINE.—M. N. Easley, Drain, Or.
329,580.—TOP PLATE FOR STOVES, ETC.—John Forbes, S. F.
328,809.—HOT AIR STOVE.—R. A. Rew, Pomeroy, W. T.
328,521.—SINGLE ACTING ENGINE.—John Richards, S. F.
328,522.—SINGLE ACTING ENGINE.—John Richards, S. F.
328,530.—DERRIER FORKS.—C. Stone, Walnut Creek, Cal.
328,531.—STEAM GENERATOR.—H. Stutsman, East Portland, Or.
328,547.—CAR COUPLING.—A. W. Van Dorston, Portland, Or.
12,609.—TRADE MARK.—W. T. Coleman & Co., S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SAW.—Henry W. Wheeler, S. F. Assignor to Tatum & Bowen. No. 328,164. Dated Oct. 13, 1885. This is an improvement in inserted-tooth and chisel-bit saws. It consists of supplemental plates or extensions fitted in the periphery of the saw-plate extending outward therefrom, and having their front and rear edges formed to receive the holding-shanks and cutting-teeth or bits. In all inserted tooth and chisel-bit saws the saw-plate wears thin upon the rim or periphery behind the hits from the constant passage of the sawdust and from the friction, and the sockets in which the shanks are fitted soon become enlarged, so that the shanks and bits wear loose from constant changing, and the saws soon become worthless on this account. By the supplemental plates provided by this invention as many teeth may go in the saw as may be got into a solid rim, and the arrangement is such that it will not affect the tension of the saw detrimentally. The invention is applicable to all saws in which the chisel-tooth is used, whether the tooth be held by a shank-wedge or other device, and is applicable to repairing old saws.

GATE.—James Bardin, Jr., Salinas. No. 328,560. Dated Oct. 20, 1885. This is one of the automatic gates which are operated by the action of the wheels of a passing vehicle running down a crank-lever in the roadbed; and the invention consists of a gate centrally pivoted and adapted in the course of its several movements to make a complete revolution, opening and closing the road at alternate quarter-circle movements, a loose sheave on the pivotal axis of the gate and connected therewith by a pawl and ratchet, weights suspended by cords from the sheave and adapted to operate the gate, crank-levers in the roadbed connected by cords with the sheave, whereby said sheave is rotated to wind up the weights, in sliding latches limiting the gate and connected by pivoted levers and cords with the crank-levers and sheave, whereby they are withdrawn by the action of the vehicle wheels on the crank-levers.

PIPE-WRENCH.—Richard E. Williams, Modesto. No. 328,167. Dated Oct. 13, 1885. This relates to that class of pipe wrenches in which a curved corrugated jaw is pivoted to a stock or handle and works in connection with a fixed corrugated jaw on the end of the stock or handle. The invention consists in the novel arrangement of the two jaws, and in an improvement by which they are guided and held in a true position when in operation. Both jaws are of the same thickness, and lie flush with each other, so that the wrench will have a good grip on a short pipe.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical and scientific progress, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTELL—Amador and Calaveras Co's.
F. H. HORN—Nevada (State).
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Bernardino Co.
R. G. HUSTON—Idaho and Montana.
Geo. McDOWELL—Fulmer and Fresno Co's.
HUGH ELIAS—Nevada Co.
J. DE PUE, Sutter and Butte Co's.
B. E. LLOYD, Stanislaus and Merced Co's.
J. WINKLER, Alameda Co.
T. BATES, Shasta and Tehama Co's.
M. L. DENNIS, Plumas and Sierra Co's.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes thereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications "Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores," that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Methods; The Assay Office; Preparation of the Ore; Weighing the Ore; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expellents; Assay Tables.

The volume embraces 166 12mo. pages, with illustrations, well bound in cloth. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.
Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Selenium; Appendix to Part I; New Assays; Weighing by Oscillation; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by DEWEY & CO., Publishers, No. 252 Market St., S. F.

These are much needed books for miners and other practical men, by an intelligent miner and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

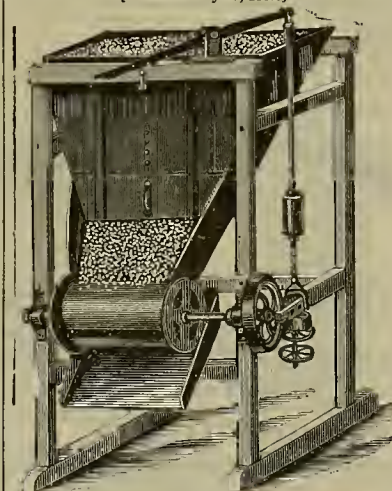
San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Oct. 29, 1885.	
ANTIMONY—Per pound.....	12 00
Hallet's.....	12 00
Cookson's.....	13 00
BORAX—Refined.....	65 00
IRON—Glengarnock ton.....	24 00
Eglington, ton.....	22 50
American Soft, ton.....	24 00
Oregon Pig, ton.....	24 00
Clipper Cap, Nos. 1 & 4.....	23 00
Clay Lane White.....	24 00
Shots, No. 1.....	24 50
Strzel—English, lb.....	15 00
Black Diamond, ordinary sizes.....	13 00
Pow.....	8 00
Machinery.....	8 00
San Francisco Bros.....	13 00
COPPER—	
Braziers sizes.....	20 00
Fire-box sheets.....	20 00
Bolt.....	20 00
Yellow Metal.....	12 00
Ingot.....	13 00
LEAD—Pig.....	4 00
Bar.....	4 00
Pipe.....	7 00
Sheet.....	8 00
Shot, discount 10% on 500 bag Drop, 75 bag.....	1 85 00
Buck, 35 bag.....	2 05 00
Chilled, do.....	2 25 00
TRIPLES—Coke.....	5 15 00
Charcoal.....	6 15 00
ZINC—German.....	9 00
Sheet, 7x3 ft. 7 to 10 lb. less the scale.....	7 00
QUICKSILVER—By the flask.....	29 75
Flasks, new.....	1 00 00
Flasks, old.....	85 00
NEW YORK PRICES—	
California Borax, concentrated.....	6 00
Pig Iron, American.....	17 00
Quicksilver.....	43 00
Lead.....	4 10 00
Copper.....	11 00
Tin.....	20 00
Bar Silver.....	1 03 00

THE ROLLER ORE FEEDER

(Patented May 28, 1882.)



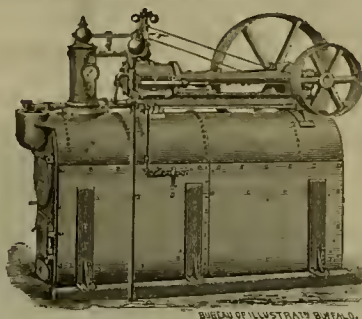
This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.
Sole Manufacturers,
237 First Street, SAN FRANCISCO, CAL.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.



SKINNER ENGINE COMPANY'S

CELEBRATED

PORTABLE ENGINES and BOILERS.

Three Gold Medals at the New Orleans Exposition over 25 Competitors.

ALL SIZES CARRIED IN STOCK.

STEEL BOILERS

All sizes and styles made to order. (2-sheet Steel Boilers a specialty.) 2000 H. P. sold on the Coast during past three months.

STEARNS MANUF'G CO.,

29 & 31 Spear Street, San Francisco.

HEALD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

ASSESSMENT NOTICE.

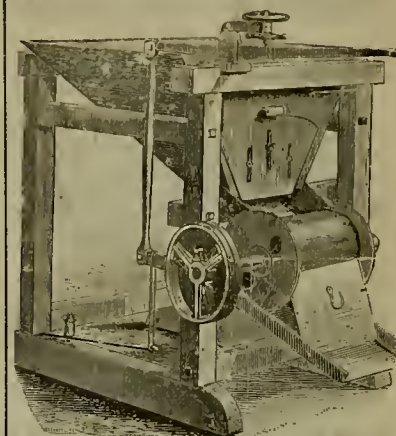
Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley, Nevada county, Cal. NOTICE is hereby given, that at a meeting of the Directors, held on the 17th day of September, 1885, an Assessment (No. 12) of Five (5) Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 934 and 936 Mission street, San Francisco, Cal. Any stock upon which this Assessment shall remain unpaid on the second day of November, 1885, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday the twenty-third day of November, 1885, to pay the delinquent Assessment, together with costs of advertising and expenses of sale.

GEO. P. THURSTON, Secretary.

OFFICE—934 and 936 Mission St., San Francisco, Cal.

THE ORIGINAL Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



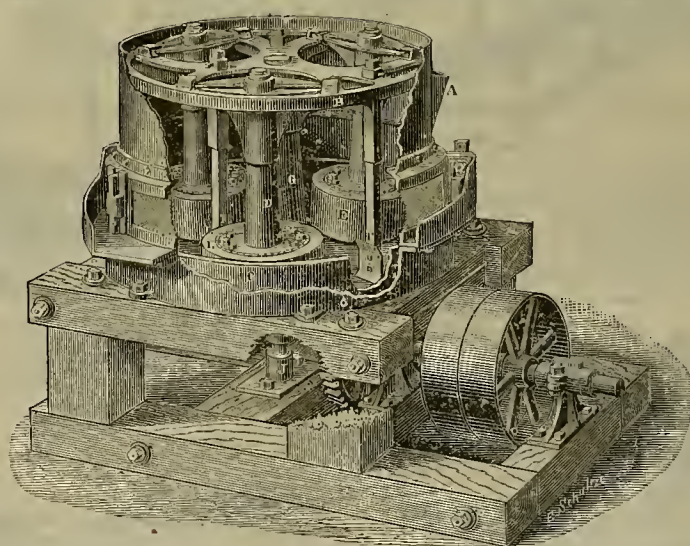
This form of Ore Feeder is well adapted for its peculiar work. Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.



Economy in Expense of Plant. Economy in Cost of Working. Economy in Saving Gold. Economy in Transportation of Machinery. Economy in Cost of Erection of Mill at Mine. Economy in Time Required to Establish Plant (one day only being consumed).

The Huntington Mill has passed entirely through the experimental stage. Two years of continuous use at a number of mines in California has enabled the inventor to perfect and improve the machinery until he feels justified in assuring the public that he has reached THE ABSOLUTE in the construction of a perfect Quartz Mill.

ROCK BREAKERS, CONCENTRATORS

.....AND.....

Mining Machinery

Of Every Description. Send for Circulars.

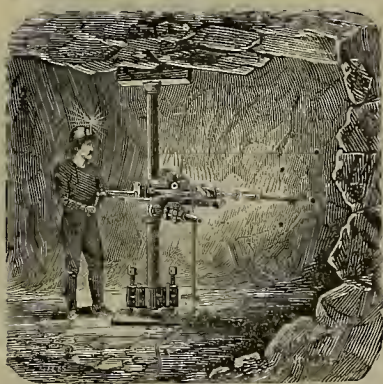
.....MANUFACTURED BY.....

F. A. HUNTINGTON,

45 Fremont Street, San Francisco, Cal.

FRASER & CHALMERS,

Cor. Fulton and Union Sts., Chicago, Ill.



INGERSOLL ROCK DRILLS

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

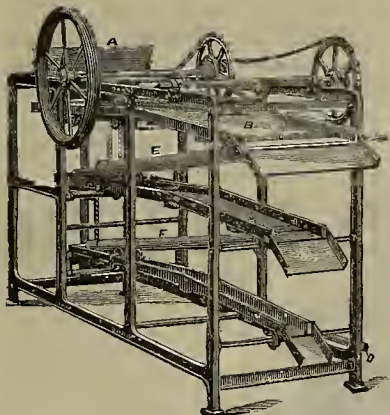
For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or fast fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.

Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of
all kinds of
Chemical Stoneware
—FOR—
Manufacturing
Chemists.
Also Chemical Brick
for Glover Tower.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.
WARRANTED.

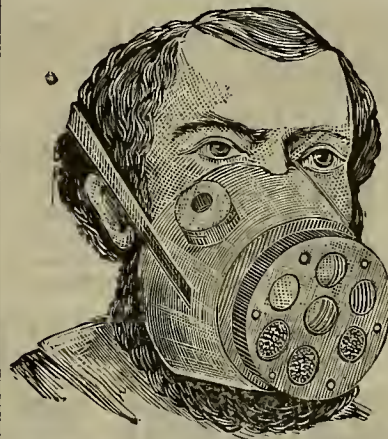
J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.



PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Gunpowder Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

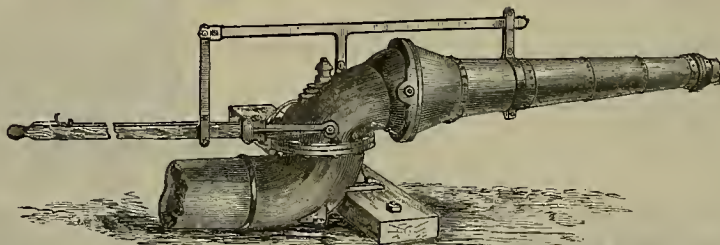
In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to
T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.

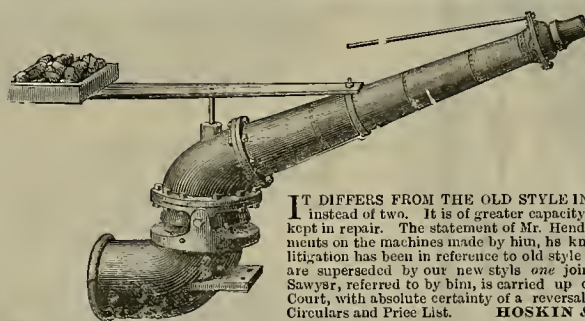
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

IMPROVED HYDRAULIC MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Gate Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
 2. Sand or grit of any kind will not injure the seat.
 3. You do not have to take them off to repair them.
 4. They can be repaired by any mechanic in a few minutes.
 5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.
- In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be disconnected from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Disc." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

Iron and Machine Works.

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

OMAS T. HOMPSON

THORNTON THOMPSON.

THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

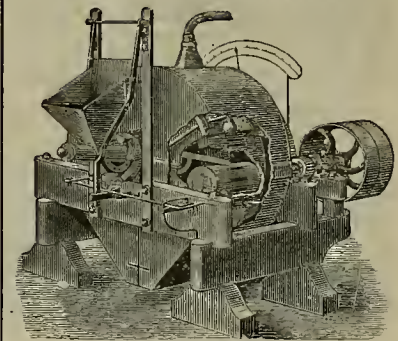
Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

Tustin's Pulverizer WORKS ORE WET OR DRY.

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

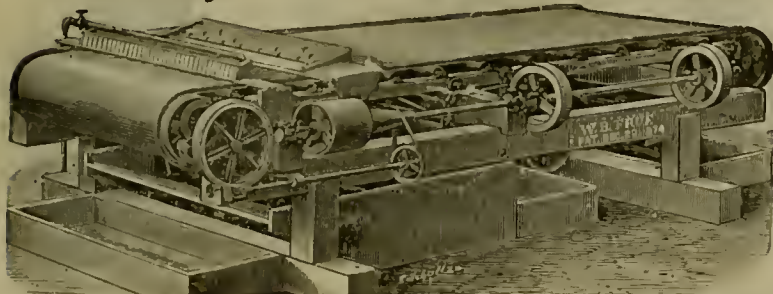
ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY is the oldest established and most successful on this Pacific Coast. No. 252 Market St., Elevator 12 Front St., S. F.

\$1,000 CHALLENGE!



PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove this Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1863, Dec. 22, 1874, Sept. 2, 1870, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

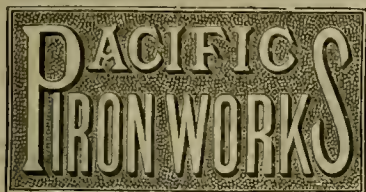
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.



1850. 1885.
RANKIN, BRAYTON & CO.,
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all the AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....
Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —
HOMOGENEOUS STEEL, SOFT and DUCTILE,
SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/2 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



Chicago Prices Beaten!
ESTABLISHED 1860.
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.
J. W. QUICK, Prop'r.
Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Shot Cut and Shot Trench Screens. Mining Screens a Specialty, from 1 to 15 feet.
Orders Promptly Executed.

Geo. W. Prescott, President.
Irving M. Scott, Gen'l Manager.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. Dickie, Manager.
J. O'B. Gonn, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Teeted and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

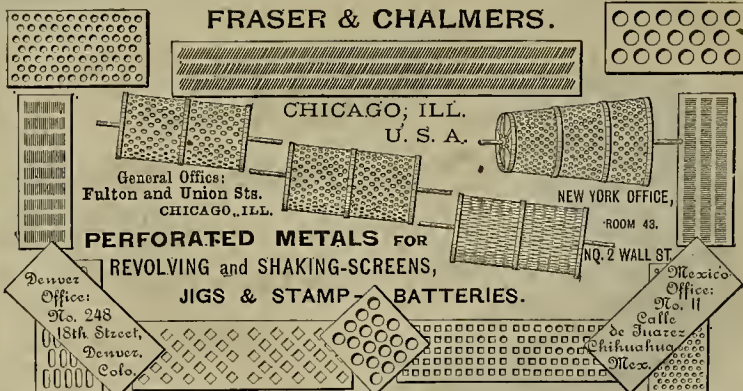
UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

FRASER & CHALMERS.



CHICAGO, ILL.
U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,
ROOM 43,
NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.

Denver Office:
No. 248
18th Street,
Denver,
Colo.

Mexico Office:
No. 11
Calle
de San Juan
de los Rios,
Chihuahua,
Mex.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

The most Complete Compound
manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid
and Alkali-Proof.



PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.

Property Owners are interested
personally

In seeing that their roofs are painted or
repaired only with the

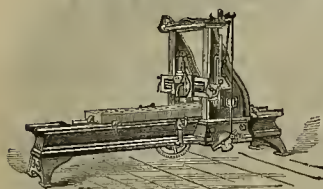
P. & B. Paint

Try our Compounds for Water-proofing
and Preserving Canvas, Rope, and
Leather.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



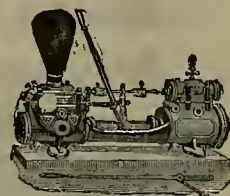
Putnam Planer.

PARKE & LACY.

IMPORTERS OF AND DEALERS IN

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

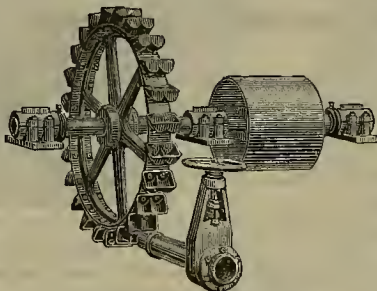
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

WIRE FENCING

Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Barbed Wire.**WIRE CLOTH.**

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.

STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.

GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY WORKS, 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St, San Francisco, Cal.

**MICA MINE.**

Capital Wanted to Develop.

Half Share offered as equivalent.

ADDRESS

G. W. SPAWFORTH, Lang Station, Cal.

A. T. DEWEY.
W. B. EWER.
GEO. H. STRONG.

Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not few. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

AN EXPERIENCED ASSAYER,

Speaking Spanish Fluently,

Desires an Engagement.

Address A. R., this Office.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 7, 1885.

VOLUME LI
Number 19.

Reading for Mining Camps.

Several miners employed in a mine in Idaho agreed recently to club together and subscribe for a number of papers for winter reading. The idea is a good one and should be followed by miners in other places. Even in those mining camps where mining is carried on all winter there are many days when little can be done, and the long evenings are apt to be tedious in any case. Loafing around saloons and playing cards is, to say the least, an unprofitable amusement, and one which is apt to pall upon the taste of the more intelligent people. There are some, of course, who will never read under any circumstances. They can, but they will not. They are perfectly satisfied with their experience and do not care to learn that of others. As a consequence they often commit blunders or make mistakes which might have been avoided had they read of the experience of others. Reading men are, of course, apt to be better informed and more intelligent than those who never look at a newspaper or technical journal devoted to their special branch of business.

It is found, however, that even those with no special taste for reading will take books occasionally to examine if they have the opportunity. In most mining camps there are no libraries and little reading matter; but when books are to be had they are eagerly read by some of the men. The writer of these paragraphs well remembers his experience in that matter some 15 years ago in a little mining camp in this State. Among other things brought to his cabin when he found it was probable he would stay a year or more, were a couple of hundred books. Some were on mining and metallurgical subjects, but most of them were standard works of English literature. The books in that little library were read and re-read by many miners in the camp, a large proportion of which had never had an opportunity to peruse works of the class. Many were the thanks received by the writer for pleasant hours given by means of these books. He also had the city dailies, the magazines, and the illustrated weeklies sent to him regularly by a kind and remembering mother. When the mail came once a week there were always several dozen miners from the neighboring cabins who came to see these papers, and they went from hand to hand until the next batch came. It was surprising to see how eagerly they were read.

The means employed by these Idaho miners—that of clubbing together—gives them the advantage of having a number of papers for small expense. Not only the local papers, but the great city dailies, the magazines, technical and mining papers may be subscribed for. Their presence in saloons or boarding houses is sure to exercise a good influence. They result in discussions and interchange of views, and serve to while away many hours which might otherwise be passed in idleness. It is not idleness to read, by any means, for men improve themselves thereby, which they do not do unless occupied in some way. The example of the miners referred to can be followed in many a camp to the great benefit of those who take advantage of it.

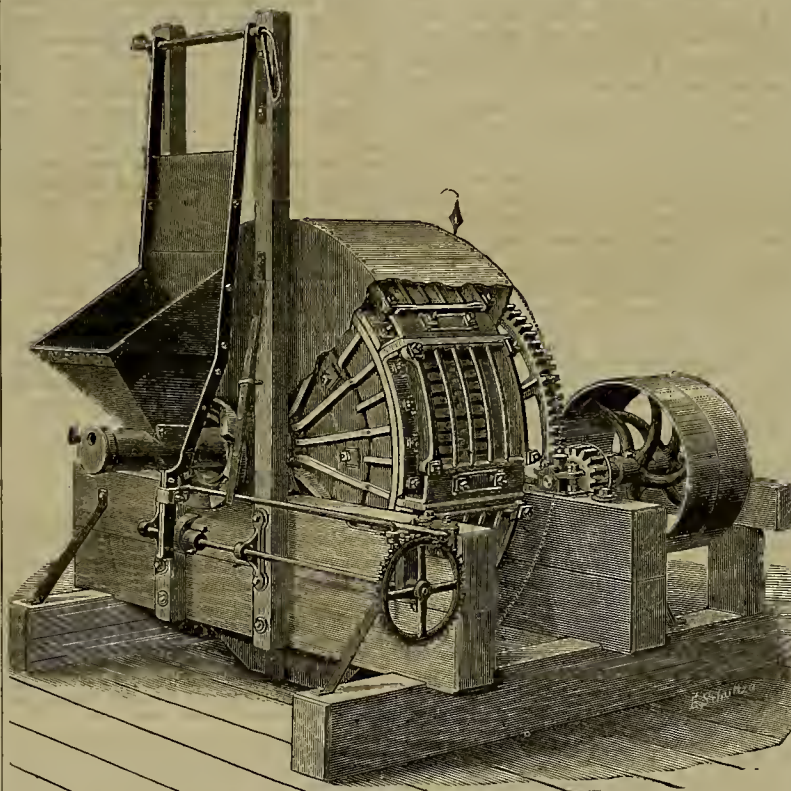
Four tunnels are to be run into Red Mountain, Montana, for mining purposes. It is supposed there are many quartz veins in the mountain.

The Tustin Ore Mill.

The Tustin ore mill is intended to obviate the necessity of using stamps in pulverizing ore. It was invented several years since, and has been improved from time to time as experience dictated, until now it is considered a perfect piece of mechanism for the purposes for which it is intended. Messrs. Hinckley, Spiers and Hayes of the Fulton Iron Works are the agents and manufacturers for this coast, which is sufficient guarantee of the character of the construction of the machine.

The mill is capable of working ores either wet or dry, and feeds itself automatically. We

For this machine the inventor and manufacturer claim the following, among other special points of merit: cheapness, lightness of weight, being comparatively small; compactness, requiring but little room; requires but little power to run it, $3\frac{1}{2}$ horse-power being sufficient; is easily set up, two men being able to put it up in two days, and no expensive foundation being required; it runs so slow that it does not heat, makes no noise, and creates no dust; it feeds itself automatically; granulates the ore uniformly, and makes but little slime, which so interferes with successful amalgamation, leaching or concentrating; the wearing parts are durable, consisting of hard cast-iron, which can be readily



THE IMPROVED TUSTIN ORE MILL.

present here a cut of this mill with a portion broken away to show the interior arrangement. The cylinder in this (the largest sized machine) is 54 inches in diameter, 18 inches between heads. Slotted dies secure the circumference of the heads in place, and wire screens are secured outside of all. Inside the cylinder, and resting loosely on the dies, are two cast-iron rolls, weighing respectively 700 and 1000 pounds.

The cylinder revolves on journals, and is driven by gear which turns it 25 times a minute.

The ore is fed from a hanging hopper through one of the journals, which is hollow. In action the rolls revolve in the opposite direction from that in which the cylinder turns. The ore being fed in, is crushed between the rolls and the dies, and drops through the slots in the screens, where what is fine enough is sifted through, and what is too coarse is again carried under the rolls. Horse-power required $3\frac{1}{2}$; capacity, 30 tons roasted ore per 24 hours, or from 12 to 20 tons raw ore, depending on its hardness.

removed and new parts put in, and is so simple in all its parts and construction that but little skill is required for setting it up, or repairing or running it.

This inventor and manufacturers of the Tustin machine have numerous letters from millmen and metallurgists testifying to its good points as above set forth. It has also on several occasions been awarded a premium by the Mechanics' Institute, as the best quartz mill exhibited, whether for wet or dry crushing.

One of these machines can be seen at the Ore Sampling and Pulverizing Works of Messrs. Hofmann Brothers, S. W. corner Fifth and Bryant streets, San Francisco, where it is in daily operation. It is the smallest size, capacity equal to a five-stamp battery, and will pulverize from five to ten tons in 24 hours, according to the hardness of the ore, through a No. 40 mesh screen, $1\frac{1}{2}$ horse-power required. Weight, 5000 pounds; heaviest piece, 425 pounds. Price, \$600. Larger size, weight, 11,000 pounds; heaviest piece, 1100 pounds; price, \$1100; capacity, 12 to 20 tons per day; $3\frac{1}{2}$ horse-power required.

Distribution of Ores.

The regularity of the distribution of ores in the Pacific Division of the United States and its relation to the irregularly uniform topography, long ago drew the attention of writers to the resources of this region. Mr. W. P. Blake first published a note on the subject in 1866, and his statement was accepted and enlarged upon by Clarence King in 1870. The more detailed technical and scientific investigations of later years have greatly increased our knowledge of the distribution and extent of the ores, and it will now scarcely be maintained there are more than four well-defined and continuous ore belts west of the Rocky mountains. Dr. Geo. F. Becker, in his "Geological Sketch of the Pacific Division," in referring to these belts, says: Beginning at the east the first is that at the western part of the Wahsatch and the southwestern continuation of that range. With the exception of the Leeds (Silver Reef) district all the important ore deposits of Utah lie in the foothills of this range, bearing a very definite relation to the main line of crests.

The gold and copper belt of California stands for a long distance in a similar relation to the Sierra Nevada. The quicksilver belt on the California coast ranges is not quite so regular in its occurrence, yet its direction is nearly parallel to the coast, and it is very persistent, though nowhere broad, for some 300 or 400 miles. The Arizona belt is less known than any of the others, but no one can glance at a map of the Territory showing the mining districts without perceiving that these lie in a northwestern and southeastern line diagonally across the country. The mining districts in Nevada are extremely numerous, so much so, indeed, that some grounds could be given for assuming a belt to run in almost any desired direction, but they are scarcely close or regular enough to any one line to compel the observer to regard them as connected.

Agents and Correspondents.

We have a number of agents and correspondents now at work in different places on this coast, who are gathering information for the benefit of our readers and taking subscriptions at the same time. Mr. J. J. Bartell is engaged in Amador and Calaveras counties; E. L. Richards, San Bernardino; Geo. McDowell, Tulare and Fresno; Hugh Elias, Nevada county; J. De Pue, Sutter and Butte; B. E. Lloyd, Stanislaus and Merced; J. Winkler, Alameda; T. Bates, Shasta and Tehama; M. L. Dennys, Plumas and Sierra. In the State of Nevada, F. H. Horn is traveling for us; in Arizona, G. W. Ingalls, and in Idaho and Montana, R. G. Huston. The first of the series of letters from Mr. Huston appears in this week's PRESS.

As we send none but worthy men to represent the PRESS, we hope that our friends and subscribers will extend to them such courtesies as may lie in their power. It is often easy to greatly aid our agents and correspondents in the various towns and camps by assisting them in gaining information and indicating those persons likely to be regular readers of a paper like the PRESS. We aim to make a paper which will be of value to the industrial classes of this coast, but need their co-operation to carry on the work satisfactorily. Those who will assist our representatives at the points they visit will place us and them under great obligations.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Notes from the Interior.

The Changes of 36 years—Mining and Milling Quartz in California—Where the Miners Can Still Make Wages.

EDITORS PRESS:—Visiting not long since the central mining counties of California, portions of El Dorado and Placer included, I had occasion to cross the deep canyon through which flows the Middle Fork of the American river, making the passage at what is now known as Grey Eagle "Bar." The last time I had made this crossing was just 36 years before, but I found the trail coming up on the south side just as steep, and not much different otherwise now from what it was then. There was the same sixteen hundred feet to be climbed in advancing a direct distance of a little more than one mile, and the same zig-zag trail, increasing the distance, as traveled, to nearly three. There have been constructed fine broad wagon-roads across these canyons, but they are generally a long way apart, with only foot or bridle trails for crossing along the intervals between them. But you will say I found the general aspect of the country greatly changed from what it was 36 years ago. No, I did not. In its general aspect it has changed very little. The scattered forests of cedar, spruce and pine cover the tall red hills as before. The deep, dark canyons remain the same. Here and there you come to a miner's or a woodman's cabin, or a settler's house and barn, with some land enclosed, some fruit trees planted, and perhaps a little grain raised. At longer intervals you strike a quartz mill or a mining hamlet, the larger towns being few and far between. Away from the railroad there is not in Placer county a town containing a thousand inhabitants, nor in El Dorado more than two or three that have a greater population than that.

And yet the mining industry throughout this region, hydraulics excepted, is in a generally healthy and prosperous condition, much solid progress having been made during the past two or three years. With the subsidence of stock gambling and other mere speculative movements the business began to improve, mine owners going to work on their claims and getting them into proper shape for producing bullion instead of doctoring them for a stock deal, or holding them for a market. Since applying themselves more earnestly and honestly to the business, our miners have learned it pretty well, and are now turning this knowledge and the experiences so acquired to good practical account.

The advances made in quartz mining are very noticeable, especially in the matter of introducing labor-saving machinery, as the incident I am about to relate tends to establish. Coming up the trail aforesaid about the first of the present month, I heard, when near the top, the pounding of a quartz-mill, which a little further on came in sight. Arrived at the place, I entered without knocking, there being enough of that going on within. These quartz mills are, in fact, rather open institutions, especially about the base, where on this occasion I made my ingress. Here is where the settlers are located, and I was not surprised to find them doing their work without an attendant, as indeed none is necessary. On the next floor above, the amalgamators were in like manner grinding away with no one in sight: ascending still higher, where the concentrators were looking after the sulphurets, I naturally expected to find someone around, but I did not, nor did I see a single person in or about that quartz mill going from bottom to top, and for the very good reason that there was no one there: not a man, even in the battery room, as, why should there be, seeing the cams were lifting and dropping the stamps with due regularity without any human assistance, and the self-feeders were supplying the ore to the batteries more evenly and steadily than could be done by hand? So, too, the grizzlie and the rock-crusher, located higher up, being able to get along for a time without looking after, why should not this day attendant have gone out into the cooler air and seating himself on the log, where I found him, proceeded to discuss the political situation with lawyer nongues? The well-appointed quartz mill may very properly be left to take care of itself, but how shall the political machine be run without looking after? Of course, this was the sensible view taken of the case by him on the log.

And now lest it be supposed that a mill so left to itself must necessarily do its work in a slovenly and wasteful manner, let me tell you that such is not the case: operations at this mine, the Josephins, being conducted as well and as cheaply, perhaps, as at any other in California, the cost of ore extraction and reduction being only \$1.50 per ton. Not only so, but the owners are planning to reduce this figure. After a time, when ore hoisting shall come to be done by connecting the gear by means of belts and pulleys with the present motive power, raising the ore will not cost over 90 cents per ton instead of \$1, as at present. This change in the machinery effecting the two mill attendants, one by day and the other by night will have to apply a portion of their spare time attending to the hoisting signals. Such is the progress being

made in quartz mining and milling in California. When human agencies shall have been wholly eliminated from the business there will be an end of changing shifts and labor strikes.

Leaving this time, labor, and gold-saving establishment, a further descent of a few hundred feet brought me to the top of the Georgetown Divide, where I found still other works of this kind operating with almost equal economy. One reason that quartz milling can be carried on here at so little expense being the cheap water power supplied to many of the mills by the California Water Company, whose large and well-constructed ditch traverses this divide throughout its entire length. This property, now in splendid condition and carrying a heavy flow of water, is under the management of the Hon. Thomas Findley, who has also charge of the Idaho quartz mine, a valuable and well conducted property, equipped with a five-stamp mill, and situated a few miles above Georgetown.

Coming further down towards Greenwood, we arrive in the country of the seam diggings, small, rich veins of quartz got out with picks and crowbars, aided, sometimes, by hydraulic pining. Only a few miners are at work here, though I see no reason why a great many might not find profitable employment in these diggings, as the veins are rich, numerous and capable of being worked at little expense. Here is a favorable field for the employment of the small hand crusher, invented by a member of the house of John Taylor & Co., who, having completed a number of these machines, are just putting them on the market. I see by advance sheets of the book entitled "Gold Mines and Mining in California," about to issue from the press of Geo. Spaulding & Co., that this district will be designated as one of the places where the working miner can make at least living wages in California, this pointing out of such localities being one of the many valuable features of that book.

HENRY DEGROOT.

Calaveras County Mines.

EDITORS PRESS:—In the halcyon days of '49 when the turbulent miners were digging out the precious metal from the numerous streams, bars and gulches throughout the foothills of the Sierras, this upper terrace of the mountains remained unprospected, and was yet a howling wilderness, where the Digger Indian still roamed amid these lofty pines, undisturbed by the untimely intrusions of civilized man, and the deer still grazed on the thousands hills as he had for a myriad of centuries past. But this state of affairs was not permitted to be prolonged in a region so approximate to a field that was being furrowed by the adventurous miner.

In those early days the miners that worked on the Mokelumne river diligently followed the coarse gold to a certain locality, situated below the intersection of the confluent of that golden stream. From the point where the coarse gold ceased to exist, the fine gold commenced and continued to higher altitudes, and this proved evident to the more experienced: that gold-bearing quartz existed in the higher Sierras; so doubts and theories were not allowed to rest, and were soon brought to practical test. The Mexicans took the initiative step towards prospecting this new region, they having mastered the art of quartz mining in their own primitive methods, in the State of Sonora. They were the only class in those early days that understood quartz and prospecting for it. So a party of Sonorians started at once from Campo Seco and Lancha Plana, in quest of that which might substantiate their visionary dreams. After one day's journeying into the mountains they pitched their tents on the right bank of the north fork of the Mokelumne river near the American bar, and opposite what is now known as the old Bucher's ranch. Their pains were soon rewarded by finding a rich quartz ledge, which yielded many thousand dollars worth of ore, and was afterwards known as the Campanya mine. Mule arastras were used to reduce the ore taken from the mine.

The next party that followed was a squad of Texan rangers. Tom Deer and Pete Gass were among them. Pete is to-day lingering in the Calaveras county hospital, and spinning yarns of his black bean experience of the ill-fated Mer expedition. The valiant Tom Deer afterwards died gone on the remote frontier, and so all those "boys" have passed in their "checks," except Pete. When the rangers arrived at the Mexican Camp, the river was swollen from the melting snows above, but as soon as the raging torrent receded and became passable, they crossed the stream accompanied by Campanya, a Mexican, and discovered the Texas Lone Star and Riverside mines.

All this happened in the summer of 1853. The subsequent influx of miners was large, and cosmopolitan in character, the Mexicans predominating. The town of West Point was soon started, together with minor hamlets, Camp Catarro and Camp Flores, these last two being in the midst of a network of quartz ledges that yielded abundantly. The first store was started by Fernando Dudino, in 1854, and was constructed of pine logs, one Stevens being the architect. A grape vine arbor marks that spot to-day, and it was where West Point was first founded. It was then hidden in the midst of a dense forest of pines. Roads were built to the outer world; a ditch was dug to carry on gulch mining and to supply the many

quartz mills; a saw-mill was erected, and more pretentious building was carried on. More stores, saloons, gambling dens and dance-houses were soon in vogue; the population increased, and the surrounding hills were soon teeming with prospectors. The musical ring of the prospector's hammer could be heard in every direction. Strikes were made almost daily. The arastras kept up their incessant grinding. Gambling and carousal was carried on night and day. The then novel way of mining, so uncommon elsewhere, was here in the glory of its palmy existence. This outfit of the miner in the way of tools, consisted of a pick, shovel, hammer, tub, rope and windlass. The latter was so constructed as to make it quite portable to carry over the hills. The soft nature of the syenite granite facilitated prospecting by sinking round, vertical shafts, three feet in diameter; 10 to 20 feet was considered a day's work, and as much as 30 feet has been sunk in one day when all conditions were favorable. Stamp and arastra mills were being built, which soon supplanted the tedious mule arastras. All ores extracted from the confines of the walls of the decomposed granite were quite oxidized, which greatly facilitated amalgamation; but as greater depth was attained in the mines, where hard ground and water was reached, the sulphurets came in, making the ore very rebellious, and consequently low-grade, by the ordinary mill process. The miners here never bothered their heads about solving problems to work sulphureted ores, as the field was too large and unexplored to harass themselves by sinking in hard ground and water, so they would pack their windlass and tools, and proceed to make a new find in soft granite. The result would be that the abandoned mine would cave in the following winter, the owners would leave the camp, or "kick the bucket," and its record would be erased from memory's storehouse and sunk into oblivion.

Twenty-five quartz mills have been built in this district since its discovery, and to-day only five mills remain in working condition; for as soon as the oxidized ore was all found and worked out and thence became bare, many mills were compelled to shut down, and left to rot. The ore of this district contains more sulphurets and of a greater variety than any other locality in this State, consequently it has been a good field for experimenters, and many scientific men have taken advantage of that condition and visited this place for the purpose, and not meeting with the desired success have left the field open to the next scientist. So the work has gone on for many years, marked by fruitless attempts to accomplish the object aimed at.

And it is only lately that this mystery has been solved, and that is by the Russell process of roasting ores. It has convinced the most incredulous mind as to its efficacy in working successfully rebellious sulphureted ores, including tellurium. The latter mineral was not known to exist here till lately, and it is quite rich when found. In my next letter I will confine myself to the description of the principal mines, or those that are worthy of attention.

FRANK M. OCHOA.

West Point, Calaveras Co., Cal.

Gold and Silver Bullion.

Dr. James P. Kimball, Director of the Mint, has submitted to the Secretary of the Treasury his annual report of the operations of the mints and assay offices of the United States for the fiscal year ending June 30, 1885. This value of gold deposited at the mints and assay offices during the year was \$56,748,752, of which \$3,854,677 consisted of redeposits. Of this gold deposits nearly \$32,000,000 consists of domestic bullion, over \$11,000,000 of foreign bullion, and some \$3,000,000 of foreign coin. The value of silver deposited for bars and purchased for coinage, computed at its coining rate in silver dollars, was \$38,082,222, of which \$1,292,447 was redeposits. Of the silver deposited and purchased, over \$32,000,000 was classified at the mints as of domestic production, \$2,000,000 was of foreign bullion, and \$1,000,000 of foreign coin. The total coining value of gold and silver deposited and purchased at the mints was \$94,830,976, against \$97,955,154 in the previous year. The decline in the production of

Gold on the Pacific Coast

Is shown by a continued falling off of the deposits at the Mint in San Francisco, the value of gold deposited at that institution having declined over \$8,000,000 since 1881. The total imports of gold bullion into the United States was \$5,849,237. The deposit of gold bullion, classed as foreign at the mints, was over \$11,000,000, from which it would appear that over \$2,000,000 worth of gold bullion had reached this country which was not entered at the Customhouses.

The imports of silver bullion amounted to \$11,530,381; imports of gold coin amounted to \$17,842,459, of which \$3,352,090 consisted of American coin and \$14,490,369 of foreign coin. The imports of silver coin were \$12,020,243, of which \$673,926 was American coin.

The imports of gold bullion amounted to only \$395,750, nearly all of which was United States bars. Of silver bullion the very large sum of \$20,422,924 was exported, only \$1,500,000 worth of which consisted of bars bearing the stamp of the United States mints or assay offices. From this it will be seen that about \$19,000,000 worth of the silver production

of this country found its way abroad by export.

The export of American gold coin amounts to \$2,345,809, and of foreign gold coin to \$5,736,333, a total of \$8,082,142. The export of American silver coin amounted to \$1,211,627 (\$1,073,150 of which consisted of trade dollars) and the export of foreign silver coin to \$12,060,612; some \$10,000,000 of the amount being exported at the port of San Francisco.

The Coinage Expected

At the mints during the year was: Gold, \$24,866,112; silver, \$28,848,959; minor coins, \$52,755. Total, \$54,237,639. Of the silver coinage, \$28,528,552 consisted of standard dollars. In addition to the coin executed, gold bars were manufactured of the value of \$32,027,463, and silver bars of the value of \$9,549,313, a total of \$41,576,776. The bars manufactured exceeded by some \$10,000,000 the value of those produced in the previous year. The total value of gold bars exchanged for gold coin was \$2,065,021 against \$25,800,799 the previous year, showing a large falling off in this demand for gold bars for export. The silver purchased for

Standard-Dollar Coinage

During the year was \$24,212,412 standard ounces, costing \$23,747,460. The average price paid for silver during the year was \$108.9 10. The average London price was about \$109.2, and the average New York price was \$109.1. The seignorage of this Government was some 18 per cent on the cost value of the bullion. The seignorage on the coinage of silver dollars during the year amounted to \$4,355,278; of subsidiary silver, \$10,198, a total of \$4,365,476. The seignorage on the coinage of silver from July 1, 1878, to June 30, 1885, amounted to \$25,338,389. The number of silver dollars distributed by the mints during the year was 20,373,625. The number in circulation increased from 39,794,913 on July 1, 1884, to 45,275,710 on Oct. 1, 1885. The number in the Treasury increased during the same period from 135,560,916 to 165,438,721.

The Total Amount Expended

For the mint service during the year was \$1,265,519. The total earnings of all kinds, including seignorages, amounted to \$5,147,210, and the total expenses and losses of all kinds to \$1,585,256. The total loss of the precious metals, arising from the wastage of operative officers and sale of "sweep" aggregated during the year \$34,048, while the total value of surplus bullion recovered was \$66,355, showing an actual surplus in the operations of gold and silver during the year of \$32,307. The Director estimates the amount of gold and silver

Coin in the Country

On July 1, 1885, at \$20,000,000, of which \$542,000,000 consisted of gold and \$278,000,000 of silver. This amount was owned as follows: By the United States Treasury, gold, \$53,223,160; silver, \$95,119,056; total, \$148,342,225. By the National Banks, gold, \$156,575,867; silver, \$11,978,833; total, \$177,554,700; by other banks and private hands, gold, \$323,375,609; silver, \$171,726,303; total, \$495,101,912. The Director has deducted the amount of the coin in the Treasury, represented by gold and silver certificates outstanding and added it to the stock of coin in circulation. In addition to the coin in the country there was in mints and assay offices on July 1, 1885, gold and silver bullion available for coinage as follows: Gold bullion, value, \$66,847,695; silver bullion, which cost \$4,654,587. Total, \$71,501,682. Adding this to the amount of gold and silver coin in the country, it gives the total coin and bullion at that date as \$92,500,518.

The Director calls attention to the necessity for improved facilities for the storage of coin and bullion at the Mints.

The saving effected at the San Francisco Mint since July 1, 1885, by the reduction of the force amounted to an annual decrease of \$35,000.

At the Carson Mint the entire force of workmen and a large portion of the officers have been dispensed with.

A NEW MINERAL.—Messrs. Cross and Hillebrand, of the U. S. Geological Survey, report a new mineral analogous to cryolite, from St. Peter's Dome, in the Pike's Peak region. It occurs in irregular, colorless masses, in pectolite, and possesses the following composition:

Aluminum.....	11.32
Calcium.....	0.72
Magnesium.....	0.22
Potassium.....	28.94
Sodium.....	9.96
Fluorine.....	46.98
	98.08

The name *elpasolite* is proposed for it, from the county El Paso, in which it was found. St. Peter's Dome has been prolific of a number of minerals which heretofore have been found only in Greenland. They comprise cryolite, pectolite, thomsenolite, ralstonite, gearkuite and prosopite, the latter having previously been found only in the tin-bearing veins of Altenberg in Saxony.

The New York Engineering and Mining Journal says that the Cassell process, so emphatically endorsed by Louis Blanding, is neither new nor practical. The Journal concludes its remarks thus: Notwithstanding the prominence given to this new process in the London engineering and mining papers, and the assertions made of wonderful results obtained or obtainable at a cost of from \$1.25 to \$2.50 per ton of ore treated, we are inclined to look upon the statement made as requiring confirmation by higher and disinterested authority.

MECHANICAL PROGRESS.

The Results of Improved Machinery.

Overproduction—Where Will It End?

At the recent meeting of the Institution of Mechanical Engineers, at Lincoln, England, the address of welcome was given by Dr. King, the Bishop. In the course of his address the reverend doctor gave expression to sentiments and thoughts which gave evidence that he had given much thought to the mechanical and manufacturing industries of the day.

In our progress toward the subjection of natural forces to the will of man, it appeared to him that we were tending toward a most extraordinary state of things. The remarks of the speaker under this head have been summarized by the *Textile Manufacturer* substantially as follows:

Before the days of steam power, and when the loom, for example, was wholly driven by manual labor, one individual worker could not possibly attend to more than one machine, for the constant presence of the worker was required in order to keep the machine at work. What has steam power done for the weaver? It has relieved him of his severe labor, and left him with nothing to do but the light work of piecing broken threads, or reeling the shuttle and generally watching the good performance of the work of the machine. But it was very soon found that one man or woman could do more than this, and in place of tending a single machine it became the custom for one worker to superintend two machines; and, as the machine improved in quality and the turning of the steam engine also improved in regularity, another and another loom was added to the charge of each worker, until now it is not uncommon for one worker to superintend perhaps four to seven looms, while at the same time the rate of work of each loom has progressed rapidly; the number of picks, from being perhaps 20 to 40 per minute in the hand loom, having attained from 100 to 300 in the most modern machines of a like width. Thus the number of yards produced has increased, say fifty fold.

Now, so long as a large number of the earth's inhabitants require clothing which they cannot provide for themselves, the above state of affairs may, and will continue, but during the last few years, more especially in England, who have for long had a supremacy in foreign trade, have been confronted with the fact that many of our old customers have begun to manufacture for themselves, and not only this, but they also aim at making for others who still buy from us. As civilization progresses, the disproportion between makers and users will become smaller still, and perhaps finally disappear, and the nearer we approach to the time when each nation shall make for themselves the more tense will become the situation.

Long before such a time comes, however, we shall have some alteration. We cannot go on making millions of yards of cloth which no one will buy, and the weavers will have to turn to other pursuits. Such, however, are not open, for every worker will be confronted with the fact that his productions are not required, and all will be seeking other pursuits and not finding them. It is therefore evident that changes must be made before this state of affairs is reached.

The change required is lessened production. As the world now stands, it would not be practicable for us as a country to say we will at once reduce our productions one-half. It would be the signal for our downfall, for the Germans and the French would at once seize the opportunity to produce a great part of our relinquished half. But the time even then would still surely arrive when they also would have to restrain production; and it is clear that some day all manufacturers will have to do this.

When that time arrives, it will be seen how machinery has reduced toil. So far the employment of machinery appears to have simply tended to the production of more goods. We have used it simply as a means to assist us in doing more work, but not, as we ought to have done, to enable us to do in one day the work of a whole week. We have been content to work along at the old strain with an assistant that has done 98 per cent of the labor, the remaining two per cent alone having devolved upon us; but we have put into the two per cent remnant the whole of the energy which we formerly expended upon the 98 per cent, which the machine now does for us. Thoughtful minds may have long foreseen what must inevitably be the result of this.

A Great Revolution Before Us.

Such a condition of things cannot continue. We must either do away with machinery, or employ it for an hour instead of a day. To dispense with machinery is out of the question and this leaves only the other course open to us. How such a mighty revolution can take place we do not clearly see; we only see that the question is looming up more distinctly day by day and week by week. The distant rumbling of the storm has been heard in various quarters. When the storm has passed, which it will do, though not in our time nor perhaps for centuries, yet it will leave the world better for the change.

It is well that the people should recognize facts which are becoming palpable to many thoughtful men. We live in an era of overproduction. The only way that we have yet been able to find to reduce the surfeit has been

to find a fresh market. This we have found from time to time, and in the present strait all eyes are turned towards Africa as a new and extensive outlet for goods. Open up Africa, say our merchants, and it will absorb all and more than we can produce, and leave enough for our Continental rivals also. Granted, we exclaim, but when Africa has been opened up, what next? Let Australia first be filled with people. So be it; but how when, like the United States they become their own producers? What must next be done? Where shall we turn for a fresh market when the whole earth is civilized throughout? Some nations must, of course, hold pre-eminence in certain pursuits, but the final result to the world at large can be but one—a partial cessation from toil. We shall have to do less and learn more. What we do will have to be done well. What we produce will have to carry the impress of beauty. We shall have to change many things now existing but the change will be for the better. The force of competition will have run its course, for it is not possible that it can last forever.

Brazing Cast-Iron.

A correspondent of the *American Machinist* writes that journal as follows: "What is the reason that I cannot braze cast-iron?" asked a machinist the other day. "Every time I try, I fail. Sometimes the cast-iron burns away, and sometimes the brass will not stick. What is the reason?"

Cast-iron may be easily brazed, if, like doing other peculiar jobs, "you know how to do it." Have the iron clean; make it free from grease and acids, which may be injurious; choose any soft brass, or make some for the purpose. The yellow brass used in brazing copper will do; it must contain a large percentage of zinc, or its melting point will be not much lower than that of the cast-iron itself.

Put on the horax before heating the iron. Dissolve the horax, and apply the solution freely to the parts to be brazed. By doing this before heating, a film of oxide is prevented from forming upon the iron. Fasten the parts together, and heat in a clear charcoal fire. Soft coal is not suitable; there is too much sulphur in it.

Heat the work gradually. Apply the heat to the largest piece, and keep that piece the hottest. Sprinkle on powdered horax and brass filings, and use plenty of horax. Watch carefully, and get the iron up to a red heat before any of the brass melts. The brass will not adhere unless the iron is hot enough to melt the brass.

Be very careful not to get the iron too hot, or away it melts and the job is lost. When the brass "runs," remove from the fire immediately, and wipe off the superfluous brass, cool off slowly, and finish up the joint.

IRON TELEGRAPH POLES.—A metallic telegraph pole has been adopted by the Canadian Government for its telegraph lines on the Northwestern prairies. The pole is constructed of malleable galvanized iron, and is one and one-half inches in diameter at the top, and two and one-fourth inches in diameter at the bottom, and weighs less than 50 pounds. The bottom of the pole is set into a claw plate, upon which the earth is closely packed to a height of about two feet. Then another plate is put into place around the pole, and the earth packed upon it to the level of the ground. The claw plates take a hold in the ground at once, so that the pole becomes solidly fixed immediately after being set, which desideratum is only obtained by the ordinary wooden pole after it has been in the ground for at least a year. A recent test is said to have shown the great strength of the pole, as a heavy No. 6 government wire was strung and the pole subjected to the greatest possible strain, but without moving it in the least.

A HOOP DRIVING MACHINE.—One of the latest novelties in the way of invention is a hoop driving machine. It has been in practical use for several months at the Export Oil Works, Point Breeze, Philadelphia. The machine, as illustrated, is quite curious, but not intricate. The harrel, when "set up," is placed in a horizontal position in the machine. As soon as the machine is started the opposite disks or heads of the harrel approach the machine and are fixed in position, when a series of drivers are pressed down upon the hoops from either end of the barrel, until all are driven to their proper position by pressure only. One machine will head and hoop 1200 barrels per day of 10 hours. Economically considered the machine is said to give good satisfaction. The cost of tenders and eteam for running the machine one day is \$9. The cost of doing the same work by hand in the ordinary way is \$35.

DOUBLE RAILS.—According to the *Joliet (Ill.) News*, the Joliet Steel Co. now roll steel rails in 2-rail lengths, thus saving two crop ends on every two rails, as well as securing a larger product than by the old method of rolling single rail. The company intend to roll 4-rail lengths after a while. The rails are passed through the rolls by machinery.

ROLLER SKATE PATENTS.—Since New Year's Day 150 inventions have been filed in the Patent Office relative to roller skates. Box-wood, of which the wheels are generally made, has doubled in price. Contracts for 10,000 tons of steel for the skatees have been given out.

SCIENTIFIC PROGRESS.

Government Aid to Science.

Sir Lyon Playfair, in his recent address before the British Association of Science, in Aberdeen, said much that was instructive and suggestive in respect to the progress of science, and the conditions on which it depends. The speaker is one of the few men in the world who has had a training both as a man of science and as a statesman. His early career was that of a chemist, but of late he has been an active and influential member of Parliament, and he at one time held a seat in the Privy Council. It is under such circumstances that he can speak both as a savant and as a statesman.

It is moreover interesting to note, continues *Science*, from which we collate, that the principles which he defends were uttered by Prince Albert in his address at Aberdeen in 1859, and long before by George Washington in his farewell address. Prince Albert laid down the doctrine that science should "speak to the State, like a favored child to its parent, sure of his paternal solicitude for its welfare," and also, "that the State should recognize in science one of the elements of its strength and prosperity, to foster which the clearest dictates of self-interest demand." The words of Washington hardly need be quoted to American readers: "Promote as an object of primary importance institutions for the general diffusion of knowledge. In proportion as the structure of a government gives force to public opinion, it is essential that public opinion should be enlightened."

Sir Lyon Playfair goes back to the Greeks and the Arabs, to remind his hearers that in ancient as well as modern times the encouragement of science has been a duty of statecraft, and with many an intermediate allusion he comes now to the actual state of affairs in the United Kingdom, where the working classes now show a respect for science by selecting as their candidates for Parliament in the next election such men as Professor Stuart, Roscoe Maskelyne and Rucker. Playfair has himself received invitations from working-classes constituencies in a dozen of the leading manufacturing towns.

In confirmation of the views which he advocates, Playfair refers to the action of France and Germany, and in still more emphatic terms to the practice of the United States. In some respects, he says, this young country is in advance of all European States in joining science to its administrative offices. He points particularly to the excellent work of the United States Fish Commission, and makes this amusing comparison of the English and American methods of promoting fisheries. In England there are expensive commissions to visit the coast and question the fishermen; and the fishermen, having only a knowledge of a small area, give the most contradictory and unsatisfactory evidence. "In America, the questions are put to nature and not to fishermen," and the results of the inquiry are therefore far more fruitful. In this bright antithesis—questioning nature, not the fishermen—there is a ready answer to those who wish for "practical" science, not abstract science. It seems "practical" to question fishermen; the process proves to be fallacious. It seems "abstract" to question nature; but this method is found to be the surest road to positive knowledge, and hence to the best results.

The Age of the Mounds.

The recent examination of a great number of mounds and their contents, and inquiries into their history, and surroundings, is gradually leading to a solution of certain archæologic riddles which a few years ago seemed unsolvable. The *Norristown Herald* says:—

While some of the mounds are, doubtless, very ancient, others similar in character and equally interesting have certainly been built up since the advent of Europeans. A string of sleigh bells much corroded, but still capable of tinkling, was found among the flint and bone implements in a mound in Tennessee, while in Mississippi, at the point where De Soto is supposed to have tarried, a Spanish coat of arms in silver, one blade of a pair of scissors and other articles of European manufacture were found in positions which indicated that they were buried by the original builders of the mounds.

In a Georgia mound two copper plates were found, upon which were stamped figures resembling the sculptures upon the Central American ruins. The workmanship is vastly superior to that displayed upon the articles of pottery, stone and bone found in the mounds, and their origin and purpose are not yet explainable. Aside from these plates nothing has been found to indicate a connection between the mound builders and the Aztecs or the Pueblos, while on the other hand, there appear many reasons for not going beyond the Cherokees and their fellow red men of the Ohio and Mississippi valley to find the origin of these curious erections. The purpose of the mounds still remains in some cases a mystery, but in others they are known to have been made sometimes for burial places, and sometimes as foundations for Indian villages secure from the floods to which the low lands were periodically subjected.

THE story of the Pennsylvania meteorite, to which we alluded in our last issue as having fallen and been found where it struck the earth

near the West Virginia State line, proves to be true only so far as it was of extraordinary size and was distinctly seen in its flight. It appears that Professor Langley, of the Allegheny Observatory, sent out a competent party to investigate into the fact of the finding and nature of the celestial visitor. This person has returned, and reports that the reported finding of the huge meteorite "fifty feet in diameter" is merely a fiction of the news gatherers.

MIND CURE, just at this time, is attracting considerable attention in this city and elsewhere. The relation of the mind to the body is as yet but very imperfectly understood, although it is undoubtedly a matter of great importance, both in an economical and scientific point of view. Mind cure is a thing about which not much is known, although there is abundant evidence that it has a basis in truth. In regard to it an exchange says: "There are certain diseases which are real and yet which can be cured or brought on simply by a certain condition of mind. As a man thinketh in his heart so is he," has in it much of truth. Learned men who do not make a business of this mind cure, who have other work, and who take it up simply as a recreation, have in some cases produced wonderful results. Every doctor has patients whom medicine will not reach, and who can be reached only by creating a condition of mind favorable to a cure. Prof. E. P. Throing, of New York, of the Academy of Science, carried on studies along with Dr. Geo. M. Beard before his death. Dr. Throing can sometimes simply by looking at a patient work a cure. He has been known by a glance of the eye to render one insensible to pain, so that the most difficult surgical operation could be endured without suffering, and to cure the most difficult cases of sciatica, when the limb was stiffened, simply by rubbing it and saying the pain had left. There are so many cases recorded where cures have been wrought that there can be no question but that mind cure has to it a basis of truth. It is also quite likely that some of the so-called faith cures are nothing but mind cures. We believe that whatever of truth there is to this thing will be carefully looked into by men of science and made use of for the good of the race."

FOSSIL INSECTS OF THE COAL DEPOSITS.—At the recent meeting of the Manchester Geological Society, a paper from M. Charles Brogniart, of Paris was read by Mr. M. Stirrup, on "The Fossil Insects of the Primary Group of Rocks: a Rapid Survey of the Entomological Fauna of the Paleozoic Systems," which was illustrated by photographs and drawings of insects found in the coal measures of the mines of Commeny (Allier). With regard to some of these insects, Mr. Stirrup remarked that there were none now in existence which were so large, and that if the forests of the coal era were not vocal with the song of birds, they were certainly vocal with the buzz of gigantic insect life. In reply to a question, Mr. Stirrup remarked that he felt certain specimens of these insects might be found in the Lancashire coal measures, if they were looked for; the insects of which they had seen illustrations, were found in the shales, such as occurred on the roofs of their own coal mines. Mr. Dickinson observed that if they were to accept the assumption that these insects were or had been amphibious, a great many difficulties would be got over as to the formation of the rocks; he had never yet met with a single fossil of any animal which had not at some period of its life had a water habitat.

FORMATION OF FOG.—The experiments of Coulter and Mascart, extended by Aitkin, have demonstrated that in a perfectly moist air no formation of fog is possible, however much the temperature is lowered, so long as the air is absolutely free from dust, and that the more air, sufficiently moist, is charged with such foreign particles the more intense is the formation of fog under a sufficient lowering of the temperature or pressure of the air. Let filtered and completely moist air in a glass ball have its pressure diminished, then will only a few particles of fog reveal themselves to the most careful inspection, even under the powerful light of an electric lamp—particles of fog, which, moreover, yield not the slightest colored image. Admit now into this filtered air a few cubic millimeters of ordinary house air, then will a very fine, silvery, transparent fog at once form itself, of such slight density that even in the case of considerable area of it the transparency of the atmosphere would be but very little affected. At the first moment of its formation let a reflected image of the sun, or the reflected light of an electric lamp, be viewed through it; the image will be seen surrounded by an intensely luminous blue or greenish light.

A NEW USE FOR SULPHUROUS ACID.—A new process for preparing chemical fiber by the use of sulphurous acid has been patented. It is intended also to prepare vegetable fiber for spinning and other uses, eliminating the silica and other incrustating substances that bind the fiber together. The principal feature of this process is the treatment of vegetable fiber with a solvent containing hydrofluoric acid and sulphurous acid.

MAJOR POWELL, chief of the Geological Survey, has discovered in New Mexico, near California Mountain, what he pronounces to be the oldest human habitations upon the American continent.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 253 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate).....25 .80 \$2.20 \$5.00
Half inch (1 square).....\$1.50 \$4.00 10.00 24.00
One inch.....2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 7, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Reading for Mining Camps; The Tustin Ore Mill; Distribution of Ores; Agents and Correspondents, 305. Passing Events; Agricultural or Mineral Lands; Burning Quartz Before Crushing; Dumps; Academy of Sciences, 308. The Philadelphia Cable Road; Single-Acting Engines; The Ovar D'Alene Mines, 309.

ILLUSTRATIONS.—The Improved Tustin Ore Mill, 305. Improved Design for Single-Acting Engines, 309.

CORRESPONDENCE.—Notes from the Interior; Calaveras County Mines, 306.

MECHANICAL PROGRESS.—The Results of Improved Machinery; Blasting Cast Iron; Iron Telegraph Poles; A Hoop Driving Machine; Double Rails; Roller Skate Patents, 307.

SCIENTIFIC PROGRESS.—Government Aid to Science; The Age of the Mounds; Mind Cure; Fossil Insects of the Coal Deposits; Formation of Fog; A New Use for Sulphuric Acid, 307.

USEFUL INFORMATION.—A New Substance for Mirrors; Solder for Glass and Porcelain; How to Keep Chestnuts Soft and Sweet; Brazing; The Largest Block of Marble on Record; Polishing Powder from Ashes; Some Things Worth Knowing; A Type and Stereotype Setting Machine; A Superior Blotter, 307.

GOOD HEALTH.—Hot Water in Dyspepsia; Raw Potatoes for the Complexion; What Shall We Drink? The Hypodermic Needle; A New Cloth for Rheumatism to Wear, 311.

MISCELLANEOUS.—Gold and Silver Bullion, 306. Practical Hydraulics, 310.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 312-14.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 316.

Business Announcements.

Centrifugal Roller Quartz Mills.—F. A. Huntington, S. F. Delinquent Notice.—Orelands Mining Co., S. F. Situation Wanted.—Pacific Iron Works, S. F. Pipe Tongs.—Henry F. W. Solist, S. F. Risdon Iron and Locomotive Works.—S. F.

See Advertising Columns.

Passing Events.

The first good rain of the season fell this week, and prevailed over a large area. This will raise the rivers enough to put a stop to river-bed mining for this year.

Preparations for winter are going on in most of the mining camps, and in the more mountainous ones to the north some mines are now shutting down.

From various points comes word that old and abandoned mines are being taken up and reworked. In some places they are striking deeper in old mines, the experience of some of our best gold mines being that they are as rich deep down as at the surface.

A number of very good strikes have recently been made in different parts of this State. Gold quartz mining is experiencing something of a revival.

OLD MINES.—An effort is being made to resuscitate many of the long-abandoned mines, in Nevada county, which have never been worked below a 500-foot level. The experience of the Idaho, Eureka, Empire and North Star proves conclusively that deep workings are the most profitable. The trouble has been that many of the mines were originally equipped with too light machinery, and the owners were unable to contend with the body of water met at from 300 feet to 500 feet below the surface. Unwilling or unable to meet the expense caused by flooding, they abandoned their claims, and new parties are reaping the rewards.

Agricultural or Mineral Lands.

Some time since several Portuguese and Italian farmers in Santa Clara county, who claimed that the land near the Guadalupe mine was more fit for agriculture than mining, received rather a setback by the Commissioner of the General Land Office confirming the Register and Receiver's action, adjudging the land to be mineral. Nevertheless, the farmers appealed to the Secretary of the Interior, the only question in the case being whether the land involved was more valuable for mineral purposes than for agriculture. The testimony was voluminous and exhaustive, numbers of the witnesses being farmers with no mining knowledge whatever. A portion of the land had even been applied for by parties under the pre-emption and homestead laws, and one farmer had even received an agricultural patent. The Santa Clara Mining Association, of Baltimore, owning the Guadalupe mine, was therefore compelled to begin a contest against the agricultural claimants.

The testimony shows that the lands in question are located about 60 miles southeast of San Francisco, within a few miles of the city of San Jose, in Santa Clara county, adjoining the Capitancillos creek, and stretching out in a southwesterly direction therefrom, embracing 957.32 acres. That the country is rough and mountainous, cut into by numerous deep, precipitous gulches and canyons, and covered to a great extent by dense brush, chaparral and scrub oak. That there are occasional patches of fairly good soil, varying from one to twenty acres in extent, but that the great mass of the soil is thin and unfit for cultivation. That the land is situated in a mineral belt embracing within four miles the "Guadalupe," "New Almaden" and "Henriquitia" quicksilver mines, all noted for the amount of quicksilver produced from them. That immediately to the northeast of said lands lies the Guadalupe mine, also the property of the Santa Clara Mining Association. That from said Guadalupe mine there extend in a southwesterly direction, three distinct ore-bearing zones penetrating and passing through said section 30 of the lands in controversy. That several of the tunnels of the Guadalupe mine penetrate lots 7 and 8 of said land to a distance of 300 or 400 feet; that many carloads of cinabar have been taken from these tunnels, and that within 10 years some 40,000 or 50,000 flasks of metal have been taken from the lands south of the Capitancillos creek. That the company has spent \$1,500,000 on its whole claim, and that \$100,000 of that sum have been expended in developing the mineral resources of the public land in question. Some 17 witnesses including civil engineers, surveyors, mining experts, practical miners, assayers, mining engineers, the Deputy County Assessor, and neighboring farmers, all acquainted with the land, testified, on the part of claimants, that the formation of these lands is similar to that of the surrounding mineral bearing lands; that numerous specimens, produced in evidence, from croppings in various parts of section 30 and 31, contained mineral, or indications thereof; that each lot and each 10 acres of each lot is more valuable for mineral purposes than for agriculture, and that, as a fact, agriculture had been prosecuted thereon to a very limited extent.

The witnesses on the part of contestants were principally neighboring farmers, none of whom claimed to be mining experts. Their testimony is to the effect that several tracts have been cleared and cultivated; that much more of the land is fit for cultivation, and is more valuable for agriculture than for minerals.

It is urged, in view of the fact that this land adjoins certain quicksilver mines, that it would have been worked long ago if it had any mineral value, and that the bad faith of the company in this matter is shown by the fact that they have so failed to work said land. The Secretary of the Interior states that this would be a weighty objection were it not for the further fact that for the past seven or eight years the company has been actively engaged in developing the mineral resources of these lands and the lands immediately adjoining them on the northeast. After bringing forward these points the Secretary of the Interior decides that the testimony is conclusive that the land is more valuable for minerals than for agriculture, and affirms the first decision of the Commissioner of the General Land Office.

Burning Quartz Before Crushing.

In the gold mining district of Maldon, colony of Victoria, it is the general custom to burn the quartz before crushing, in order to extract the sulphur from the pyrites to render amalgamation possible. At the Grand Junction Company's works there are four kilns for burning the quartz as it comes from the mine, a description of which will interest miners here who have sulphuretted ores. These kilns adjoin each other and are built up with strong, dry stone walls in the following manner: A cutting or hench is made into the face of the hill, and the wall is built at the front side and ends, high enough to admit of the whole length of the kiln being built between the front wall and the side of the cutting already made, having openings in the front wall opposite the places where the kilns are built, to haul out the quartz to take it to the battery. Circular kilns are built in the shape of an inverted cone, as close to each other as the walls will admit. These are capable of holding and burning 50 tons each. The bottom of the kilns is sufficiently high above the tramway, which runs along the front, to allow the burnt quartz to be hauled out into the trucks.

Before commencing to put the quartz into the kilns, there is a good layer of firewood placed in the bottom; then a layer of quartz, next a layer of firewood; afterwards quartz again, and so on until the kiln is filled; but in filling the kiln, firewood is set on and all around its sides, and quartz hooped up on top as much as possible, after which the fire is kindled at the bottom, and the kiln kept burning from seven to eight days. By the end of this time the quartz is tolerably well calcined, especially near the bottom of the kiln, where it is run together like slag. The manager of the company states that the cost of this process amounts to about four pence per ton, and he contends that, irrespective of the cost of liberating the sulphur and arsenic, it pays the company to roast the quartz in this manner, as the amount of work done by the battery is greatly increased, owing to the quartz being more friable. In this he is no doubt correct, as those who have burned quartz before grinding it in arastras can testify.

After the burned quartz is taken out it is crushed in an ordinary battery, but no quicksilver or copper plates are used on the riffle tables, they being simply covered with blankets. At the end of the blanket tables the tellings run into Chili mills and are ground up with quicksilver, after which they run over rocking tables, also covered with blankets.

There has been considerable discussion in Australia on this subject, and it has been one of the subjects of inquiry of a Government Board. From the evidence they obtained it would seem that crushing pyritous quartz raw is the more advantageous method, and the testimony of mine managers was corroborated by professional evidence on this point. It is asserted that it would be impossible to thoroughly oxidize the sulphur by burning, and that a lower sulphide would result, which would melt and enclose the fine particles of gold, rendering their subsequent extraction more difficult. The evidence of one gentleman of a practical nature, was to the effect that the roasting has the effect of converting the gold on the exterior of the quartz into globules and covering them with ferruginous glaze, which is prejudicial to the proper extraction of the precious metal. This gentleman had microscopically examined raw and burnt quartz washings from the lowest blankets, and found most particles of gold in the latter.

Some persons examined by the Board of Inquiry advocate the burning, not because they believe it to be the more efficacious method but because of less wear and tear of machinery, and by such a method more quartz can be crushed in the same time. Some considered that many substances are removed during the process of roasting which would tend to interfere with amalgamation, and that the loss of mercury is less. Others think that fine gold is run into a globular form during roasting and is more easily saved. On the other hand, one manager of a large company said he would burn the quartz previous to crushing if the pyrites were not to be saved, but if they were needed he would crush raw. After a careful consideration of this portion of the questions, the Board was of the opinion that crushing raw is the best method of treatment, except where

pyrites are absent; then burning might be adopted if fuel is easily obtainable, in order to economize wear and tear in crushing.

Dumps.

There is no doubt that during the days when mining and milling was carried on more carelessly than it is at present on this coast, a great deal of pretty good ore was thrown over to the dumps. In the hurry and push of those times there was much waste of all sorts of things. In some cases the miners were to blame, in others the managers. To get a good high average of ore, considerable that would pay, but was not rich, was thrown away. But in these days of cheaper milling this ore would pay well. It is all on the surface and needs sorting only from the real waste. In some of the larger camps, like the Comstock, Eureka and some other Nevada mining regions, many of the dumps have been sources of profit to those who have picked them over. This has also been the case in this State. No doubt it would pay many persons better than prospecting to get permission to work over old dumps at mines where large quantities of material have been extracted.

A useful lesson is taught to miners in this connection by an event at the McBride mine, east of Benton, Mono county, in the White mountains, as told by the *Inyo Independent*: A large amount of ore lay on the dump at this mine for a long time. This ore was thought to be of very little value, and no attention was paid to it. H. H. Russell, Superintendent of the Mountain Queen mine, in the same neighborhood, at length had his attention called to the dump. Mr. Russell is not an elegant gentleman, but a practical miner, who lets nothing about a mine escape his observation, and will not take gossip for facts. He prospected the supposed worthless dump, and then made an offer of \$900 for the lot. This was like finding so much money, and the offer was accepted. A small two-stamp mill stands near the dump; with this Mr. Russell went to work on the ore. In three weeks' run of the mill \$1800 in gold was got from the worthless dump. Mr. Russell finds that there is ore enough in the dump to keep the mill running steadily eleven months, and is satisfied that it is all as good as that already milled. Here is a lesson for miners to be careful about what they throw on the dumps.

Academy of Sciences.

Dr. Harkness was in the chair at the last meeting of the California Academy of Sciences.

The following donations to the museum were acknowledged as received: Timber destroyed by the tereid in seven months, taken from San Francisco bay and presented by Marsden Manson; hydroid from the ship Earl of Dalhousie, donated by Mr. Buckminster; section of a log of driftwood found at Cape Lishurne, Alaska, 60 degrees north latitude, and supposed to have drifted from the Yukon river, donated by Professor Davidson; specimens of limestone, iron ore and serpentine from Alta, Placer county, presented by A. Larsen; *Nepenthes distillatoria*, or pitcher plant, presented by Captain R. W. Simpson. A few remarks were made by Dr. Behr upon the secretion of pepsine by the *Nepenthes*, and also upon the subject of carnivorous plants.

Mr. Charles Burkhalter, of Oakland, read a note on the new star in Andromeda. A change was noticed in the star on Oct. 26th, and on the 27th, under most favorable circumstances, the star was found after much search to be of the eleventh magnitude. He made arrangements with Mr. Hill, who is in charge of the Davidson observatory, to take simultaneous observations. A letter had been received from Mr. Hill, and was read, in which he reported the star Nova Andromeda as of the twelfth magnitude on October 27th when he observed it.

Captain Churchill exhibited a new chart for the use of mariners, which he had invented. Edward Stephens Clark was proposed for membership.

The famous Allison ranch mine, Nevada county, produced under the original management \$2,800,000, but was abandoned when the pay streak ran out. It was subsequently worked, but at a loss. Recently it was handed to a French company, and it is intended to work it deeper than the 500 feet already sunk.

The Philadelphia Cable Road.

On Oct. 24th, a severe accident occurred on the Philadelphia Cable road, seriously injuring three persons—one fatally, and killing one horse. It occurred at Forty-second and Market streets, where there is a turn table for the traction cars. There are usually a number of cars standing in a line awaiting their turns, between Forty-first and Forty-second streets, as happened shortly after 6 o'clock on that evening. There were also a number of horse cars on the curve leading to Forty-first street. Several of these cars contained passengers going to other parts of the city. At that moment traction car No. 103 came up Market street and was released from the grip, the car coming to a stand still. Just after the passengers alighted, there was a shock that threw the grip man and conductor off their feet. The car shot forward as though it was struck by a cyclone, tearing through the transfer car, which it tossed in the air. The horse attached to this car was crushed and killed. Several other cars were smashed, including the one filled with passengers, four of whom were seriously injured. Finally the grip broke, and the tearing car came to a halt.

The cause of the accident was: A strand of the cable became detached and caught in the grip, which is a very imperfect and crude affair. It is something in the shape of a grip formed by a human hand, with no device for throwing out the cable in case of a strand catching, like the San Francisco roads are provided with. The Philadelphia grip is not only liable to injure the cable, but is subject at any time to the same kind of an accident, and should the grip get foul when the car is running through a crowded thoroughfare is liable to cause a great loss of life and property.

In all the experience of cable road in this city, no such accident as that reported in Philadelphia ever occurred here. The Philadelphia company appears to have made mistakes from the start, not being willing to take advantage of the experience of the roads in this city, but wanting "something new and better," which they claimed for their system, and because it did not cost much for patent rights, the latter evidently being the principal reason for not adopting the successful system in use in this city.

Such a system of cable roads as they are attempting to run in Philadelphia is not only dangerous to life and property, but seriously injures the cable system when it is attempted to be adopted in other cities. The New York Times, which appears to be in the interest of elevated or horse roads of that city, and opposing the adoption of the cable system, always refers to the Philadelphia failure. In referring to this accident, the Times says, "For many months a cable company has been trying to operate cable roads in Philadelphia. Thus far these roads have been a nuisance. The streets of which the company took possession have been in a condition of chronic upheaval." This refers to the constant tearing up of the streets to alter the tube, which was so imperfectly constructed that the slet cannot be kept open.

We would advise our Eastern friends who propose constructing cable roads, to send their engineers here and profit by the experience of the successful roads in operation in this city, or what is better still, get engineers from here to build their roads for them.

FIVE tunnels are to be run this winter on leads situated in Sheep mountain district, upper Emigrant gulch, Montana.

Single Acting Engines.

Mr. J. Richards, the talented superintendent of the San Francisco Tool Company, has recently received through the MINING AND SCIENTIFIC PRESS Patent Agency patents covering several improved designs for single acting engines. The San Francisco Tool Company are the only makers of these engines on this coast. The engravings on this page give an idea of the general design.

Engines of this class are now extensively employed for all kinds of purposes both in this country and in England, where they have been in regular use for 12 years past. They are in most respects a plain steam engine, without other novelty than having an extra cylinder and piston. They require no oiling, packing or adjusting like common engines, and cost no more, according to their power.

The high speed of the engine dispenses with gearing and belts for pumping, the engine being connected directly to the pump shafts. The shafts of the engines are made of steel and the connections of bronze. The valves are, in most

will receive more attention. Those who wish to pursue the subject may find some information relating to it anticipated in the MINING AND SCIENTIFIC PRESS of April 10, 1875.

The Coeur D'Alene Mines.

[Written by our Special Correspondent R. G. HUSTON.]

The Coeur D'Alene mines are situated in the range of mountains of that name, 33 miles southwest of the station of Thompson Falls, on the North Pacific Railroad, now reached by hiring saddle horses from that place. The road in is very rough, although some enterprising individual has a lien on it in the shape of toll, and from the amount of corduroy bridges he had to build to make it passable, I think he has amply earned all he charges for traveling over his road. Fifty cents is the assessment. There will be undoubtedly a good road from that point in, as there is some very heavy machinery to be transported soon for the Plume Company.

There is another way of getting in, but it is not the popular one: by getting off the N. P. R. R. at Spokane Falls and staging for 35 miles

militated against the best interest of it in a great degree. It was located in 20-acre lots, and Government patents were issued for it, and many of these were owned by ranchmen from the Palouse valley, and they would neither do anything themselves or permit anyone else unless they were paid a fabulous sum for their locations, something that men of means are not prone to do in an unprospected mining camp. They did not, in many instances, go through the preliminary formality of sinking down and striking a discovery.

The placer mines that have been developed, and are now working, are all within a radius of 10 miles of Murray. As a natural consequence that is the main distributing point for the different mines. During the first excitement the town of Eagle City was built up, but as the placer developments that were easy made were some four miles further up the main creek, Murray was started and is now the town of the miners. It is also the county seat of Shoshone county, Idaho.

There has been considerable prospecting done and parties have satisfied themselves that there is a channel of pay running along the hill north of the town. There was a small ditch taken on this last season. One or two companies have worked their ground with good results, notwithstanding the fact that they have to cribb their tailings, an expensive luxury in this county where timber is plenty—so much so that it is greatly in their way.

The results have been so satisfactory that a company has organized to bring in a large ditch. The sides of the gulch are of such a loose, shelly formation that they are compelled to flume it all the way. This will be finished by another season, and will doubtless give remunerative employment to a large number of men. On Eagle creek, which is some 12 miles long, there are about 25 men at work up near the head of it. It is at the junction of this creek that Eagle City is located. Thence up the creek comes the Cumber gulch. Occident and Octon have all been worked. Then we come to Dream gulch, out of which there was some very good pay taken. This is noted for the largest nugget that was ever taken out in the camp, weighing nearly 20 ounces. It is also the location of the Buckeye Boy lode, of which more anon.

The next is Missoula and Buckskin, both of which have yielded good pay. Vestal's claim in Buckskin in particular is paying over one ounce a day to the hand, which is good enough to make an old miner's mouth water, although I doubt if Vestal will clear the

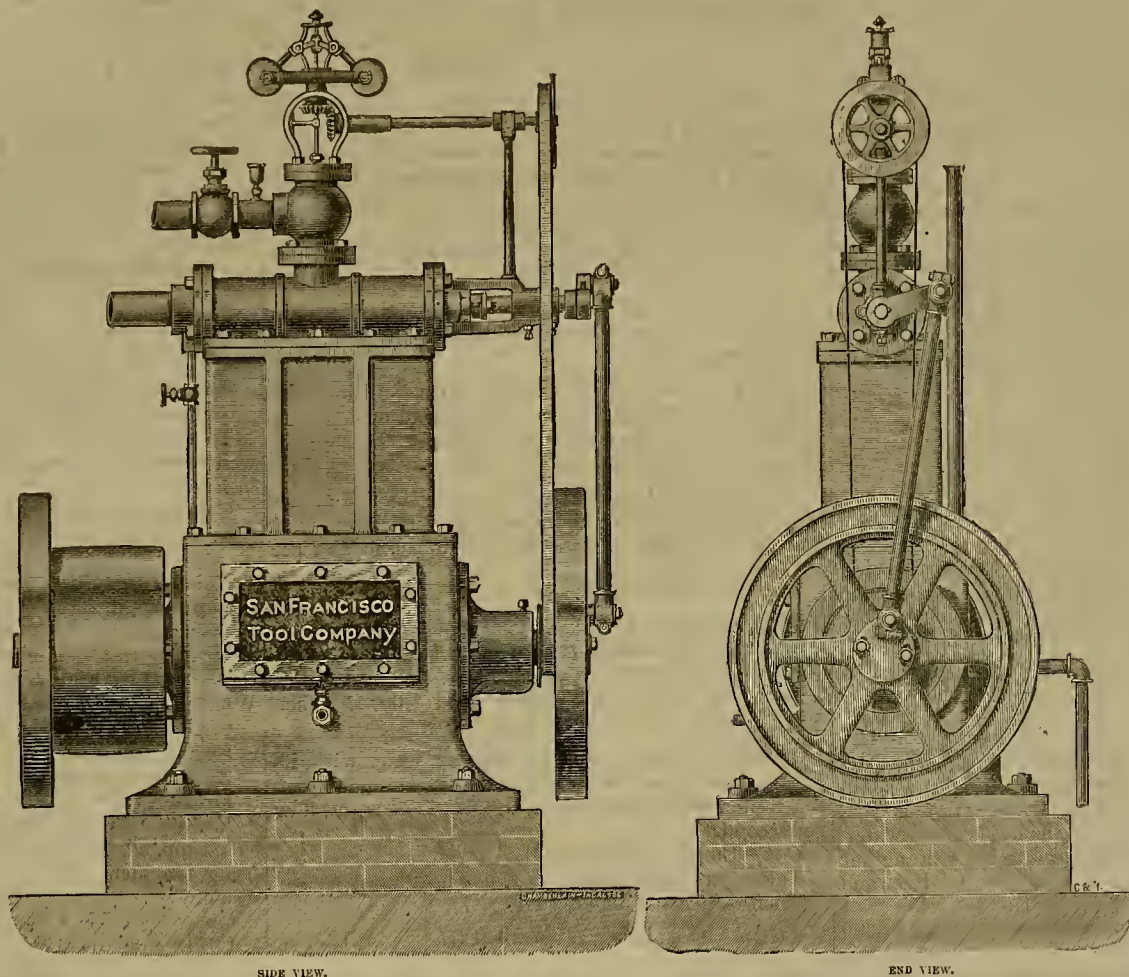
amount of hard coin out of it that he did out of the Penobscot mine, some 20 miles from Helena, which he discovered some years ago. As we continue up the creek there are more, such as Nugget, Alder, Gold Run, Cougar, Wasp and Reeder gulches, all of which have been and are being worked.

Then on the south side, from Murray over the divide and tributary to Beaver creek, are a number of others. Trail gulch being open in a number of places, and in some of them paying handsomely, Frank Gordon, the week I was there, with one man and recker cleaned up 12 ounces, which I call a pretty good starter for a placer claim.

There are two little towns located on these Beaver creek mines. Delta is at the junction of Trail gulch and Beaver creek, and is quite a promising little town. Another season when there is plenty of water, no doubt it will be a prosperous place; and Myrtle is the same distance up Trail gulch and the junction of Placer gulch.

There are just now many of the miners who have locations in this locality at work for the Plume Company, for the reason that they cannot work their own grounds for want of water. Potosi gulch is also being worked to some extent. The whole country is so densely wooded that the only way you can get through, except on the trails that are cut out, is to go about and then sometimes it is almost impassable. Gold is said to be "where you find it." My experience teaches me that it is found in some very tough places to get at, but the average miner and prospector is a persevering individual and "he gets there."

(To be Continued.)



IMPROVED DESIGN FOR SINGLE-ACTING ENGINE.

cases, placed outside the main frame and accessible. The cylinders are jacketed, and every precaution taken to save steam and cost of running. The position of the valves and their working is not concealed and inaccessible, but in sight and adjustable. The wear of the valve and also of its connections can be taken up, otherwise the position would soon be lost. The crank cases contain nothing but the cranks and piston connections, no governor eccentric or other parts to break or come loose. The engines have no eccentrics, in the common sense of that term; the valves are driven by cranks, as shown in the engraving. The steam valve is free to wear to its seat, as in the case of a common slide valve, and will not leak from wear. Piston valve engines are furnished, in some cases, for very high speed and intermittent duty, and where engines are exposed to dust and grit; but are not recommended where oscillating valves will suit as well. Single acting engines will, it is thought, in the near future, take the place of the double acting type in most cases where condensing apparatus is not wanted. They should be examined by everyone desiring to erect steam power.

METALLIC SULPHIDES.—In the PRESS of Sept. 5th we gave some valuable information relating to the oxidation of metallic sulphides. The process rests on scientific data, and no doubt

to the Coeur D'Alene lake; thence by steamer 60 miles, and then stage again for 35 miles, making a tedious two or three days' trip; the preference of the traveling public is surely in favor of the Thompson Falls route.

The main camp lies on Pritchard creek, and so far as I am now capable of judging, has been as much misrepresented a camp as I have ever seen, for the reason that discouraging and conflicting reports have been all that the outside public have seen. To be sure, the first excitement was almost without foundation, and men from all parts of the Union rushed in there in the dead of winter when the whole country was covered with 10 feet of snow, and from all accounts were expecting to scratch away the snow and find nuggets of gold the size of a water bucket, and, of course, they were disappointed. Some had some means, others had none, and the consequence was that nearly all of them left disgusted, and consequently gave the country a black eye. In all candor they believed that they were truly stating the facts, but a few persevering, patient workers remained and their efforts have been rewarded by developments that I am sure will make it a remunerative camp for years to come. There are already quite a number of placer claims that are paying their owners handsomely. The manner in which the camp was located has in my mind

PRACTICAL HYDRAULICS.

NUMBER 5.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]
[COPYRIGHTED.]

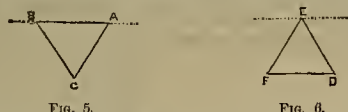
Making $b=ph$, $t=0$, that is, closing the top of the weir, at the level of still water, and equation (46) becomes

$$Q = \frac{gpc}{15} (2g)^{\frac{1}{2}} h^{\frac{5}{2}} \text{ cubic feet.} \quad (48)$$

Comparing equations (48) and (34),

$$Q:Q::\frac{g}{48}:\frac{g}{34}::\frac{h}{15}:\frac{h}{15}::3:2. \quad (49)$$

Equation (49) shows that, with respect to two triangular weirs of equal size, that the discharging capacity of the weir whose top is closed at the level of



still water, as E in Fig. 6, is, to the discharging capacity of the weir whose top is open, as AB in Fig. 5, as 3 is to 2, or 1.5:1. Table 4 was computed from an open weir, as ABC, Fig. 5. To render it applicable to a closed weir, as DEF:

Rule 16.—Multiply the tabulated flow due any head given in Table 4 by 1.5.

Ex. 26.—In a trapezoidal weir, the head between the crest and the level of still water being three (3) inches, the length of the crest two (2) feet, and the width of the opening at water level one and three-fourths (1.75) feet, what is the flow in cubic feet per second when the coefficient of discharge is .62?

Cal.—Head 3 inches = $\frac{1}{4}$ feet.

By formula (47), $(\frac{1}{4})^{\frac{3}{2}} = \frac{1}{8}$.

Three times bottom width: $2 \times 3 = 6$.

Twice top width: $1.75 \times 2 = 3.5$.

Whence, $1.07 \times .62 (3.5 + 6) \frac{1}{8} = .7878$ cubic feet.—Ans.

Ex. 27.—In a trapezoidal weir, the head being twelve inches, the bottom width three feet, the top width one foot, and the coefficient of discharge .624, what is the flow of water over it in cubic feet per second? By formula (47).

Cal. 1st.— $1.07 \times .62 (1 \times 2 + 3 \times 3) \times 1 = 7.3445$ cubic feet.—Ans.

Cal. 2d.—Observe that the weir opening, ACDB, Fig. 4, is resolvable into two parts, to wit: the part CDBE, which is equal to the rectangle CDGF, and the triangular part ACE, whose crest is AE, and whose top is closed at C, at the level of still water. Applying, in Example (27), Table 2, to the rectangular part CDGF, substituted for the part CDBE, and Table 4, to the triangular part ACE:

By Table 2, due one foot head, one foot crest, 3.3390 cubic feet.

By Table 4, due in quadrantal weir with open top, 12-inch head, 2.6365.

By Rule 16, $2.6365 \times 1.5 = 3.9547$.

Hence $3.3390 + 3.9547 = 7.2937$ cubic feet.—Ans.

The discrepancy between calculating 1st and 2d arises from Table 4, in the computation of which .616 on the authority of Prof. Thompson, was employed as the coefficient of discharge, instead of .624, as proposed in the given example.

FLOW OF WATER OVER A RECTANGULAR WEIR, HAVING ITS ANGLES, HORIZONTAL AND VERTICAL, AND ITS UPPERMOST ANGLE ON THE LEVEL OF STILL WATER.

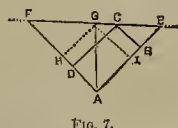


Fig. 7.

Let ABCD, of Fig. 7, represent a rectangular weir, having its vertical angle C, at the level of still water. Through C, draw a horizontal line indefinitely. Produce AB, AD, intersecting this horizontal line in E and F. Draw AG = h perpendicularly to EF, and bisecting A.

Let AB = m, and AD = n. It is obvious from the imposed conditions, that AE = AF = m + n; that EF = 2GE = 2GF = 2AG = 2h; that FD = DC = AB = m, and BE = BC = AD = n.

Observe that in Fig. 7 are represented three open

quadrantal weirs, FAE, FDC and CBE, and that the given rectangle ABCD = FAE + FDC + CBE. (50)

Denote by Q_u the flow of the given rectangular weir.

By similar triangles, find the heads or depths as follows:

$$PD = \left\{ \frac{mh}{m+n} \right\} \quad (51)$$

$$LB = \left\{ \frac{nh}{m+n} \right\} \quad (52)$$

Substituting these values, and the value of AG = h in (34), noting that for quadrantal weirs, $p=2$,

$$Q_u = \frac{g}{15} c (2g)^{\frac{1}{2}} \left\{ 1 - \left\{ \frac{m^{\frac{5}{2}} + n^{\frac{5}{2}}}{(m+n)^{\frac{5}{2}}} \right\} \right\} h^{\frac{5}{2}} \quad (53)$$

If in (53), the general formula for the flow of water through a rectangular weir having its uppermost angle vertical at the level of still water, we make m equal n, and substitute the value of $(2g)^{\frac{1}{2}} = 8.025$, and $c = .616$,

$$Q_u = 1.70435 h^{\frac{5}{2}}. \quad (54)$$

In which case the rectangle becomes a square, as represented in Fig. 7, by AIGN.

Comparing formula (54) with formula (35), which is for the flow of water over a quadrantal weir, we have:

$$Q_u = \frac{1.70435}{2.6365} = .6464 Q. \quad (55)$$

To determine the flow of water through a square weir, having its uppermost vertical angle at the level of still water.

Rule 17.—According to formula (54), multiply the square root of the fifth power of the head or depth by 1.70435; or by formula (55), multiply the flow in Table 4 for the given head by .6464.

Ex. 27.—The head being 3 inches = $\frac{1}{4}$ foot in a rectangular weir, having its upper most vertical angle at level of still water, what is the flow in cubic feet per second?

Cal. 1st.—By formula (54).

Fifth power of the square root of $(\frac{1}{4})^{\frac{5}{2}} = \frac{1}{32}$.

$1.70435 \times \frac{1}{32} = .05326$ cubic feet.—Ans.

Cal. 2d.—By Rule 17, second part.

By Table 4, flow due $\frac{3}{4}$ -inch head = .0824. Then $.0824 \times .6464 = .05326$ cubic feet.—Ans.

Ex. 28.—The sides of a rectangular weir, with its angles vertical and horizontal being 2 feet and 1 foot, the coefficient of discharge being .62, what is the flow per second?

Cal.—Employ formula (53).

Taking the given data $m=2$, $n=1$,

Then $m+n=3$, and (see Fig. 7),

$$AG = h = \left(\frac{m+n}{2} \right) \sqrt{2} = \frac{3}{2} \sqrt{2} = 2.12127 h^{\frac{5}{2}} = (2.12127)^{\frac{5}{2}} = 6.55376.$$

By Table 5, $m^{\frac{5}{2}} = (2)^{\frac{5}{2}} = 5.657$; $n^{\frac{5}{2}} = (1)^{\frac{5}{2}} = 1$.

By Table 5, $(m+n)^{\frac{5}{2}} = (3)^{\frac{5}{2}} = 15.590$.

Substituting these values of $m^{\frac{5}{2}}$, $n^{\frac{5}{2}}$, $(m+n)^{\frac{5}{2}}$ $h^{\frac{5}{2}}$, $(2g)^{\frac{1}{2}} = 8.025$, and $c = .62$. $Q_u = \frac{g}{15} c \times .62 \times 8.025 \left(1 - \frac{5.657+1}{15.59} \right) 6.55376$.

Whence $Q_u = 9.9644$ cubic feet.—Ans.

FLOW OF WATER THROUGH CIRCULAR AND SEMI-CIRCULAR WEIRS.

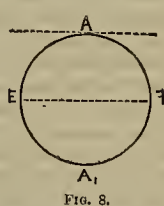


Fig. 8.

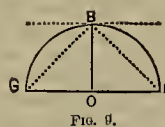


Fig. 9.

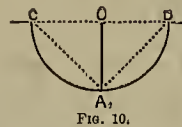


Fig. 10.

Let Figs. 8, 9 and 10, represent respectively the circular and semi-circular weirs, Fig. 8 touching the water surface at A, Fig. 9 in a similar manner at B, and Fig. 10 at its diameter CD.

Let r feet denote the radius with which the several weirs are described, then in both Figs. 9 and 10 will r denote the head, while in Fig. 8 the head (maximum) will be 2r.

Let x in Fig. 8 denote any portion of the head, and

Q , the flow in cubic feet $(2g)^{\frac{1}{2}}$ to acceleration of gravity, and c coefficient of discharge.

$$\text{Then } dQ = 2c (2g)^{\frac{1}{2}} 2 (r)^{\frac{1}{2}} \left(1 - \frac{x}{2r} \right)^{\frac{1}{2}} x N dx. \quad (56)$$

Integrating (56) between limits of $x=0$, and $x=2r$, and substituting the value of $(2g)^{\frac{1}{2}} = 8.025$,

$$Q = 24.2129 C r^{\frac{5}{2}}. \quad (57)$$

Let Q_2 = the flow in Fig. 9 per second. Integrating (56) between limits of $x=0$, and $x=r$, there results the flow in that portion of Fig. 8 represented by FAE, which is equal to HBG, Fig. 9, the discharge sought, viz.:

$$Q_2 = 9.2313 C r^{\frac{5}{2}}. \quad (58)$$

Again in Fig. 10: Let x denote any portion of the head from A, and Q_3 the flow in cubic feet per second; Then

$$dQ_3 = (2g)^{\frac{1}{2}} (r^2 - x^2)^{\frac{1}{2}} x dx. \quad (59)$$

Integrating (59) between limits $x=0$, and $x=r$, and substituting value of $(2g)^{\frac{1}{2}} = 8.025$,

$$Q_3 = 7.6932 C r^{\frac{5}{2}}. \quad (60)$$

Comparing equations (60) and (35) and making $c = .616$, and $r = h$,

$$Q_3 = 1.79 Q. \quad (61)$$

To find by Table 4 the flow through a semi-circular weir: Open at the top as represented by CD Fig. 10.

Rule 18.—Multiply the flow in Table 4 for the given head or radius by 1.79. See formula (61).

The triangle CA₂D, inscribed in the semi-circular weir, Fig. 10, represents a quadrantal weir whose flow is Q , while the flow of the semi-circular weir CA₂D is Q_3 .

Comparing equations (58) and (35) and making $c = .616$, and $r = h$,

$$Q_2 = 2.1568 Q. \quad (62)$$

To find by Table 4, the flow through a semi-circular weir closed at the top, as represented at B Fig. 9.

Rule 19.—Multiply the flow in Table 4 for the given head on radius by 2.1568 (62).

To find by Table 4 the flow through a circular weir touching the water surface at A as represented in Fig. 8.

Comparing equations (57) and (35) and making $C = .616$, and $r = h$,

$$Q = 5.6566 Q. \quad (63)$$

Rule 20.—Multiply the flow in Table 4 for the head or depth equal to the given radius of the circular weir or opening by 5.6566. See formula (63).

Ex. 29.—In a semi-circular weir, with open top, as represented by Fig. 10, the head on radius is ten inches. What is the discharge in cubic feet per second?

Cal.—By Table 4 the flow due a head of 10 inches is 1.6713 cubic feet.

By Rule 18 we have—

$1.6713 \times 1.79 = 2.9916$ cubic feet.—Ans.

Ex. 30.—In a semi-circular weir or opening with closed top, as represented by Fig. 9, the head or radius being ten inches, what is the flow in cubic feet per second?

Cal.—By Table 4 the flow due a head of ten inches is 1.6713 cubic feet.

By Rule 19 there results—

$1.6713 \times 2.1568 = 3.6047$ cubic feet.—Ans.

Ex. 31.—In a circular weir or opening touching the water surface, as at A, Fig. 8, the radius is eight inches; required, the cubic feet flow per second?

Cal. 1st.—By Table 4 the flow due a head of eight inches is .9567 cubic feet.

By Rule 20 we have—

$.9567 \times 5.6566 = 5.4117$ cubic feet.—Ans.

Cal. 2d.—By formula (57): 8 inches = $\frac{2}{3}$ feet.

By Table 5, $(\frac{2}{3})^{\frac{5}{2}} = \frac{5.657}{15.59} = .3629$ nearly $24.2129 \times .616 \times .3629 = 5.4117$ cubic feet.—Ans.

FLOW OF WATER THROUGH PARABOLIC WEIRS.

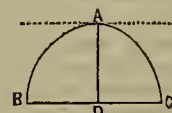


Fig. 11.

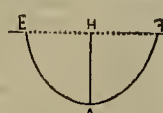


Fig. 12.

Let Figs. 11 and 12 represent parabolic weirs, touching the water surface, Fig. 11, at its apex, A, and Fig. 12 at its inverted base, EF.

Let h, in each weir, as AD or HA, denote the head, and let b denote the base, as BD, DC or EH, FH.

Let c = the coefficient of discharge.

Q = the quantity discharged in cubic feet per second,

and $(2g)^{\frac{1}{2}} = 8.025$ due gravity.

Let x = any part of the head, estimated from A, in Fig. 11.

PROSPECTORS.—This is the season of the year when the prospector, after bising in the mountains for several months, digging in the ground in search of the precious metals, and enduring all manner of hardships and privations, gathers up his prospecting outfit and comes to the city and takes up a winter's residence. We do not mean to say that all prospectors do this, only those whose mines have not been sunk deep enough, and of which the excavations are not sufficient to protect them from the severity of the winter weather. If there is one man more than another who deserves the kind consideration and good will of all classes of our citizens, it is the prospector. There is not a mining camp in America but owes its existence to the men who, leaving the usual haunts of men, their families, friends and civilization, and taking up the weapons of their warfare—the pick, hammer, drill and shovel, and strapping a side of bacon, a sack of flour and a few potatoes to a bony looking horse or mule, he goes away into the mountains and trackless desert, and for months, and sometimes years, he suffers all kinds of hardships, and often, very often, he dies in some lonely spot, the only attendants at his dying bed being the wild game of the hills, a faithful dog and his old horse. Very often, however, the prospector meets with better success, for after being on his trip in the mountains but a short time he returns laden down with pay rock, and rejoices over the discovery of a ledge that in a short time makes its locator rich and results in the building up of a city and the maintenance of thousands of human beings.

SQUIRRELS AS PROSPECTORS.—The Virginia Chronicle says: Bradley, the prospector who discovered the new mining camp in Esmeralda, formerly known as Lake district, but now changed to Hawthorne, gives the following account of how he found the rich gold-bearing vein on which the La Panta and other claims are located through the misrest chances. The La Panta lode is what is known as a "blind ledge," there being no surface croppings to indicate the existence of a mineral bearing vein at the point where it is located.

In passing along the side of the hill Bradley's attention was attracted by a mass of decomposed quartz mingled with dirt that had been scratched out by ground squirrels in digging holes in the side of the hill, which was fairly honeycombed with them. He collected some of the quartz, crushed it in a mortar and horned it out, getting a fine prospect in gold. This led him to search for the vein whence the decomposed quartz had been excavated, which he found by following the squirrel holes, which extended close up to the rim of the vein or gold-bearing ledge, one claim on which has been disposed of for \$35,000. Had it not been for the excavations of the whiskered little rodents, the gold-bearing vein that is now attracting so many prospectors and mining men to Esmeralda might have remained hidden for countless centuries.

ALASKAN MINES.—E. W. Haskett, whom the new administration has displaced as United States District Attorney for Alaska, has arrived in this city. In speaking to a reporter, he expressed himself in many respects pleased with the country, but considers it a land of undeveloped resources. "As for the mines," he said, "it is probable that a large portion of Alaska is one vast mineral deposit. As yet, I suppose, all the mining in Alaska could be included within a mile or so square. I would not advise a man without capital to go to Alaska in the hope of engaging in the mining business. There is gold there, and lots of it, but it requires capital to develop and work it. The mines of the Basin and Treadwell mine have paid immensely during the past year, but it has been done with capital. Prospecting is a very difficult matter, owing to the condition of the ground and the thick timber lands. The placer mining is conducted on the hydraulic plan. You see, the mountains are very high and are capped with glaciers. The miners consequently just hitch onto the melting end of a glacier and find an abundance of hydraulic pressure."

STAY AWAY.—The news that work is about to begin at Panamint is already attracting men in that direction. To one and all we would say, stay away, you are not needed, there is no work for any more men there at present. When the road shall be completed, the force now at work upon it will set to work clearing away the rubbish of the burned mill, and doing other preparatory work. This force will be all that Mr. Fairman will employ for some months to come. Panamint is 50 miles out in the desert beyond Darwin, and 75 miles beyond the railroad. There is no chance for men to find other employment in that region, and therefore all are warned to stay away for the present.—*Inyo Independent.*

SHASTA COUNTY is having a veritable mining, manufacturing and agricultural boom. More people have gone to that county this year than to any three other counties in the northern part of the State. Houses have been built on tens of thousands of acres of unsettled lands. Mining was never carried on so actively before, and never looked so promising as now. The bullion product is large and rapidly increasing. As a result of this, the trade is good, and the towns are growing in wealth and population. Manufactures are springing up and assuming importance.

USEFUL INFORMATION.

A NEW SUBSTANCE FOR MIRRORS.—Is glass to be superseded by "ferrolite" in the manufacture of mirrors? Some months ago a Pittsburgh paper gave in detail the discovery of a new material invented or discovered by Dr. E. Rosenzi, the well-known chemist of that city, and named by him "ferrolite." The new substance had been found to be identical with that from which the obsidian mirrors used in ancient telescopes were composed, and the secret of making which was lost to mankind several hundred years ago. Dr. Rosenzi made and sold several of these mirrors, one of which went to the Imperial Observatory at St. Petersburg, Russia. He felt the greatest confidence that his discovery would in time be utilized in the arts and commerce, but, lacking the necessary capital to bring its manufacture on an adequate scale, allowed the matter to rest quietly. A few months ago, however, he succeeded in interesting a number of leading Pittsburgh and Beaver county capitalists in the matter, and a company has been organized in Rochester, Pa., and a factory building erected and the necessary furnaces, machinery and appliances put in for the manufacture of ferrolite of obsidian mirrors and other articles of use and ornament.

SOLDER FOR GLASS AND PORCELAIN.—A soft alloy which attaches itself so firmly to the surface of glass and porcelain that it can be employed to solder articles that will not bear a high temperature can, as the *Pharmaceutical Record* asserts, be made as follows: Copper dust obtained by precipitation from a solution of the sulphate by means of zinc is put in a cast-iron or porcelain-lined mortar and mixed with strong sulphuric acid, specific gravity 1.85. From 20 to 30 or 36 parts of the dust are taken, according to the hardness desired. To the cake formed of acid and copper there is added, under constant stirring, 70 parts of mercury. When well mixed, the amalgam is carefully rinsed with warm water to remove all the acid, and then set aside to cool. In 10 or 12 hours it is hard enough to scratch tin. If it is to be used now, it is to be heated so hot that when worked over and brayed in a mortar it becomes as soft as wax. In this ductile form it can be spread out on any surface, to which it adheres with great tenacity when it gets cold and hard.

HOW TO KEEP CHESTNUTS SOFT AND SWEET.—The chestnut is not strictly a fruit, but thousands of boys and girls like to eat it in late fall or winter, and many of them do not know how to preserve it so that it shall be pleasant eating in winter. Generally it soon becomes as hard and dry as marble, but this is unnecessary. When first gathered put the nuts in a common bag—not a paper one—and expose them a few days to the sun and air on some roof, wood pile or fence. Stir them over occasionally, so that they do not sweat and mould. They will become a little warty, and when this is the case uniformly and they seem dry, hang them in the cellar—not in any chest or closet up stairs—so that no mouse, squirrel or rat can reach them. If properly cured when placed there they will remain sweet and soft all winter; if not cured they will mould in the cellar, while above the cellar they will become too hard for anybody's teeth.

BRAZING.—A correspondent of the *Blacksmith and Wheelwright* writes in regard to "brazing," as follows: I wish to say a word about brazing. I am not an expert at brazing, but I have had fair success in the method I follow in such work. It is as follows: I get the iron bright at the point where the brazing is to be done. There must be a good clear fire with coal well charred. The pieces are fastened together as closely and firmly as they can be, and then put in the fire so that they can be watched easily. I then take some sheet copper such as turners use, cut it into fine pieces, and lay them on the iron at the place where the brazing is needed. Then fine borax is applied, and the bellows are worked steadily until the copper melts and runs. It is advisable to turn the iron around so as to get the copper into all the cracks. The piece is then taken out of the fire and allowed to cool, which finishes the job.

WHEN A LEATHER BELT has been slightly injured by being wet in any manner, it should be dried as much as possible, and laps that may be started can be fastened by a little cement, the composition of which, as follows, is furnished by the Page Belting Company: Equal proportions of good glue and Prussian gelatine dissolved in water, and cooked in a tin vessel set into a large one containing water. Do not allow the vessel containing the cement to set quite on the bottom. It should be cooked until it is quite thick and ropy; it can then be worked in the places where the laps are started by means of a knife. The belt should then be hammered until dry and a few pegs may be used, which can be obtained from any local shoemaker. Cut the pegs off a little from the surface on the reversed side, and hammer them down on a flat-iron, anvil, or lapstone.

A LARGEST BLOCK OF MARBLE ON RECORD.—Mr. Odell, the efficient superintendent of the quarries of the Vermont Marble Co., at West Rutland, Vt., has the distinction of making the largest raise of stone ever made at one time. A huge mass of marble eight feet in thickness and 54 feet in length, weighing, by actual

measurement, 876 tons, was recently lifted from place by a line of plugs and feathers. The entire mass was lifted from the bed without the slightest injury to the marble, and was afterwards broken up into blocks and lifted to the mills. At this rate, the expense of quarrying marble should fall below 10 cents per foot.

POLISHING POWDER FROM ASHES.—The *Iron Trade Review* gives what is stated to be an original recipe for making from anthracite ashes a polishing powder of much value for polishing machinery. Sift the ashes, fill a pail one-third full of ashes; fill up with water, stir well, with one-quarter of a minute for coarse grade, one-half minute for medium, three-quarters of a minute for fine suitable for fine metals; then pour off into another vessel to settle. When settled pour off the clear water and dry the sediment any way you please, in a bakepan on a stove, but not too quickly. It is, says the writer, the best polishing powder in use, and the cheapest.

SOME THINGS WORTH KNOWING.—To make green blinds that are faded look like new, brush them over with linseed oil. Black ornaments may be mended with shellac. Smoking the joint renders it black. If the brass top of a paraffin lamp has come off, it may be repaired with plaster of Paris wet with a little water, and it will be as strong as ever. Tough meat may be made as tender as any by the addition of a little vinegar to the water when it is put on to boil. Fish may be scaled more easily if dipped for an instant in boiling water, or if they are slightly sprinkled with salt.

A TYPE AND STEREOTYPE SETTING MACHINE.—A machine which is said to enable the operator to set type and stereotype at the same time was experimentally tested in Baltimore a few days ago, and several newspaper men from different parts of the country are reported to have invested in it for its value in book and job work, though doubtful whether it can be made to meet the requirements of a newspaper composing room.

A SUPERIOR BLOTTER.—Blotting paper, saturated with a solution of oxalic acid and dried will not only absorb the ink of a blot, but will remove the blot itself, if the ink does not contain indigo or aniline color. It might be dangerous in removing signatures from important papers, but the trace of this writing will remain, and can be made legible by adding ferrocyanide of potassium or gallic acid.

The decay of stone, either in buildings or monuments, may be arrested by heating and treating with paraffine mixed with a little creosote. A common "paint burner" may be used to heat the stone.

CLEAN AND OIL LEATHER BELTS without taking them off their pulleys. If taken off they will shrink. Then a piece must be put into them and removed again after the belt has run a few days.

GOOD HEALTH.

Hot Water in Dyspepsia.

The internal use of hot water in various ailments, but especially in dyspepsia, is exciting a good deal of interest, both among the people and among physicians. The leading medical journals are also devoting much attention to a favorable discussion of the subject. The *London Lancet* and the *New York Medical Record* recommend its use. A practicing physician gives an extended personal experience of its use in a late number of the last named journal. He was prostrated in 1883 by sunstroke, which brought about a serious disarrangement of the stomach that resulted in the habitual ejection of his food from that organ. After trying various remedies without avail, his attention was attracted to the use of hot water by reading an article in the *London Lancet*. He resolved to try it himself, which he did, with the following result, as described in the *Medical Record*. Before rising in the morning he had his servant bring him a pint of boiling water. This, so hot that he could not touch his lips to it, he drank, drawing it through a tube, during the space of 12 minutes.

His lay in bed one and a half hours longer, and then took his breakfast and retained it on his stomach with no unpleasant feeling. He did the same one and a half hours before dinner and supper, and a half hour before retiring.

This course he continued for several months, using no other fluid whatever. The vomiting was wholly arrested from the very first. For the next nine months he used the hot water less regularly, with occasional return of the vomiting. A subsequent change of climate helped to complete his cure and to do without the water. He since used it in his own practice, with excellent results every time the treatment was persevered in.

RAW POTATOES FOR THE COMPLEXION.—Most women value a clear complexion, if attainable. Helen of Troy is said to have bathed daily in wine and milk to preserve the purity of her silky skin. Cleopatra used various medicated ointments and fragrant cosmetics to enhance her charms. Catherine of Russia habitually washed in strawberry juice; while strange and grim tales are told about the preparation of the

mysterious baths Ninon L'Enclos is supposed to have indulged in. Our fair sex are less luxurious in these days, and we find that ladies who value a transparent white skin—a delicate complexion in which the tint of the rose is softly blended with the snowy hue of the lily—are now being advised by an eminent authority on this art of keeping beautiful forever, to frequently apply the end of a raw potato to the face and neck by gentle rubbing. After rubbing, the face and neck should be washed, and gentle friction is to follow. Ladies are strongly urged to always keep a raw potato on the washstand. One great advantage the potato seems to possess over many other skin beautifiers seems to be its exceeding cheapness, as one potato may be used over and over again, since it is only necessary to remove a little of the outer surface and to pare off a thin slice before applying the freshly cut surface.

What Shall We Drink?

Of all stomach questions this is the most difficult to answer. If coffee and other beverages were disagreeable, and we drank them as a duty, it would all be easy. Duty is weak, appetite strong. If your teeth are good, chew your food till it is ready for deglutition and digestion. Without this you miss the full pleasure of eating. To bite a piece of bread in two or more pieces and wash it down with coffee or tea is to cheat the palate.

You need considerable water in the system to run the machines. This may be taken on rising and on going to bed. If within a mile or two of a spring make it a visit early in the morning, and take one or more draughts of fresh water charged with electricity from the earth. To boil water is to lessen its physiological value. There is something magical in the influence of water fresh from a spring, drank on rising in the morning. Cold water morning and night is so stimulating to the alimentary canal that it relieves constipation.

Milk is a bad drink for students. Those who have studied the laws of digestion in the light of Beaumont's experiments know that a quantity of milk in the stomach must interfere with the digestion of solid food. Milk, even when taken with simple bread, will not leave the brain as clear as will dry food with abundant mastication.

Tea and coffee injure the brain of the student. The human brain no more needs the stimulous or narcotism of tea and coffee than does the brain of a deer or race-horse.

Alcoholic drinks are poisons. We drop a little into a man's eye. It reddens and irritates it. The eye is not scratched, it is poisoned.

A living man with an opening through his side into his stomach presents himself for experiment. It is the famous case of St. Martin. Gazing through that strange opening we see, when alcohol is introduced, the same poisoning as in the eye. So strong was this Frischman's stomach that on going to bed at night he could gorge himself with the most indigestible food, and the lining coat of his stomach would show no irritation the next morning. But when he was given a glass of pure French wine, the lining the next morning showed a distinct irritation. After a glass of whisky the veins were very much swollen, and the irritation continued several hours.

And now we study the stomachs of drinking men after death. The moderate drinkers show a stomach resembling St. Martin's after the wine. The free drinkers discover a worse lining. Hard drinkers show a stomach dotted with dark ulcers. The stomach of the poor wretch who shrieks out his life in delirium tremens is a putrid-looking mass riddled with black destruction.—*Dio Lewis' "Nuggets."*

THE HYPODERMIC NEEDLE.—Frightful accounts of the opium evil appear from time to time in the newspapers, and it is probable that the half has not been told. A writer in a St. Louis paper tells of a bright and beautiful woman who buys \$20 worth of opium at a time. When her supply of the drug is out she wakes up in the night in the utmost agony and bites her arms until they are torn and bleeding.

A celebrated actress gets fairly wild about 2 o'clock every afternoon, and she makes an excuse and gets by herself for a few minutes. When she returns she is a changed woman, for a short time pleasant and talkative, and then she begins to drift into a semi-unconscious state. Her eyes shine and look at you, through you and beyond you. Then she will start, beat a tattoo with her hand, stir up her bang, brace up for a few minutes and float away again. This continues for hours. At a big dinner she will drift away over her plate, rouse herself, take a fork and separate some portion of her food, have another relapse, and so on through a long dinner without eating a mouthful. Sometimes she suspends her awful habit and adopts as a substitute whisky, tobacco and other things; but she always returns to the hypodermic needle.

A NEW CLOTH FOR RHEUMATISM TO WEAR.—As for the wool question, it is probable that vegetable fabrics are even better clothing than animal, and as a fact wool of the most valuable kind for hygienic purposes—a specific almost for rheumatism—is now being made largely from the leaves of the fir. I, myself, am wearing that manufactured by Laivits, from pinaster, or black pine, and find it in every way admirable, whether for under or over clothing. The *Lancet* pronounces it far superior to animal wool.—*Anna Kingsford.*

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

VARIOUS MINES.—Amador *Sentinel*, Oct. 28: Three men are engaged in retimbering the Tripp & Littlefield mine. An arastra is being put up on the Cleveland mine, near the Big Bar bridge. Work is progressing at the Kennedy mine. The lumber is now being delivered. The Pacific mine, Plymouth, is closed down while the shaft is being retimbered. The men who have bonded the Mahoney mine of Sutter Creek, are expected up every night. Tom Read and Geo. Busb of Plymouth, have been in town for a couple of days. The Shugert mill was running its full twenty stamps last night being supplied from Horne's ditch, the lumber supply in which is reported as increasing. Louis Isola is said to be developing a fine mining property on John Belluomini's ranch. The shaft is down forty feet, with a drift of forty feet, in which is a four-foot ledge showing gold very freely. We were told the other day that some Eastern mining men would soon visit this county looking for a mining investment. They are said to be men of sand, having sunk in unprofitable ventures in Arizona and Colorado two or three million dollars. Amador is a good county in which to get even and we trust they will find something here to suit their taste.

SOUTH SPRING HILL.—*Ledger*, Oct. 31: The recent clean-up of this mill for a run of 15 days with only 10 stamps, crushing 16 to 18 tons per day, realized nearly \$7000 in free gold, besides sulphurets, which will give \$800 more. This is the handsomest yield yet made by this splendid mine, being an average of over \$25 per ton. The mine is looking better than ever, the ore body in places being over thirty feet wide, and of high grade. At the mill, the work of putting in ten additional stamps is almost completed, but the woodwork of the original ten stamps will have to be renewed. One of Knight's improved wheels is also to take the place of the old one. The Hendy concentrators have been taken out, and two Frue and two Triumph concentrators have been put in opposite the ten new stamps. This is for test purposes, and whichever make proves the most efficient will be adopted for the other batteries—making eight concentrators all told. The mill is likely to be idle until the rains increase the water supply, as it is not fitted to run by steam.

MISCELLANEOUS.—The Mammoth mill was brought to a standstill last week on account of a failure of the water supply. There is nothing doing at the mill or mine. At the big tunnel at Middle Bar, the work of putting up the new and more powerful air compressor is under full headway. It will take two or three weeks to get it in running order. The Bunker Hill mill was compelled to close last Monday, on account of a scarcity of water. It is supplied with steam fixings, but even battery water cannot be had, the Keystone requiring the whole of the supply. It will probably have to take to steam in a few days, and then there will be battery water for the Bunker Hill. A rich strike is reported at the New York mine, 5½ miles south-west of Jackson. At a depth of 120 feet a body of quartz has been discovered, which shows plentifully in free gold and sulphurets. We have not heard the extent of the ledge. W. C. Anderson has stuck to this claim persistently for several years, and he deserves the good fortune which appears to be dawning upon him.

SUTTER CREEK.—F. B. Latham, Secretary of the Consolidated Amador Mining Co., has been here for several days in company with a gentleman named Gillette, the largest English stockholder. As to what will be done with the mine, nothing definite is known as yet, but in all probability there will be an entire change of program. The machinery will most likely be put back on the old shaft, and the water taken out to a certain depth, which proposition is universally approved here, as most likely to place the mine once more on a prosperous basis than any steps which have been taken since the old shaft was abandoned. Since the closing of the Mahoney, one of the engineers and one or two other men have been kept on to keep things straight around hoisting works and mill. They have devoted a portion of their time to prospecting, and recently they discovered a ledge north of the hoisting works, which has opened out into an ore body of considerable dimensions. A good track has been laid, and about 200 tons of rock is now on the dump. This ledge is favorably located, so that a few men can easily keep the 40-stamp mill going, and it is believed that the rock will pay a fair profit. The Canal Co. have a number of men at work fixing flumes, etc., and placing the canal in condition to withstand the winter's storms. The Amador reduction works resumed operations this week, after six weeks' idleness.

Butte.

BUTTE CREEK.—*Cor. Record*, Oct. 31: If Butte Creek was five hundred miles from where it now is, with its present prospects, instead of having the number of miners it now has, would have hundreds of men driving drifts into the hills, and plenty of coin to back them. The trouble is it is too near home, and as often said too old a mining camp. The day is not far distant when the people of Butte county will be astonished at the wealth upon Butte Creek. Drift diggings are what we want; this kind of mining will pay. Above this place much gold is being taken out. The Indian Spring, Pershacker, Cole, Merideth, McIntyre and Foley claims are all of first-class paying mines. John Nicoll is opening up a claim just above Helltown, and from all indications it will be a paying piece of property from the start. C. Smith has started a drift near the lava on the west side of the creek; success to him. I am satisfied he will strike pay gravel in running fifty feet. All are sanguine of there being good pay under the mountain. Bowman is on the east side two hundred and fifty feet, and has found paying gravel, it pays him three dollars per day, and every appearance of being a "stayer." Ben Gale and Harry Moore are driving the Foley drift back into the hill with encouraging prospects. C. Hintz & Co. have started a drift just below the bridge, intending to mine out the flat, which is richly charged with gold their energy and perseverance will insure them success. Moss & Co. are driving ahead, doing an ex-

tensive business by way of tearing down the hills. The Frisker claim was recently sold (so we hear) for fifteen thousand, and the company will soon be at work taking out the root of all evil.

Calaveras.

GOLD.—Mountain *Echo*, Oct. 30: We learn from good authority, that Hugh Duffy and Edward Purdy lately uncovered an immensely rich deposit of gold in their mine on Dead Horse hill, near this town. It is said that they have already taken out quite a large sum of money. The quartz mine owned by John Graham and Joe Whittle, situated near Albany Flat, is yielding handsomely; in fact, it is considered one of the richest mines in this section. Since the water has been turned out of the ditch, a good deal of prospecting is being done, and new mines are being developed.

FROM MURPHY'S.—The Canon mine bonded by the Kelly brothers to Mr. Canon for \$10,000, is in a prosperous way to develop into a valuable piece of property. There are now six men at work on this mine, and lumber will be hauled this week for the construction of suitable buildings for the accommodation of the workmen. The new shaft is now down near 20 feet, good progress having been made since the commencement. The vein is of good width, averaging over two feet, free milling, and the bright shining metal plentifully sprinkled through it. John Boyle, who is an experienced miner, and an expert in mining matters, is foreman of the mine.

MILL.—Calaveras *Chronicle*, Oct. 31: We learn that Mr. Kervin is putting up a 10-stamp mill on the Fine Gold mine. It will be run by water power and no doubt it will pay from the start as there is a great abundance of \$75-ore exposed in the mine. Just as we go to press we learn that the deal has been made on the Cook mine, the price paid being \$50,000. The purchasers are W. A. Nevills, Col. J. M. Morehead and Mr. Henry Janin of San Francisco. The acquisition of this valuable property by such thorough-going mining men indicates the building up of a lively camp at Greville in short order. We hear that a fine prospect has been struck in Fred Greve's ranch by Dr. Wright and two Colorado prospectors. Quite a considerable amount of prospecting is going on at West Point, and some rich ore is being produced. A. L. Redstone & Co. are getting their big stamp mill up on the Champion mine, belonging to Geo. Simpson & Co. It will be ready for business in about two weeks, and as its capacity is as much as 60 tons per day big shipments of gold must follow, especially as the Champion mine contains good quartz.

Marin.

ANOTHER GOLD MINE.—Marin *Co. Journal*, Oct. 30: The glories of the Bismuth mine on Mr. Rose's, and the adjoining property, have paled during the week before some astonishing developments of gold and silver, which have been found in the same rock at a little greater depth. The discovery was made by observing flakes of free gold in the rock with the naked eye. This led to making some assays, one of which showed gold of the astonishing richness of fully \$2000 to the ton. Mr. Rose is pushing his prospect with energy born of great hope, and we trust he will be better awarded than our former discoverers of precious metals.

Mono.

MONO'S NEW DEVELOPMENT.—Bodie *Free Press*, Oct. 30: Superintendent Kelly of the Bodie and Mono mines this morning escorted a couple of cage-loads of Bodieites down the Lent shaft and through the Mono, the special object of course being to take observations of the new find. The sight-seers were landed at the 550 station and passed through the south drift into Mono ground. Descending a winze 100 feet the party explored the new bonanza. In the drift the showing of the bunches of pay rock, with stringers of quartz tally exactly with John Kelly's published reports. He has not stated, however, the fact that a very apparent and comparatively smooth foot-wall well defines the ledge. On the east side there is no "wall," so to speak, but characteristic indications of another ledge or ledges lying alongside. In the drift, some 75 feet in length, stringers of rich ore reach along the top and bottom, concentrating at the end. A winze about six feet deep now being sunk discloses the apex of a chimney of ore, widening to the southward and at the bottom. At the bottom the ore body is 38 inches in width. The rock is bright with native silver, and shows flecks of gold. The ledge is easily picked out in a soft and "motherly" formation, in virgin ground. It would require the most scientific "rock sharp" to detect the difference, if any there be, between the specimens which were readily broken out with the point of a candlestick and those from the old Burning Moscow and the Mexican of the Comstock in early days. The strike, at its comparatively great depth, in unexplored ground, remarkable richness, and all, is the most important event Bodie has experienced in some years. These are facts and may be taken for what they are worth, however affecting Pine street.

Nevada.

GOLD PRODUCERS.—Foothill *Tidings*, Oct. 31: The Crown Point is still looking well, the mill being kept running night and day on pay ore. Mr. Gauthier intends soon to run another level below the present one, for the purpose of ascertaining the extent of the vein. Mr. Hendy is now engaged in the Crown Point mill putting up two Triumph concentrators, which will be running in a few days. The North Star is also looking well and is improving in appearance. The mill will soon be enlarged in order to accommodate the ore. The North Banner crosscut is near the ledge, which will be cut in a few days. The several stringers run through by miners proved to be very rich. Work is steadily going on in the Boston (Granite Hill), located near the Larimer mill on Wolf creek. The shaft is down over 200 feet, with drifts running from it. A clean-up from a crushing of 40 loads just made yielded between \$40 and \$50 per load, the exact figures not yet having been made. The Phoenix continues to look well and the owners have the greatest confidence that they have a rich mine. Thursday some more rich ore was hoisted. The Green Mountain will soon have a clean-up.

NORTH BANNER MINE.—Grass Valley *Union*, Oct. 31: Prospecting operations in the North Banner Con. Tunnel Company have been going on actively through the season, and a crosscut from the tunnel is now near the ledge, which is expected to be cut into any day. Several stringers putting down toward the ledge have been cut lately, all of them

showing gold. The present tunnel is lower than the old one, and will have a considerable extent of backs above it. The rock from the mine has always been of fair quality, and the company having its own mill and water power can do the milling cheaply. The North Banner always has been a good prospect, and the probability of there soon being a large body of ore at command gives a promise of future favorable results.

A GOOD OUTLOOK.—North San Juan *Times*, Oct. 31: Several months ago while Martin, Waters & Co. were hydraulicizing a small deposit of gravel, at their quartz claim on Canada Hill, near the Charonnat mine, they uncovered a fine-looking ledge. About the time of the discovery Deputy U. S. Marshal Robinson served an injunction on them, whereupon they quit washing and began running a drain tunnel. This tunnel is now in 100 feet, and when they get 70 or 80 feet farther they will have 200 feet of back. They have taken out about 100 tons of excellent ore in running the tunnel. Only six or seven men are working at present, but as soon as the tunnel is completed quite a force will be put on. The four-stamp mill is not running, the owners bending all their energies to the thorough opening of the claim, which is one of the most promising of the many good properties in this section. The 24 Chinamen who purchased, some time ago, the Sweetland Creek Placer mine at Buckeye Hill, this township, paid their last installment on Wednesday the 28th, and received their deed for the same. This placer mine has a history, and an unlucky one too. Many years ago it was sold by General O. Evans, Thomas Cloake, Peter Purcell, the late John S. Stidger and others, to an English Company for the sum of \$200,000. Subsequently it was sold by said company to George E. Yates and George D. McLean for the sum of \$25,000, who sold it to the late owners for \$5000, and they in turn sold it to the Chinamen for \$8400. The English Company realized, it is said, over \$500,000 in dividends from this mine, and supposing it to be worked out, sold it to Yates & McLean for \$25,000. They realized about \$700,000 from it and sold it cheap, believing it to be entirely worked out. The Chinamen have made a rich thing out of it, and have plenty of rich paying ground left.

MORE RICH QUARTZ.—Rich strikes of quartz is the order of the day in the Grass Valley district at the present time. Yesterday some rock was taken up from below the floor of the 200 level of the Phoenix mine 30 feet from the shaft, which was very rich in free gold, gold-bearing sulphurets and galena. Several boxes of this character of quartz was taken out during the forenoon, and was brought to the office, Coleman & Glasson's store, where it was examined by many persons, and the universal expression was that beside the fact of the presence of gold the quartz itself was of a quality to give encouragement for the future of the mine. The ledge at the point from which this rock was taken out was 12 inches in width, but in the shaft below this level the ledge is showing between one and two feet in thickness. When the shaft is sunk to the 300 level a new drift will be run under where the rich rock was taken out with the expectation that the ledge will yield fine milling rock. The value of the rock taken out yesterday is believed to be nearly \$1000. The Phoenix is an old mine, which has lain idle for a long time, but upon which work was resumed a few months ago by erecting the necessary hoisting and pumping works. The old workings were only put down to the depth of 200 feet, when work was suspended after only limited development had been made. If the old company had prospected carefully they might have come upon good quartz, but it has remained for the present company to make the discovery, and there is now every prospect that the company is going to open a good paying mine.

GOOD FOR THE PEABODY MINE.—The Peabody mine is now being operated under lease by a company of practical miners, who have, since commencing work been extending the second level north, which is 183 feet on the incline. The theory has been that in that direction the pay rock would be found, and this has apparently been demonstrated within the last few days by the coming in of good quartz which shows well in free gold.

Placer.

OPHIR MINES.—Placer *Herald*, Oct. 31: There is, perhaps, hardly a section of California so thoroughly ribbed with quartz veins as the country in and around Ophir, in this county. Many of these ledges have been worked more or less, and many of those worked have, at times, paid. While, for several years back but few mines have been operated, those few have been run by experienced miners on an economical basis, and their success is convincing proof that for those who wish to follow their example the Ophir district offers flattering inducements. Prompted by this belief, many owners and prospectors have recently resumed operations, and a general stimulus has been given to the whole surrounding country, which by spring promises to develop into a regular boom. Mr. W. A. Plantz is just finishing a 10-stamp mill and new hoisting works on what is known as the old Hatbaway ledge. This is a well defined lead running through the country south of Ophir, which has yielded good ore wherever prospected. The Kirkland, the Butts and the Adams mine are all on this same lead. P. Hanson is opening up the old Jamison ledge, close to the town of Ophir. He has put up a wheel for hoisting and pumping, and will be ready for active operations as soon as the water is turned into the ditch again. He will crush his ore in the Pugh mill, near by, in which he is an owner. Shurtliff & Shor have a force at work on the original St. Patrick cleaning out the old shaft and opening the mine again. Harsh & Jacobson are working a lead on the Jaroldson ranch and are taking out ore. This ledge was prospected more or less some years ago and the rock then taken out was of a high grade. The Kaiser boys are sinking on the east extension of the Boulder and are taking out rich rock. Samuel Kaiser and the Lozano boys are working on the old St. Lawrence, below Ophir, and are highly encouraged. On the Gold Blossom, where there are steam hoisting works and a good mill, work has again been resumed under the superintendency of Mr. M. B. Burlingame. A new shaft is being sunk, now about 100 feet deep, and some good rock is coming out. The mill is idle at present for want of water. The Morning Star, owned by the Peardon and Hawkins boys, still maintains its reputation as one of the best quartz mines in the district. A new Friedenberg wheel is being put up in the mill and five more stamps added, and pending this work of

course they are crushing no rock. Their last crushing from shaft No. 3, which is down about 150 feet, went about \$20 to the ton. Shaft No. 1 is down about 400 feet, and at that depth the ledge is on an average 3½ feet wide, and the rock now out and on the dump, nearly 200 tons, is estimated to go about \$30 to the ton. Lou and Chas. Kittler are working on an extension of the St. Lawrence. They are down about 75 feet, have a good ledge and some pay ore, and are much encouraged. Ross Bradbury and Chas. Carter are sinking on a ledge close to Mrs. Kittler's on St. Patrick mill site. They are down about 45 feet. At the Boulder, which has lain idle for some years for the want of sufficient power to keep out the water, a fine and substantial new building is about completed, designed to cover the pumping and hoisting machinery, which is about to be put in place. Samuel Howe, an old California miner, is in charge of the work. A Pelton water wheel will run the hoisting works and pump. A new mill on this mine in the near future is one of the probabilities.

Sierra.

MORE GOOD QUARTZ.—*Mt. Messenger*, Oct. 31: We learn that a ledge of rich quartz has been discovered on the ridge between Butcher Ranch and Gold Valley by Wm. Meserve, Jo Logarmisno and Mr. Myer. As we understand, the ledge was a blind one and was sunk for and found simultaneously by two parties, viz., Meserve and Logarmisno and Myer, at a depth of only a few feet. Neither party seems to have known that the other was prospecting in that vicinity until they met while running out their lines.

PUMP STARTED.—The pump at the Extension shaft was started last Tuesday, and at last accounts was working smoothly. Running at the rate of 10 strokes a minute, the pump throws about 30 inches of water, which will be more than the necessities of the mine require with the present working force—about 70 men. The job of putting the pump in place, which is the work of Mr. Collins, is said to be first-class in every respect, the pump working so easily and smoothly that a person standing near it would not know it was running did he not see it move. George Parent has sold the Tippecanoe mine, recently purchased from the Extension Company, to a Chinese company which has been working the ground for the past year. The heathens had a good thing—working ground that belonged to other parties. The new pump at the Plocene shaft, belonging to the Extension Company, began working Monday, when, with an increased force, breasting was resumed at the mine.

Shasta.

WHISKYTOWN.—*Cor. Shasta Courier*, Oct. 31: Preparations are being made to build a quartz mill near this place for the purpose of crushing rock from the old Phoenix mine which has again been placed in working order. J. S. Strode has moved his cannon ball mill from Dog Gulch to a new find which he has made on Whisky creek about one mile from here. Several parties have visited the Mad Ox mine lately with a view of leasing that property. Work is progressing nicely on the Mad Mule mine under the superintendency of F. M. Stocking. Report reached here today that a rich quartz lead has been discovered on Deadwood Gulch, about one mile from the Mad Ox mill, by A. L. Ferguson, an old "forty-niner," who mined here in early days. He came back to his old claim thinking there was a hidden treasure there. The name of the Postoffice here has been changed and is now Stella.

SILVER.—Shasta county *Democrat*, Oct. 31: Two silver bricks weighing 165 pounds were shipped from Copper City last week. Tom Green came down Monday with another chunk of amalgam and yesterday returned with a load of lumber. Two tons of ore from the Altoona quicksilver mine in Trinity county were shipped last week to San Francisco to be worked. Last week Haskell, Teneyck & Co. shipped to San Francisco two tons of their best ore from their mine on Slickrock to be milled as a working test. We hear it stated that the Iron Mountain Mining Company has bonded two more mines adjoining the Lost Confidence from Camden, Magee & Co. for \$75,000 each. It is thought that the Iron Mountain Mining Company will have its mill up by the middle of next month. Just now that camp is the busiest and liveliest in the county. Developments are being pushed ahead night and day. Dan O'Neal started up his mill yesterday on custom rock from the second extension of the Florida, as an accommodation to Forbes & Co. They will mill about 30 tons of high-grade ore. Dan went to Red Bluff yesterday to examine a 20-horse power engine he expects to purchase. W. W. Morely of Oak Run was in town last Saturday and showed some very fine ore he lately struck in his mine near Furnaceville. The ore assays way up, is heavily sulphureted and also pans out in free gold. Friend Morely evidently has a splendid prospect for a rich mine, and is developing it as fast as his means will allow. An old gentleman by the name of Kemp last Thursday struck a very rich gold quartz prospect east of Shasta on the Iron Mountain road. The vein is about 20 inches wide and carries a red ochre seam that is very rich; the rock is also literally speckled with free gold.

Tuolumne.

RICH.—Tuolumne *Independent*, Oct. 31: We learn that Mr. Rapp and the McArdle brothers, of Tuttletown, have taken out some \$8000 during the past month on the Rapp quartz mine above Robinson's ferry. For several days \$1000 per day was obtained. The rich spot was discovered in a singular manner. Near the cabin was a large boulder which Mr. Rapp wished removed. A blast was put in and fired as the parties went to dinner. On their return, in removing the rock, they discovered it was full of gold.

POCKET.—It is reported that Mr. Joseph Whitde has just struck another pocket in his claim near Albany Flat, from which he has taken the large sum of \$35,000. He is an uncle of Mrs. Ed. Henderson, of Sonora.

Trinity.

NEW RIVER.—Trinity *Journal*, Oct. 31: A friend writes us that there are about 200 men in the New River mining district, and that an abundance of food for winter has been packed in. Most of the miners now there will remain all winter. There are three arastras running, one at the Hard Tack, one at the Mountain Boomer and another at the Tough Nut. The Buckeye Co. has recently made an important and rich discovery. The Ridgeway Co. has cleaned up, and while the amount realized is

not made public, enough is known of the richness of the mine to satisfy an observer that it was no small sum. The Uncle Sam has commenced crushing and others will follow as soon as water becomes plentiful.

NEVADA.

Washoe District.

HALE & NORCROSS.—*Enterprise*, Oct. 28: On the 3000 level crosscut No. 3, about 40 feet south of the deep winze, remains just as it was at last report. It is in 15 feet, with its laces all in excellent ore, or as Archie Norland expresses it, "as fine a face of ore as ever was seen on the Comstock." This has been held in abeyance in order to give the other crosscuts a better chance for driving ahead, and in order that heavy stockholders might have an opportunity of seeing what they had there in place before proceeding further. It is proposed, however, to go ahead with this drift directly, commencing about to-morrow or next day. This will cut directly into the heart of the best portion of the ore vein on this level, and very decisively determine its true bullion merits. Crosscut No. 2, farther south, 90 feet from the Chollar line, is in 85 feet, and shows strongly mineralized quartz, with streaks and spots of ore, improving with further advancement. On the 3000 level the crosscut west, near the face of the main lateral drift, was advanced to the distance of 30 feet from the main drift, and last Saturday night tapped a strong flow or seepage of boiling water, amounting to several inches. Work was stopped, and since then the water has been gradually subsiding and draining out. It will be sufficiently drained to allow of work being resumed there shortly. This flow of water is considered good evidence of an ore body lying to the westward.

CHOLLAR.—The principal work on the 3000 level is confined to the branch lateral drift southward from the Combination west drift. This drift has been advanced to the distance of 187 feet, passing in a direction west of south diagonally across the main vein to the west side of the same. Its direction is now changed to due south and it is proposed to run it through to the north line of the Potosi mine, a distance of 320 feet, unless prevented by some unexpected strike of hot water or other adverse circumstance. This drift is now being run in the wall rock along the west side of the vein, the material being dry and working well. The explorations will eventually be carried further west, penetrating the diorite or west country rock of Mount Davidson. Where this drift passed through the ledge it was found to be over 60 feet in width, all solid quartz, and carrying more or less of the precious metals, but not concentrated into a paying ore body at any point. The ore vein certainly does show great strength, if not richness, in that direction.

YELLOW JACKET.—The old upper workings, from the 1300 level up, continue their daily output of 170 tons, keeping the Brunswick mill well supplied and steadily running. The drift north on the 1700 level from the Crown Point through the Kentuck is making good progress, and bids fair for making important developments at that depth. Considerable prospecting work is also conducted in the old upper workings, at the same time the ore extraction goes ahead. There is a perfect wilderness of low-grade ore in this mine, and occasional streaks of higher grade are met with.

OPHIR.—On the 400 level the main drift west from the Mexican shaft continues passing through the same character of vein matter as last week with no improvement apparent. Upraising will soon be commenced to stope out the good ore known to exist above this level as high as the 250 level, and perhaps higher. A drift has been started south from this main west drift, at a favorable point in the ore vein, to explore for good ore thought to lie in that direction.

BEST AND BELCHER.—The crosscut west on the 1000 level, 100 feet south of the old Consolidated Virginia south lode was advanced only a distance of six feet, making a total length of 372 feet. Work in the face was then suspended and a drift south started at a point in the crosscut 250 feet west from the main lateral drift. This new lateral drift south is being run to explore a favorable point showing strongly mineralized quartz, and has been run into it a distance of 48 feet.

ALTA.—Excellent progress has been made during the past week in the west drift on the 700 level, the rock working very favorably. Only about 50 feet remains to carry this drift through to the ore body it is being driven for.

CROWN POINT.—Owing to the breaking of the main spur wheel and pinion at the hoisting works, all work in both this mine and the Belcher has been suspended for a week.

CON. CALIFORNIA AND VIRGINIA.—From the 1750 level about 100 tons per day of ore is being extracted on company account, average assays being about \$18 per ton. A few tons are extracted in the Jones lease section, above the 1300 level, opening out the old workings and preparing for extensive ore extraction during the coming winter, or when the mills on Carson river are again able to run.

MONTE CRISTO.—The new shaft is down 150 feet in dry, hard blasting rock. Further sinking is suspended, and a drift started for the ledge, which is in thirty feet. Are engaged at present in the extraction of ore from the mine through the old shaft for the mill, the supply on hand having run short. Will resume work at the new shaft shortly.

KENTUCK.—The extraction of low-grade ore from the old upper workings continues to progress with the utmost regularity, and is hauled by teams to the Rock Point mill on Carson river for reduction. That famous ore demolisher never stops.

UNION CONSOLIDATED.—The crosscut east on the 500 level, 100 feet from the Sierra Nevada line, was advanced 45 feet last week, making a total distance of about 70 feet. It is running in very promising vein matter, consisting of decomposed quartz, clay, etc.

GOULD AND CURRY.—On the 1000 level the crosscut west has been extended 50 feet during the week, making a total distance of 606 feet. The material encountered at present is soft vein porphyry, with an occasional streak of quartz and clay.

MEXICAN.—On the 500 level the middle crosscut east was extended nearly 70 feet during the week, the formation consisting of soft vein porphyry and heavy clay, with streaks of decomposed quartz.

SIERRA NEVADA.—On the 550 level the north lateral drift from the west crosscut has been extended 65 feet during the week, making a total distance of 95 feet. It is in quartz principally, considerably mineralized, carrying good streaks and bunches of ore. Some little water is met with, and the formation of a character favorable to the finding of an ore body.

Columbia District.

MT. DIABLO.—*True Fissure*, Oct. 30: The incline has been sunk 19 feet during the week and a shaft will at once be cut out for the seventh level. The east drift on the sixth level is in 169 feet, and the west drift on the same level is 415 feet in length. The winze from the east drift on the fourth level is down 41 feet and shows ledge matter with spots of good ore. The raise from the intermediate, between the fourth and fifth levels, shows six inches of 550 ore, and has nearly connected with the fourth level. The raise from the east drift on the second level is up 34 feet and shows a small amount of ore.

Eureka District.

ORE SHIPMENTS.—*Eureka Sentinel*, Oct. 31: During the week ending yesterday ore shipments from the mines of this district were made in the two reduction works in town as follows: To the Richmond—Wide West mine, 9 tons; Home Ticket, 23; Scorpion, 3; Morning Star, 31; Dunderberg, 10; Lone Pine, 5; Geddes and Bertrand, 30; Rescue, 5; San Jose, 5; Macon City, 7; Hamburg, 17; and White Pine 4. To the Eureka Con.—California, 25 tons; Lizzie J., 9; Revellie, 4½; Eureka Tunnel, 1; Dougherty, 1; Summit, 10½, and Alexandria 9.

Moss District.

RICH ROCK.—*Walker Lake Bulletin*, Oct. 28: While everybody is looking for gold and expecting to find a rich mine, Joshua Moss has kept along at his work and, although making no noise, has discovered another ore body in the Montreal mine. The rock now in sight is as rich, if not richer, than any that has been found in this section, and the next stupider will be for the Gillis range and Moss district.

Pahranaagat District.

BULLION.—*Pioche Record*, Oct. 28: Eugene Howell shipped up another bar from Pahranaagat; value, \$1,241.41, 954 fine; results from 15 tons of ore, showing extraction of \$82 for every ton worked. He has thus made a thorough test on 34½ tons of ore from the new find, having made two shipments. In total \$2,542, taking out in wet crushing on this heretofore considered base ore from 80 to 87 per cent of assay value, or \$72.10 for every ton. This test fully demonstrates with systematical working and economical management that the mines in Pahranaagat still possess merit, and when handled on a proper basis can be made pay.

Sweetwater District.

A RICH MINE.—*Eureka Sentinel*, Oct. 31: From a reliable source it is learned that the Frying Pan mine in Sweetwater District, this State, is the richest ever discovered in that section of country. It is said that \$62,000 was offered for the mine, but the owners refused to sell for that price.

ARIZONA.

GOOD ORE.—*Prescott Courier*, Oct. 30: It is claimed that Bullwhacker ore will mill between \$150 and \$200 per ton. The ledge is a fine one; location about three miles from Prescott. Miners say Gov. Tritle has a fortune in sight in the Blue Dick. Mr. Ross, just from Turkey creek, reports progress in taking out ore there. Jacob Henkle and James Daly report very little doing in Centennial district, Yuma county. Jas. Vanderberg has taken seven tons of rich silver ore to the Kingman sampler.

COPPER. we regret to have to say, does not cut a big figure in the metal market. This is bad for Arizona, which has a great many fine mines. As the United Verde mines of this county yield silver, as well as copper, the construction of a railroad into this section will enable their owners to work them with profit. There are besides the United Verde, many fine copper mines in Arizona, notably the Old Dominion, Copper Queen, Lawlor Bros., which are more or less affected by the glut in the market, which, central authorities say, is liable to cause a suspension of copper mining even in Chili.

THE GILA RIVER GOLD DISCOVERIES.—*Tucson Citizen*, Oct. 28: Matt Flynn returned a few days ago from a visit to the new gold discoveries on the Gila near the mouth of the San Pedro, and brings additional information respecting the mines and their developments. The mines are located about two miles from the Gila river, where plenty of water exists at all seasons, and wood abounds in great quantity, the locality being about 64 miles from Tucson by the traveled wagon road. The ore was at first believed to contain only gold, but from recent assays, giving a general average of the ore in several of the claims, they yield about 15 ounces of silver to \$33 in gold, which, counting silver at \$1 per ounce, gives an average of \$48 per ton. The ledge, upon which nearly all the claims are located, is strong and easily traced for a long distance, and the croppings evidence their permanency. The oldest claim is the Sitting Bull, owned by John T. Bates.

COLORADO.

RUNNING.—*Idaho Springs Gazette*, Oct. 28: All the batteries of the Sunshine mill are running on Clarissa ore. As the ore is assorted, it runs well. We saw some handsome ore that has been encountered in the shaft of the Mattie mine in sinking, all of which betokens a pocket of rich ore. On the U. P. R. mine, on Fall river, the drifts are chock full of ore. The mill has been idle, on account of not being able to get teams to haul ore, the road being rather steep and there being a scarcity of teams. The timbers are now being delivered for the dam of the Plutus Company. Work will shortly commence and be pushed to completion. The water power will be utilized to run large air compressors, which will furnish power to run the air drills, hoisting and pumping machinery, thus doing away with steam power and making a large annual saving for fuel and boiler attendance. The time will come when all the machinery of the mines on the creek will be run by compressed air.

DAKOTA.

A BUSY GOLD CAMP.—*Times*, Oct. 28: Within

a radius of five miles of Deadwood, Dakota, there are over 1000 heavy stamps dropping on the low-grade gold ores. There are three 120-stamp mills, one 100-stamp, three 80-stamp, three 60-stamp, two 40-stamp, and 16 20-stamp mills running all day (and the larger one nights) crushing the gold-bearing quartz with their 750-pound stamps. The ore averages about \$6.35 per ton. A new 200-stamp mill is just erected three miles from Deadwood. On such low-grade ore the profitable business is with large mills. The various mines produce annually \$5,000,000, and the mines and mills distribute in payments to their employees over \$150,000 each month. One mine (the Homestake) has, after its first year of operations, paid steady dividends, now aggregating \$2,736,509. Several other mines have each paid to their shareholders upwards of a million in six years and dividends continue as regular as the quarter comes. The mills are kept busy; some are custom mills and have proved profitable investments. All go to make a mining and milling business steady and profitable the year round.

MONTANA.

BANNACK BONANZAS.—*Inter-Mountain*, Oct. 24: We learn from Dr. J. S. Meade, now visiting Butte and one of the owners of the Polaris mine, that they have a showing of five feet of good ore at a depth of 100 feet from the surface in their new shaft. Returns from the last three shipments of ore to Omaha netted \$1692 50. A good hoist and buildings have been placed on the mine. Mr. Connor is pushing development on the Odell property. The Mono mine is to be worked this winter by its owners Messrs. Steel & Mason. Wm. Perkins shipped eight tons of high-grade ore from Elk Horn district this week. The Elk Horn district ores and formation are similar to Butte. Mr. Lancy and Frank Williams are cleaning up good pay from their Gulch mine below Bannack. M. S. Herr is shipping considerable of good ore from the Charter Oak mine. L. C. Fyhrer has a continuous streak of good ore in the Bismarck lode. Phil Shannon expects soon to cut in a rich lode with a long tunnel. The Blue Wing property is now being worked by its owners, Messrs. Gallagher and O'Leary. Mr. Charles Beam foreman.

SWEET GRASS NEWS.—*River Press*, Oct. 25: Joe Supernaut, Fred Derwent, Billy Hagen and three or four others arrived in the city Saturday evening from the Sweet Grass and are buying a big lot of supplies for the winter—some 12,000 or 15,000 pounds. The best news they bring is that no action on the part of the military has been taken to put them off the reservation, and as they are there with the nominal consent of the Indians, molesting no one, it is not likely any such action will be taken; next to this is the good report from the mines. All the claims that have been worked and prospected are showing up handsomely. Fred Derwent brings in 42 ounces this time and has taken over \$3000 from his dry gulch claim, hauling the dirt over half a mile to water. Bender & White, Hagen brothers and others are also doing well. Supernaut and partners have been prospecting their claims all season and are now in condition to work to advantage in the spring, when water will be plenty. They have completed a ditch and will build a reservoir this winter, and are willing to wait until spring for the returns. By hauling the dirt to water they have taken out a "grub stake," and have not tried to do more. The whole season has been devoted to prospecting their ground, and they now know they have a good thing. The pay ground in the Sweet Grass so far discovered is limited, but of the fact that it will yield the miner ample returns there is no question. It has been demonstrated by faithful work. It is only the lazy ne'er-do-wells, who expect to find pay dirt on the surface, that have gone off and branded the camp a bill.

BOULDER DISTRICT.—*Helena Independent*, Oct. 29: The Amazon mine, owned by the Amazon Mining Company, has a shaft 250 feet in depth. The lead is crosscut at a depth of 100 feet, showing a fine body of lead ore. At a depth of 175 feet is another cross-cut, showing up three feet of concentrating ore, assaying forty ounces, in silver and twenty per cent lead. They have lately resumed sinklog on the main shaft. This company is equipped with steam hoisting works. They also possess the most complete milling, concentrating and smelting works in Montana, located one mile and a half from the mine. The concentrator is at present running on ore from the Ella mine, owned by John W. Buskett, of the Wickes company. This is one of the best looking mines in Jefferson county for the amount of work done. It is developed by a shaft 110 feet deep. They are at present stoping and working two shafts. The vein shows up three feet of ore, which they have had from the start, running about thirty ounces in silver and twenty per cent lead. The Amazon concentrator started up last Tuesday, and has proved an entire success. The works have a capacity of 25 tons per day and have all they can do. The works will prove of great benefit to the district, enabling miners to have their low grade ores put in shape for shipment. The Mona mine, owned by W. C. Jones, is located about one mile and a half from the Amazon works. It is developed by a shaft eighty-five feet in depth, showing up four feet of fine concentrating ore. He is at present running a stope; taking out about two tons of ore to the mao. North of the Mona is the Spencer mine, owned by Mr. Spencer. It is developed by a shaft fifty-five feet in depth. The lead shows up sixteen inches of pure galena ore, running ninety ounces in silver and seventy per cent in lead. Work on the Mollie McGregor has been resumed. They are crosscutting the lead at a depth of 200 feet. This company has a fine concentrator with a capacity of sixty tons per day. The mine was bonded a year ago to the Mollie McGregor company for \$60,000. The bond will expire the 6th of January. A. G. Clark, of Helena, is one of the principal movers in the enterprise.

NEW MEXICO.

CONCENTRATOR.—*Santa Fe Leader*, Oct. 28: The concentrator at the Cash Entry, Cerrillos, is being repaired by the placing of a new pulverizer, the old one being broken two weeks ago. The owners of the mine feel confident that the works will prove a success. The mills will start running next Monday.

SABINAL DISTRICT.—*Deming Headlight*, Oct. 23: Exceedingly rich specimens of ore from the Sabinal district continue to be brought into town by prospectors, and miners are continually going down that way in order to see what there is down there. They all

seem contented to stay, for we have seen none of them return except for supplies, and they are in a hurry to get back. There is something rich down there.

NEW MILL.—*Lake Valley Press*, Oct. 28: Dirt has commenced to fly preparatory to excavating for the new mill. If this process should prove a success it will be a boon to New Mexico, the value of which can hardly be realized. Indeed, all eyes are turned on Lake Valley, and should lixiviation prove a success Sierra county will flourish like a green bay tree. To Dr. Endlich will be due much credit for his perception and foresight.

GENERAL NOTES.—*Mining World*, Oct. 28: White Oaks expects a new 25-stamp mill soon. Stream tin has been discovered in Socorro county. Another big strike of free-milling ore is reported at Gold Hill. A shipment of ore from the Grey Eagle mine, Gold Hill, was made last week. The Billing smelter at Socorro is using eighteen carloads of Utah ore per week. The Glass stamp mill at White Oaks has shut down until a new boiler arrives. A new find of silver ore has been made in the Pinos Altos. It is said to run very high. Considerable ore has been passing through Organ for the railroad, from the Silver Gem mine, during the last few days. John Ross, of Organ, will concentrate forty or fifty tons of low grade ore for shipment. He will commence work next week. The Kansas City Mica Co. are shipping crude mica from their works at the junction of the Vallecito and Petaca rivers. They have ten men at work. The Water Canyon concentrator is to have its capacity materially augmented. The concentrator now being sacked for shipment vary in value from \$138 to \$300. The people of Good Hope mining camp, where J. D. Long has spent \$12,000 in improvements, are jubilant over the prospects of the mill starting up on the first of November. The Santa Teresa, Induvigan and other claims in the Socorro district, owned by Hon. F. A. Manzanares and Don Abeytia Montoya, are showing up increased volume of ore under recent developments. The Kelly mine continues to yield sufficient ore daily to run the 180-ton Billing smelter of Socorro; and at the same time Superintendent Huber continues to explore the depths below the lower workings. The main shaft in the Silver Glance, Socorro district, has attained a depth of 235 feet, and work proceeds steadily. At that depth a vein of argentiferous galena in crystallized quartz has been encountered. The Billing smelter is working to perfection, and its best advertisement now possessed by New Mexico, it having run continuously over two years without ceasing for one day, a standing and promising success. The Lone Hand, Gold Hill, made a shipment about six weeks ago, which, after all charges had been deducted, netted \$403 per ton. A considerable quantity of horn silver being in the lot is what caused the figures to run so high. Mr. Townes, of the El Paso sampling works, is in Kansas City, supposed to be making arrangements for the erection of a large smelter in El Paso. It has been demonstrated that 100 tons of good ore per day can be secured for a smelter at that point.

OREGON.

NOTES. *Jacksonville Times*, Oct. 30: Ingram & Baker are getting ready for an extensive run in their Willow Springs diggings. The Sterling Co.'s reservoir is nearing completion and will be utilized early next winter. Carter Bros. of Pleasant creek have found good prospects on the home place and are getting ready for the winter's run. Dr. Colvig and others of Rock Point precinct are engaged in prospecting and think they have found some excellent ore. G. E. Dyer, the Portland mining expert, is visiting several ledges in this vicinity, with several of which he seems to be favorably impressed. Wimer & Sons and Desselles & Connell of Waldo precinct, Josephine county, are about ready for extended operations, which will soon be commenced. The miners having been disappointed for the past three seasons, anticipate better luck this time. It is to be hoped that they will have all the water they wish. Ex-Governor Chadwick inspected his ledge in the Fort Lane district while in the valley this week, and is well pleased with it. He intends to have it thoroughly prospected before long. Moody & Bell undoubtedly have one of the best ledges thus far discovered in this section. They already have quite a quantity of ore on the dump, with several hundred tons more in sight. Work continues on the Yank ledge at Galice creek. It will be thoroughly prospected, and a gentleman who claims to know says that there is no doubt but what it will prove a paying mine. Work is still progressing on Swinden's ledge near Rock Point and better prospects than ever are in sight. We were shown some of the ore, in which considerable gold can be seen with the naked eye. The mining interests of Evans and Pleasant creeks are coming to the front again. Several promising ledges and placers are being thoroughly prospected. S. Beers, Jas. Evans, John Blalock, John Robinson and others are among those prospecting new ledges. G. B. Dyer, representing L. D. Brown and others of Portland, is now in Jacksonville for the purpose of getting our citizens interested in a quartz mill that his company propose putting here in case some inducements are given.

UTAH.

REVIEW.—*Salt Lake Tribune*, Oct. 30: The week has been one of lovely weather and the movement of the metals has been brisk. From all directions come reports of good strikes, and there is more interest taken in mining enterprises, in the way of local capital backing them than has been usual in this city. The shipments out from this city for the week ending Saturday, Oct. 24th, inclusive, were 1,650,000 lbs. The receipts in this city for the week ending Oct. 28th, inclusive, \$138,057.72 in bullion and \$36,102.30 in ore, a total of \$174,160.02. The week previous the receipts were \$110,110.54, of which \$85,154.54 was bullion and \$24,956 was ore. The Ontario sent in during the week bullion to the value of \$75,654.88, making its total output for the year to date \$1,353,327.21. For the present month a double dividend is declared by the Ontario Co., making one dollar per share, or \$150,000. Every month there has been a dividend of fifty cents per share, making \$75,000. The total dividends, therefore to the end of October, have been for this year \$325,000, or \$5.50 per share. There is nothing new from Horn Silver except the tapping of a large body of water, whether a reservoir or spring is unknown. The Stormont sent up two bars of silver on the 25th,

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION

Of the City and County of San Francisco.



PREMIUMS AWARDED.

H. N. COOK,

Manufacturer of

LEATHER BELTING and LACING.

OAK-TANNED, SHORT-LAP BELTING.

Awarded **GRAND SILVER MEDAL** for Best Exhibit of Leather Belting, Hose, Raw Hide, etc., of California Make.**SPECIALTY: HEAVY DRIVING BELTS.**Order direct from the manufacturer for perfect guarantee and lowest prices. Correspondence solicited.
Send for Catalogue. 405 MARKET ST., Cor. Fremont, SAN FRANCISCO.**GOLD QUARTZ and PLACER MINERS'****SILVER PLATED AMALGAMATING PLATES**
FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,
658 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEISE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

Send for Circular and Price List.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

**HORSE POWERS, WINDMILLS, TANKS**
and all kinds of Pumping Machinery built to order.
Awarded First Premium for Windmills at Mechanics' Fair, 1885.**F. W. KROGH & CO.,**
51 Beale St., San Francisco.**PATENTS.** Thousands of Inventors throughout the Pacific Coast can and will willingly attest to the promptness, reliability and success of Dewey & Co's U. S. and Foreign Patent Agency. No. 252 Market St. Elevator, 12 Front St., S. F.**MICA MINE.**

Capital Wanted to Develop.

Half Share offered as equivalent.

ADDRESS

G. W. SPAWFORTH, Lang Station, Cal.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.**SILVER MEDAL AWARDED**

For Best Slide-valve Engine and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street,
SAN FRANCISCO.**AUTOMATIC****ENGINES**

A Specialty.

**San Francisco Cordage Factory.**

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.



HERCULES SLAYING THE GIANTS.

HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE

THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.
ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.**JOHN F. LOHSE, SEC'Y.**

Office, No. 230 California Street, - - - San Francisco, Cal.

**THE CONSUMERS' COMPANY.****VULCAN B B AND AJAX.**

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

**The California Perforating Screen Company.**

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

American Exchange Hotel,

SANSOME STREET,

Opposite Wells, Fargo & Co's Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50

PER DAY, According to Room.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe,
Iron Wheel-barrowes,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 48, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard
Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY
SMELTING and LEAD CO.,
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

J. KUSTEL.

H. KUSTEL.

★ **METALLURGICAL WORKS,**
318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.
118 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.
NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED
Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the
most suitable Process for Working Ores.
Special attention paid to Examinations
Mines; Plans and Reports furnished.
C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.
Location of Works: Melrose, Alameda Co., Cal.
OFFICE: 318 Pine St., San Francisco.
Gold and silver ores of every description, from \$40 up-
ward per ton; Jewelers' sweepings and scrapings bought
or worked for the owners at a fixed rate per ton. Rebell-
ious ores especially solicited. Ores worked and practical
working tests made by any process, to wit: Amalgama-
tion in battery and copperplates for free gold ores.
Amalgamation in pans for silver and gold ores, with or
without roasting. Leaching of silver ores. Chlorination
of gold sulphurets. Assaying, Chemical Analyses of Ores,
Metals and other substances.

METALLURGICAL WORKS,
STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

THOMAS PRICE,
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,
524 SACRAMENTO STREET,
SAN FRANCISCO, - CALIFORNIA.

JOHN TAYLOR & CO.,
IMPORTERS AND DEALERS IN
Assayers' Materials,

MINE AND MILL SUPPLIES,
CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Cruc-
ibles, Scorifiers, etc., including, also, a full stock of
Chemicals.
Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.
For Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.
JOHN TAYLOR & CO.,

Pacific Machinery Depot. H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven Mfg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's
Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES and LUBRICATING OILS.



Chicago Prices Beaten!

ESTABLISHED 1860.

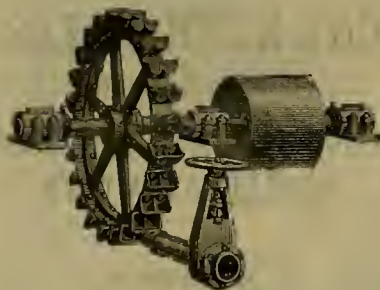
S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and
Rice Mills, Grain and Malt Driers, Furnaces, Chess,
Cement and Shunt Mills, Separators, Revolving and Shot
Screens, Stamp Batteries and all kinds of Mining and Mill-
ing Machinery. Inventor and manufacturer of the celebrated
Slot Cut and Slot Punched Screens. Mining Screens a
Specialty, from 1 to 15 (fine).
Orders Promptly Executed.

DEWEY & CO. { 262 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent, distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

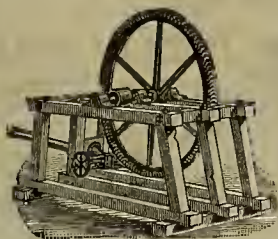
Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!
All Estimates Guaranteed.
SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

Hints for Lubricating.

[Written for the Press.]

An oil, designed to be a lubricant, should reduce to a minimum the loss of force occasioned by the friction of the surfaces lubricated. A lubricating oil should be smooth, sweet and neutral. A neutral oil is one that is free from harmful acids. Perfectly neutral oils, fit for lubricating, are unobtainable. The United States Government admits of 3 per cent of free acid. But a merchantable lubricating oil should be sweet and almost odorless. Beware of an oil or compound that has a bad breath, or that emits a perfume. If animal oil, any pronounced smell betrays rancidity; if petroleum oil, a strong smell suggests overheating—that the oil is burned. Perfumes, whether exhaled by oils or human beings are suspicious.

Any oil which contains acid in quantity will attack and corrode all metal with which it comes in contact. Perhaps you have noticed discoloration on the slides of the engine—dark spots on the steam-chest, that are with difficulty removed by the use of sand-paper or even metal. They are indicative of incipient corrosion. Look out for animal acid in your oil.

An easy way to find it is the following: Take a mixture of two parts clear water, (distilled if possible) with one part carbonate of soda. Fill a bottle two-fifths full of the liquid, and add as much more of the oil to be examined. Shake the mixture and let it stand awhile. There should be little precipitate. The bottle should exhibit mainly greasy globules. If, however, there is a coagulated lump, a sort of soap, in the bottom of the bottle, the oil contains too much acid.

There is another way: Put in fine small strips of copper in the oil. If, after a few days rust appears upon them and the oil takes on a green color, you may be certain of the presence of fatty acid. The denser and more extensive the rust, the greater the quality of acid.

CHARLES J. WOODBURY,
123 California St., S. F.

Mining Share Market.

There is no special change to note in the Comstock mining situation, and therefore little in the mining share market. Prospecting is still going on and assessments continue to be levied to pay for it.

In speaking of the mining on the Comstock the *Enterprise* says: It should be understood that deep developments in these mines are necessarily slow, and that all progress in any direction is costly as well. One of the chief obstacles to be encountered and guarded against is hot water. It is true that the famous hydraulic pump at the Combination shaft is now completed and in perfect working order, capable of handling any amount of water that may be accidentally tapped or met with at any point in the deep explorations, but it should be understood and appreciated that it is not ordinary cold or warm water, but scalding water, the boiling, hot and almost suffocating steam from which fills the lower drifts and very seriously impedes work, if it is not properly cared for. It will therefore be readily perceived that it is not a judicious proposition to rush a drift or crosscut recklessly forward into a point or locality where this hot water is known to exist in quantity, but whenever tapped it has to be given a chance to gradually drain out, and is run out to the pump shaft through drain boxes carefully covered up in the floor of the drift, and made to carry away its own steam. Moreover, it is good policy to handle scalding water carefully, even with the bare hands, and to manage and direct its course judiciously, even if it takes a little longer than the handling of cold or warm water.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco.

TULARE VALLEY AND GIANT FOREST R. R. Co., Oct. 29th.—The road is to be built from the most convenient point on the Southern Pacific Railroad in Tulare county to a point in the foothills of the Sierra Nevada mountains, near township—south range 29 east, and townships 15 and 16 south, range 30 east, Mount Diablo meridian. Directors, R. Butterfield, Charles F. Keller, L. A. Rockwell, Henry Miller, James B. Johnson, W. C. Owen, R. A. Gilbreath, E. G. Anderson, James J. Martin, B. G. Haskell and Martin Schneider. Capital stock is \$500,000.

ANGLO-NEVADA INSURANCE Co., Oct. 30.—Capital stock, \$2,000,000, in 20,000 shares. Directors: John W. Mackay, James L. Flood, George L. Brander, W. Greer Harrison, Louis Sloss, James B. King, Edward E. Eyre, John Rosenfield, W. F. Whittier, Jacob Greenbaum and Edwin L. Griffith.

Bullion Shipments.

North Star (for October) \$15,000; Pittsburg, Oct. 31, \$2,500; Germania, 27, \$4827; Alice, 27, \$18,584; Hanauer, 27, \$2400; Germania, 28, \$4532; Hanauer, 28, \$2800; Crescent, 28, \$4200; Vienna, 28, \$3620; Ontario, 28, \$35,249; Germania, 29, \$4598; Hanauer, 29, \$4600; Queen of the Hills, 29, \$2800; Crescent, 29, \$3750; Bannock, 29, \$5419; Antelope, 29, \$1341; Silver Chief, \$1310; Vienna, 30, \$1804; Southern Utah, 30, \$1650; Stormont, 30, \$3840; Queen of the Hills, 30, \$1200; Crescent, 30, \$800; Hanauer, 31, \$2400; Germania, 31, \$4446; Hanauer, Nov. 1, \$4500; Queen of the Hills, 1, \$2400.

Following were the ore and bullion shipments from Salt Lake city during the week ending Oct. 31st: Twenty-six cars of bullion, 636,641 pounds; 41 cars of ore, 1,220,370 pounds.

MULLER'S optometer the only reliable instrument of the kind in use. 135 Montgomery St. x

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No. AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Baker Divide M Co.	California.	10.	25.	Oct. 29.	Dec. 1.	D. M. Kent.	330 Pine St.
Buchanan M Co.	California.	14.	15.	Oct. 30.	Dec. 5.	J. P. Sullivan.	121 Post St.
Booker Con M Co.	California.	8.	05.	Oct. 23.	Nov. 27.	G. W. Seast.	309 Montgomery St.
Bulwer Con M Co.	California.	2.	20.	Oct. 29.	Dec. 10.	W. W. Wallis.	309 Montgomery St.
Con Pacific M Co.	California.	7.	15.	Aug. 27.	Oct. 13.	S. Gardner.	330 Pine St.
Chollar M Co.	Nevada.	15.	50.	Nov. 21.	Nov. 24.	C. E. Elliott.	309 Montgomery St.
Con Amador M Co.	California.	10.	50.	Nov. 21.	Nov. 24.	F. B. Latham.	327 Pine St.
Del Norte M Co.	California.	1.	30.	Oct. 8.	Nov. 14.	J. B. Cronan.	230 Montgomery St.
Epitaph Tunnel M Co.	Utah.	32.	10.	Aug. 3.	Nov. 15.	C. J. Collins.	512 Montgomery St.
Guadalupe M Co.	California.	1.	05.	Oct. 12.	Nov. 16.	R. E. Elliot.	310 Pine St.
Golden Jacket M Co.	Nevada.	1.	05.	Oct. 27.	Dec. 3.	R. G. McCallan.	331 Montgomery St.
Hale & Norcross M Co.	Nevada.	87.	50.	Oct. 8.	Nov. 12.	J. F. Lightner.	309 Montgomery St.
Holmes M Co.	California.	10.	05.	Sept. 23.	Nov. 10.	C. R. Bridge.	224 California St.
Johnson Gravel M Co.	Nevada.	31.	05.	Sept. 2.	Oct. 15.	G. W. Holmes.	318 Front St.
Julia Con M Co.	Nevada.	21.	10.	Nov. 4.	Dec. 9.	J. Steadfield.	419 California St.
Mexican G & S M Co.	Nevada.	30.	25.	Sept. 21.	Oct. 27.	C. E. Elliott.	309 Montgomery St.
Mountain Tunnel G M Co.	California.	1.	15.	Sept. 28.	Nov. 2.	A. B. Paul Jr.	328 Montgomery St.
New York Hill M Co.	California.	3.	15.	Oct. 20.	Dec. 19.	J. M. Buington.	309 Montgomery St.
Navajo M Co.	Nevada.	13.	50.	Oct. 23.	Dec. 2.	J. W. Pew.	310 Pine St.
Potosi M Co.	Nevada.	20.	40.	Sept. 28.	Nov. 4.	C. E. Elliott.	309 Montgomery St.
Russell Reduc & M Co.	California.	1.	25.	Oct. 15.	Nov. 25.	J. Morizio.	328 Montgomery St.
Sammit M Co.	California.	8.	05.	Oct. 23.	Nov. 30.	G. W. Seastons.	309 Montgomery St.
Savage M Co.	Nevada.	64.	50.	Oct. 9.	Nov. 9.	E. B. Holmes.	309 Montgomery St.
Sierra Nevada S M Co.	Nevada.	83.	25.	Sept. 30.	Nov. 4.	E. L. Parker.	309 Montgomery St.
Sulphur Bank Q M Co.	California.	4.	50.	Aug. 29.	Oct. 9.	T. Winttingham.	336 California St.
Trinity M Co.	California.	1.	10.	Nov. 2.	Dec. 8.	H. W. Pearson.	417 Kearny St.
Union Mine Co.	California.	1.	05.	Sept. 15.	Nov. 13.	G. W. Seastons.	309 Montgomery St.
Union Con M Co.	Nevada.	31.	25.	Sept. 2.	Oct. 19.	J. M. Buington.	309 Montgomery St.
Virginia Creek M Co.	California.	2.	10.	Sept. 11.	Oct. 16.	M. M. Quay.	408 Montgomery St.
Willow Creek M Co.	Nevada.	2.	10.	Oct. 12.	Nov. 16.	R. E. Elliot.	310 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Challenge M Co.	California.	C. L. McCoy.	329 Pine St.	Annual.	Nov. 19
Bodie Tunnel M Co.	California.	C. O. Harvey.	309 California St.	Annual.	Nov. 9
Silver Lick M Co.	Nevada.	L. J. O'Farrell.	420 California St.	Annual.	Nov. 25

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Jackson M Co.	California.	D. O. Bates.	328 Montgomery St.	10.	Oct 5
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	06.	Mar 16
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept 1
Del Norte M Co.	Nevada.	R. W. Heath.	318 Front St.	25.	Sept 1
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	20.	July 30
Plymouth Con G M Co.	California.	W. Van Norden.	Pres. 23 Nassau St. N. Y.	50.	Apr 6
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Oct 13
Syndicate M Co.	Nevada.	J. Stedfield Jr.	419 California St.	10.	Sept 8

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 15.	WEEK ENDING Oct. 22.	WEEK ENDING Oct. 29.	WEEK ENDING Nov. 5.
Alpha.	60	65	65	70
Alta.	20	25	20	30
Andes.	30	25	30	25
Argenta.	120	150	145	170
Belcher.	1.20	1.50	1.45	1.70
Best & Belcher.	1.15	1.40	1.20	1.35
Bullion.	35	40	40	55
Bonanza King.	1.15	1.40	1.20	1.35
Bodie.	1.65	2.75	2.25	2.70
Benton.	10	10	10	10
Boile Tunnel.	20	20	20	20
Bulwer.	1.30	1.50	1.20	1.40
California.	1.30	1.50	1.20	1.40
Challenge.	15	15	15	15
Champion.	20	20	20	20
Chollar.	90	110	110	130
Confidential.	80	100	100	100
Con. Imperia.	120	150	120	140
Con. Virginia.	120	150	120	140
Con. Pacific.	110	125	145	115
Crown Point.	1.10	1.25	1.45	1.15
Day.	3.25	2.75	2.25	2.50
Eureka Con.	2.25	2.75	2.25	2.50
Eureka Tunnel.	25	20	25	25
Exchequer.	50	50	50	50
Grand Prize.	70	50	70	50
Gold & Curry.	30	35	35	35
Goodshaw.	15	15	15	15
Hale & Norcross.	3.75	4.50	3.85	4.35
Holmes.	3.00	3.00	3.00	3.00
Independence.	1.00	1.00	1.00	1.00
India.	15	15	15	15
Justice.	15	15	15	15
Martin White.	1.85	3.35	2.60	4.30
Mono.	40	40	40	40
Mexican.	80	80	80	80
Mt. Diablo.	2.50	2.50	2.50	2.50
Northern Belle.	40	40	40	40
North Belle Isle.	1.00	1.00	1.00	1.00
Occidental.	85	85	85	85
Ophir.	85	85	85	85
Overman.	20	30	35	35
Potosi.	20	30	35	35
Final Con.	1.30	1.50	1.40	1.70
Savage.	1.30	1.50	1.40	1.70
Seg. Belcher.	50	70	70	70
Sierra Nevada.	50	70	70	70
Silver Hill.	10	10	10	10
Silver King.	6.25	6.25	6.25	6.25
Scorpion.	30	36	40	35
Tioga.	30	36	40	35
Union Con.	30	36	40	35
Utah.	2.00	2.00	2.00	2.00
Yellow Jacket.	1.30	2.00	1.75	2.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Nov. 5.	60 Kentuck.	75	
200 Alta.	30c	100 Mexican.	85
50 Andes.	40c	970 Mono.	8.50@9.00
100 Belcher.	1.75	100 Nevada.	40c
50 B. & Belcher.	1.50	750 Ophir.	1.50c
330 Bodie Con.	2.90	50 Overman.	30c
200 Bulwer.	40c	50 Potosi.	60c
50 Con Va. & Cal.	1.50	500 Savage.	1.70c@1.65
100 Crown Point.	1.20	500 Scorpion.	70c
50 Eureka Con.	2.50	550 Sierra Nevada.	1.15c@1.10
100 Goodshaw.	15c	150 Utah.	75c
720 Gould & Curry.	1.90	30 Yellow Jacket.	1.80
430 Hale & Norcross.	3.15@3.10		

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. J. BARTELL—Amador and Calaveras Co's.
F. H. HORN—Nevada (State).
G. W. INGLE—Arizona.
F. L. RICHARDS—San Bernardino Co.
R. G. HUSTON—Idaho and Montana.
Geo. McDOWELL—Tulare and Fresno Co's.
HOON ELLS—Nevada Co.
W. D. PIER, Sutter and Butte Co's.
R. E. LLOYD, Stanislaus and Merced Co's.
J. WINKLER, Alameda Co.
T. BATES, Shasta and Tehama Co's.
M. L. DENNIS, Plumas and Sierra Co's.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DREW & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING OCTOBER 27, 1885.

329,252.—ANIMAL EXTERMINATOR—A. Anderson, San Jose, Cal.
329,132.—TWO-WHEELED VEHICLE—W. C. Bradford, Germantown, Cal.
329,363.—APPLE PARER AND CORER—F. Clingman, Albany, Or.
329,364.—MILL STOCK FEEDER—Geo. Cottrell, S. F.
329,148.—CRANE AND DERRICK—W. S. Doan, S. F.
329,158.—HARVESTER—J. B. Gemmill, Red Bluff, Cal.
329,312.—VEHICLE BRAKE—J. B. Hinton, San Diego, Cal.
329,048.—ROCK CRUSHER—E. W. Jones, Portland, Or.
329,395.—GAME BOARD—A. F. Knorp, S. F.
329,056.—GATE—E. J. Lane, Williams, Cal.
329,312.—CLASP FOR RIBBON ROLL—E. W. Raymond, Couperville, W. T.
329,082.—ANIMAL TRAP—S. K. Reynolds, San Jose, Cal.
329,418.—WASHING MACHINE—H. H. Tuttle, Phoenix, A. T.
329,113.—BARK MILL—W. A. Woods, Santa Cruz, Cal.
329,114.—BARK MILL—W. A. Woods, Santa Cruz, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

FOR SALE.

ONE SET

CORNISH ROLLS,
12x27, at Carlisle Mine.

Good as New, having been
used but a few days.

ADDRESS:

D. B. HUNTLY,
Carlisle, New Mexico.

Or RISDON IRON WORKS,
SAN FRANCISCO, CAL.

THE CELEBRATED

Woodbury Oils.

Pure, Perfect, Uniform!

The WOODBURY OILS are in use on the Central and Southern Pacific Railways, and on nearly every railroad and steamship line on the coast.

We are not agents for other manufacturers, but have our own works, and adapt here all our oils to the requirements of home machinery and our climate. We can show recommendations and records of tests, showing a saving to our customers of 60 per cent on their lubrication last year. Address

CHARLES J. WOODBURY,
123 California St., San Francisco.
WORKS: Cor. Fifth and Townsend Sts.

W. E. CHAMBERLAIN, JR. T. A. ROBINSON.

PACIFIC Business College,
320 POST ST. SAN FRANCISCO.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.
Ladies admitted into all departments. Day and Evening Sessions during the entire year.
Call, or send for CIRCULAR to
CHAMBERLAIN & ROBINSON, Prop's.

PACIFIC ELECTRIC PAD
THE GREATEST DISCOVERY OF THE AGE!
Patented Jan. 20, 1885.

Best Retainer in Existence!
Gives perfect ease and comfort in all positions. Does not irritate perfect cure of Rupture in all cases which we cure and treat, both adults and children. Now, reader, if you are afflicted with this terrible disease, those considered incurable, if other treatment has failed you, come and see us. EVIDENCE

Our Terms: NO CURE, NO PAY.
CURES RUPTURE IN FROM 60 TO 90 DAYS.
Single case with solution, fee, \$50.00.
Truss with solution, fee, \$100.00.
Full information and Circulars. Office open even'gs. 7 to 9 P. M.
WE GUARANTEE TO RETAIN ANY CASE!

PACIFIC ELECTRIC CO.
SOLE PROPRIETORS,
No. 330 Sutter Street, San Francisco, Cal.

HEAD'S BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

DELINQUENT NOTICE.

The Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley township, Nevada county, California.

NOTICE.—There is delinquent upon the following described stock on account of Assessment (No. 12) levied on the 17th day of September, A. D. 1885, the several amounts set opposite the name of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Platt, Charles.	9	59	\$295 00
Cuddeheigh, Thomas.	30	10	50 00
Delano, M. H.	31	10	50 00
Delano, M. H.	32	10	50 00
Delano, M. H.	33	10	50 00
Delano, M. H.	34	10	50 00
Delano, M. H.	35	10	50 00
Delano, M. H.	36	10	50 00
Delano, M. H.	37	10	50 00
Delano, M. H.	38	10	50 00
Delano, M. H.	39	10	50 00
Dibble, A. B.	41	12 1/2	62 50

And in accordance with law and an order of the Board of Directors, made on the 17th day of September, A. D. 1885, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, Nos. 934 and 936 Mission street, San Francisco, California, on Monday the twenty-third day of November, A. D. 1885, at the hour of two (2) o'clock p. m. on said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

GEO. P. THURSTON, Secretary.
OFFICE—Nos. 934 and 936 Mission Street, San Francisco, Nov. 3, 1885.

METALLURGIST.



L. C. MARSHUTZ

T. G. CANTRELL

NATIONAL IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco.

...MANUFACTURERS OF...

Stationary and Compound Engines,

FLOUR, SUGAR, SAW and QUARTZ MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials proves. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.

Geo. W. Prescott, President.
Irving M. Scott, Gen'l Manager.

H. T. Scott, Vice-Pres't and Treas.

Geo. W. Dikie, Manager.
J. O'B. Gunn, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

—BUILDERS OF—

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



IMPROVED PIPE TONGS.

[PATENTED OCTOBER 23, 1885.]

This cut illustrates a Tong that can take any size pipe without screwing or setting it. It cannot slip, for the more you pull the tighter it gets. There is no need of pressing the handles together, for it has only one stock or handle. It is very simple and durable. For further information, address

HENRY F. W. SOHST, 1804 Dupont Street, San Francisco, Cal.

H. M. RAYNOR,
No. 25 Bond St.,
NEW YORK.

ESTABLISHED
1858.

PLATINUM

FOR ALL
LaboratoryAND
Manufacturing Purposes.

Wholesale and Retail.

Native Platinum and Scrap purchased.

VALUABLE CHROMIC IRON MINE.

Within 2 miles of Railroad.

Thousands of Tons on Surface.
CAPITAL WANTED TO DEVELOP.

Half share as equivalent, or will tell outright. Address
G. W. SPAWFORTH, Lang Station, Cal.

N. W. SPAULDING
SAW COMPANY

Manufacturers of
SPAULDING'S

Inserted Tooth

AND
CHISEL BIT

CIRCULAR

Saws.



SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

THE PACIFIC COAST ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,

FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

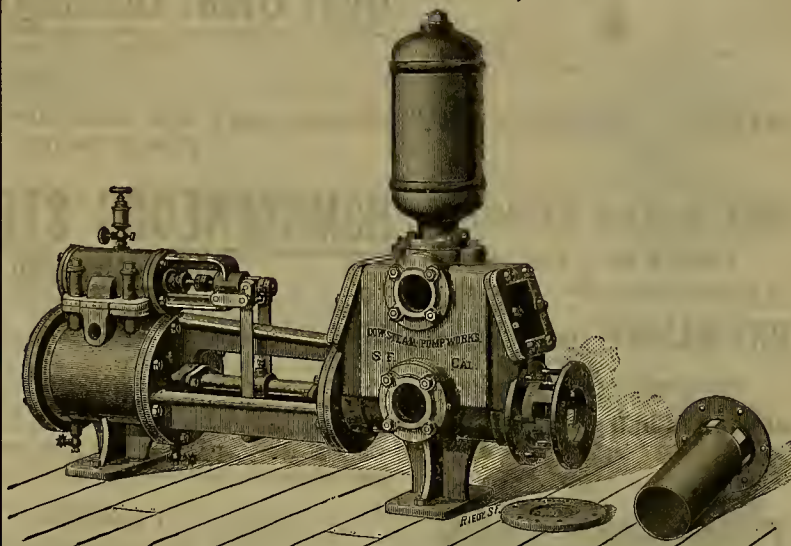
The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

DOW STEAM PUMP WORKS,

San Francisco, Cal.



DOW'S IMPROVED STEAM PUMPS And Pumping Machinery

FOR EVERY POSSIBLE DUTY.

COMPOUND PUMPING ENGINES,

Condensing and Non-Condensing,

.....FOR.....

Water-works, Mining Purposes, Irrigation, Etc.

GRAND SILVER MEDAL Awarded at Mechanics' Institute Industrial Exhibition for Best Direct and Double-acting Pump.

Works: 114 & 116 Beale St. Correspondence solicited. Call or send for Catalogue.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET. SAN FRANCISCO.

The most Complete Compound
manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid
and Alkali-Proof.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.



Property Owners are interested
personally

In seeing that their roofs are painted or
repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing
and Preserving Canvas, Rope, and
Leather.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal.

JENKINS BROS., 71 John St., New York.



INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

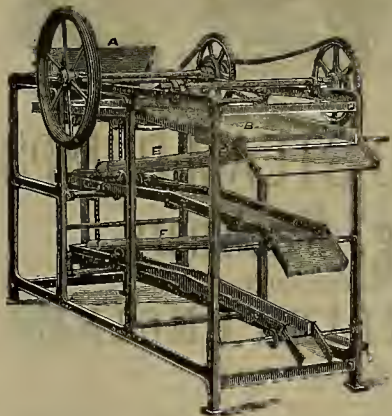
For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.
Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Cokes having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Cokes, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1/2 to 8 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shapes Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

FRASER & CHALMERS.

CHICAGO, ILL. U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,
ROOM 43,
NO. 2 WALL ST.

PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,
JIGS & STAMP BATTERIES.

Denver Office:
No. 248
13th Street,
Denver,
Colo.

Mexico Office:
No. 11
Calle de Suarez
Chihuahua,
Mexico



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,
The BEST ROCK DRILL HOSE Made.

SOLE AGENTS
"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents,

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

Iron and Machine Works.

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

OMAS T. HOMPSON

EDMONTON THOMPSON.

THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF—

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henriksen's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

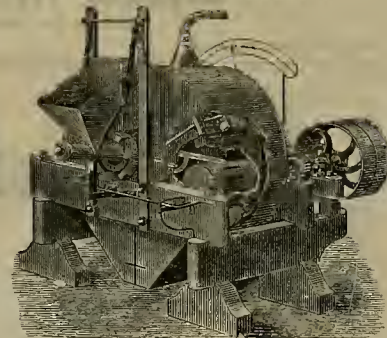
Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

Tustin's Pulverizer WORKS ORE WET OR DRY.

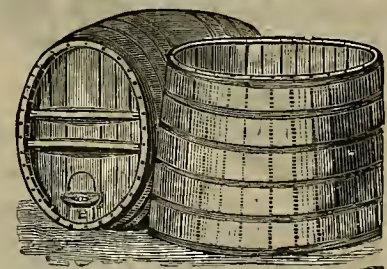
FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

WATER TANKS! WINE TANKS!
CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,
30 to 40 Spear St., San Francisco.

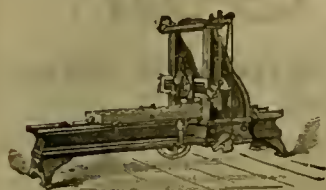
ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



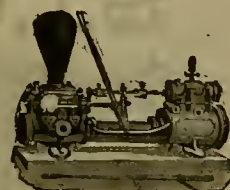
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

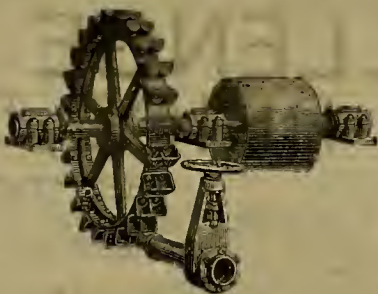
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.



SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.

SEND FOR CIRCULARS.



PELTON
HURDY-GURDY WATER WHEEL.

SOLE AGENTS FOR

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Bars.

Barbed Wire.

WIRE CLOTH. Brass, Copper, and Steel, all kinds, and meshes
running from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

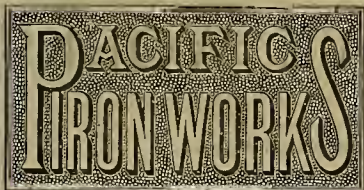
For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.



1850. 1885.
RANKIN, BRAYTON & CO.,
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS,
embracing machinery of LATEST DESIGN and
MOST IMPROVED construction. We offer our cus-
tomers the BEST RESULTS OF 35 YEARS' EX-
PERIENCE in this SPECIAL LINE of work, and
are PREPARED to furnish from SAN FRAN-
CISCO or CHICAGO, the MOST APPROVED
character of MINING AND REDUCTION MA-
CHINERY, adapted to all grades of ores and SU-
PERIOR to that of any other make, at the LOWEST
POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DE-
LIVER in COMPLETE RUNNING ORDER,
in any locality, MILLS, CONCENTRATION
WORKS, WATER JACKET SMELTING
FURNACES, HOISTING WORKS, PUMP-
ING MACHINERY, ETC., ETC., of any DE-
SIRE CAPACITY.

WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD
ores of NEW and ORIGINAL DESIGNS, covered
by LETTERS PATENT. No other Furnace CAN
COMPARE with these for DURABILITY, and in
CAPACITY for uninterrupted work. MORE
THAN 150 of them are now RUNNING in various
parts of THIS COUNTRY, as well as many in
FOREIGN COUNTRIES, giving results NEVER
BEFORE ATTAINED as regards CONTINUOUS
running, ECONOMY of fuel, AMOUNT and QUAL-
ITY of BULLION produced. These CLAIMS have
been PROVEN BY RESULTS in ANY NUM-
BER of INSTANCES, and the GREAT SUPER-
IORITY of this SYSTEM of smelting ores DE-
MONSTRATED BEYOND QUESTION. COM-
PLETE PLANTS furnished to order of any CA-
PACITY, with ALL IMPROVEMENTS that ex-
perience has DEMONSTRATED as VALUABLE
in this class of work.



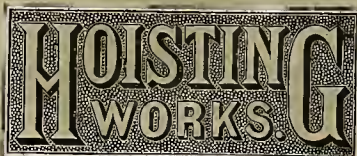
Beyond question the cheapest and
most effective machine of the kind
now in use adapted to all grades and
classes of ores.

This machine has been THOROUGHLY TESTED
for the past TWO YEARS, under a GREAT VA-
RIETY of CONDITIONS, giving most EXTRA-
ORDINARY results FAR IN ADVANCE of
anything EVER BEFORE REALIZED. A re-
cent COMPETITIVE TEST at the Carlisle Mine in
Mexico, showed an ADVANTAGE OF OVER 30
PER CENT in favor of THE DUNCAN. The
amount SAVED OVER THE TRUE being suffi-
cient to PAY THE ENTIRE COST of the ma-
chines EVERY MONTH OF THE YEAR. One
of its MOST VALUABLE features is as an AMAL-
GAMATOR. It saves all THE AMALGAM GOLD
and SILVER that ESCAPES the BATTERIES,
PANS or SETTLERS, making the machine worth
MORE than ITS COST for THIS PURPOSE
ALONE.

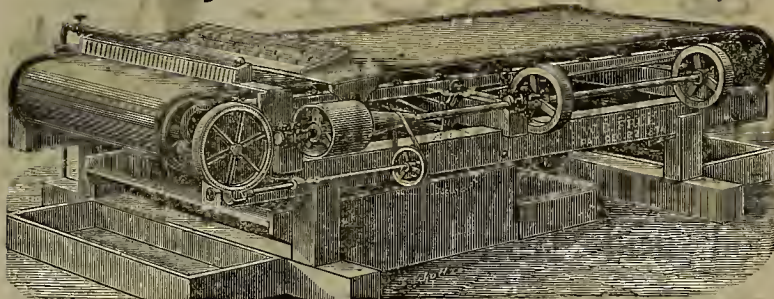


Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist
and affording means for the continuous operation of a
Pump or Blower, without interfering with a hoisting ap-
paratus. It is made entirely of iron, no piece weighs
over 300 pounds. At the ordinary speed of a horse, a
1,000-pound bucket of ore may be raised 120 feet per
minute. The hoisting-drum is under the complete con-
trol of the man of the shaft, and is capable of carrying
500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

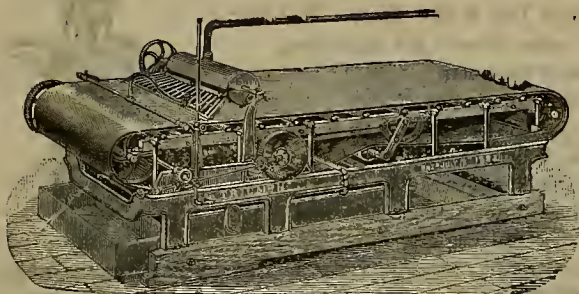
Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED.

**PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.**

THE "TRIUMPH" TRIUMPHANT!



**THE
"TRIUMPH" ORE CONCENTRATOR.**

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test, which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners. This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

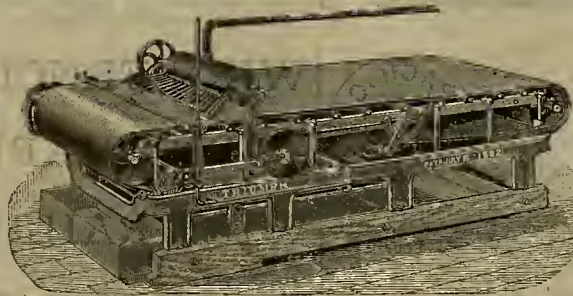
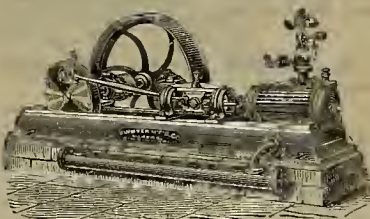
San Francisco, Cal.

JOSHUA HENDY MACHINE WORKS,

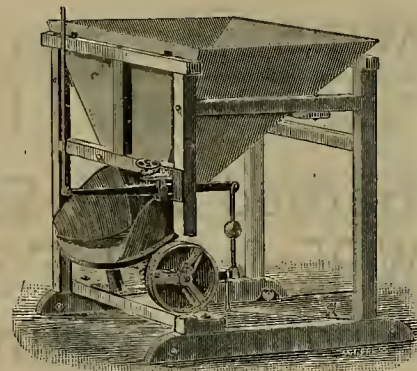
Nos. 49 and 51 Fremont Street, San Francisco, Cal.

**DEALERS IN NEW AND SECOND-HAND BOILERS, ENGINES, AND MACHINERY OF EVERY VARIETY.
TRIUMPH CONCENTRATORS.**

Stationary Engines.



"Challenge" Ore Feeders.



QUARTZ, SAW-MILL, AND HYDRAULIC MINING MACHINERY.

AGENTS FOR THE SALE OF THE

Celebrated CUMMER ENGINES, of Cleveland, Ohio,

BAKER ROTARY PRESSURE BLOWERS, WILBRAHAM ROTARY PISTON PUMPS,

HOT POLISHED SHAFTING, and P. BLAISDELL & CO'S MACHINISTS' TOOLS.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. **NOTE**—Have just completed order for 35 miles of 44-inch

pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide Valve, Poppet Valve, Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heino" Patent Safety Boiler (Water Tube);

50,000 horse power now in use.

MACEETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

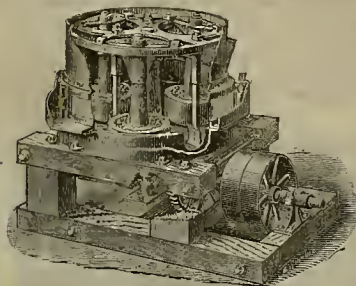
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 80-stamp Mill for Quartz Mountain

Mining Company.

Send for Circular and Price Lists.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

MANUFACTURER OF

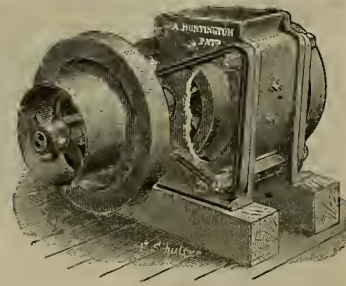
**Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 14, 1885.

VOLUME LI
Number 20.

Concrete Construction.

Concrete may be described briefly as pieces and particles of rock or like material aggregated together with lime or cement. The origin of its manufacture is unknown. The massive ruins in Italy testify to its durability, and of its extensive employment by the Romans. Since the introduction of Portland cement, the use of concrete has greatly extended. In England, where the first cement was manufactured, Drake states that thousands of concrete buildings have been erected of late years. The great desirability of concrete as a building material is well recognized and rapid strides are being made in its application. Rapid as has been the increase of concrete building during the past few years, the progress would have been still greater had it not been hindered by the general lack of knowledge on the subject, the great cost of molding or shaping the material, and the want of adequate appliances for mixing the concrete.

There are many localities where sand rock or gravel can be obtained at a nominal cost, in which concrete could be profitably introduced by any metallurgical man. And in these same districts are men plodding along in the grooves of better-known trades, who by turning their attention to concrete construction could establish themselves in a good business. Of course it would be necessary to purchase a license from the inventor of the more improved systems of concrete building, in which case buildings can be put up with unskilled laborers, provided the men are intelligently directed.

On this page we give an illustration of a building in process of erection on the system invented by Ernest L. Ransome of this city. Mr. Ransome has received patents covering building construction, concrete mixer and a concrete apparatus for molding walls, houses and other buildings.

The engraving gives an isometrical view of a building in course of erection with part of the scaffolding removed. Ransome apparatus for molding the walls consists of slotted standards, which being placed in pairs, one on either side of the site of the wall and bolted together, hold in place the mold boards, between which the concrete is placed. These standards are arranged to slide upwards upon the outer face of the mold boards as the wall progresses, and are made to conform to any breaks or projections that may be required in the building.

The molding boards may be of any size. If they are permanently required for the apparatus, they should be surfaced and squared, and about 1½ inches thick, 6 to 12 inches wide, and as long as could be conveniently obtained or handled. If on the other hand, by reason of the location or other causes, they are only

needed temporarily for this purpose, then their dimensions should be determined by their future use. For instance, if they are subsequently needed for flooring, then flooring could be used; if fencing is wanted, then use fence boards; if planks are required, then let planks be taken. In using them for the mold the boards or planks are but little damaged, the bolt holes required in some of them are not large and could easily be filled up.

Ordinary bolts may be used for connecting the standards together, but those having winged nuts will be found more convenient. The washers should be of good size.

In building retaining walls, posts are inserted in the face of the bank and sunk below the foundation of the wall at intervals of from five to ten feet, and the slotted standards are attached to these by means of lag screws.

For a plain building, say 100 feet long by 50 feet wide and 50 feet high, the cost of the apparatus, irrespective of height, would not exceed \$150 and the expense of working it would not be more than a cent per cubic foot of concrete. After building a wall the apparatus is good for 10 or 20 more. By this system the first cost is small and the expense of working slight. There is no difficulty in keeping the wall plumb,

Not Wasted.

The statement is often made that millions of dollars have been wasted and lost in useless work on unproductive mines on this coast. It is not lost in the sense that money is lost in a shipwreck or a fire. It simply changes hands. Men with means go into a mining speculation and employ men who work by the day to do the work on the claim. They buy machinery, provisions, tools, and sink shafts, run tunnels, and do general mining work, which they pay for. The money goes into the hands of the people who make the machinery, tools, etc., and those who do the mining work. And the work in going on gives employment directly and indirectly to many persons, according to the magnitude of the interests involved. So, now, if a mining venture proves a financial failure to those who have invested, the region where the mine is situated gets the benefit of the money spent.

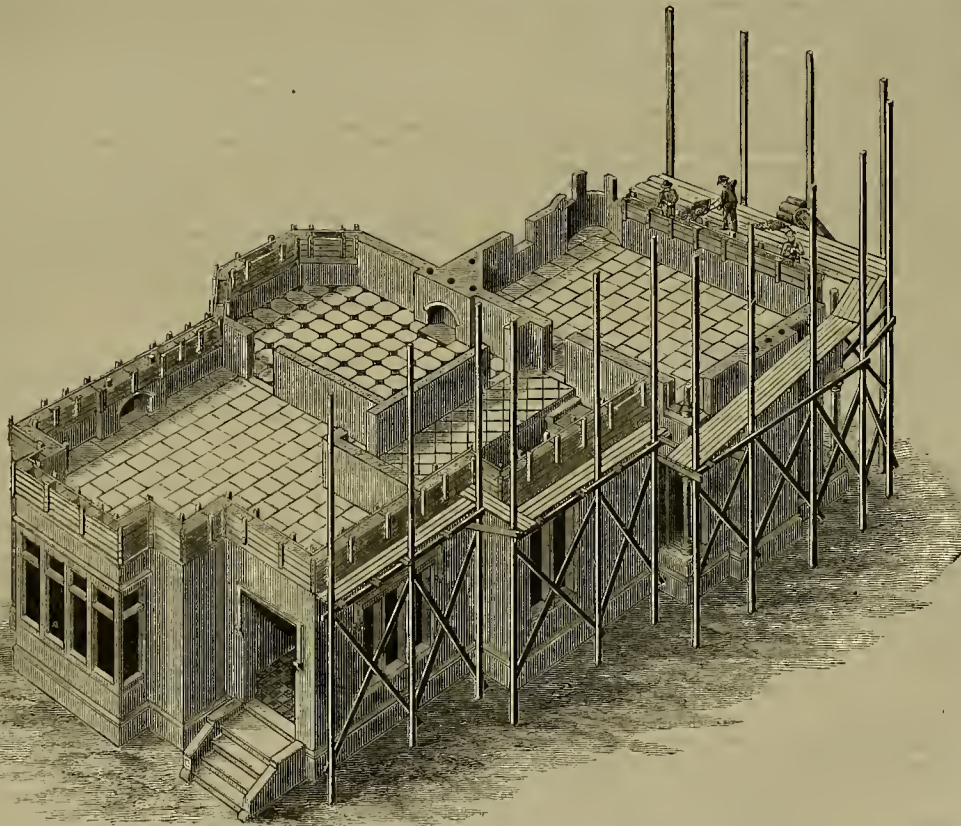
Even unlucky mine ventures add to the general wealth. There are few which do not produce some results in gold or silver, even if the amount is not sufficient to pay profits, and every cent taken out adds so much to the world's wealth. If people spend \$100,000, and only get out \$50,000, there is \$50,000 more in circulation than before that amount was taken out, and the \$100,000 is yet in existence, but in other than the original hands.

This argument may seem specious and would not be satisfactory to the men who have put in the money and lost it; but they have simply lost it. It is gone from them and is in some one else's hands. It is not lost from the world's circulation.

But we often hear of heavy losses in mining, which are merely losses in stocks. Men pay \$10 a share for stock and it goes down to \$1 a share. The appreciation or shrinkage of

stock makes and loses many fortunes. But it is not of this form of "mining" we are speaking. It is in legitimate mining work where money is paid men to develop property, in hope that returns may be made on the investment from the product of the mine itself. Of course a great deal of money is expended on unproductive properties. Yet, on the whole, there is no doubt that taking the mines of the country at large, very heavy profits have been made on the investments.

RELOCATION.—If the locator admit another to the possession with him, this will amount to an abandonment *pro tanto*, and a re-taking by the party admitted, upon which they will become interested in the claim, jointly or otherwise, according to the terms of their agreement. In these particulars the rule is the same when applied to the relocation of an abandoned claim.



ISOMETRIC VIEW OF CONCRETE BUILDING IN COURSE OF CONSTRUCTION

The *modus operandi* is as follows: The foundations being prepared and the standards and lower molding boards all in position, concrete is put into the mold continuously, layer after layer. Molding boards are added from time to time, as needed, until the concrete is brought to about the top of the standards. The bolts are then slackened, a set at a time, and the standards pushed up a few inches, or a foot or two, dependent upon the character of the work.

As soon as the lower bolts are in the way of the upward movement of the standards they are withdrawn and replaced at the top of the slot. The moulding boards, liberated by these movements, are reused above those already placed as often as needed.

This action is repeated as often as may be necessary to obtain the height desired. It forms a continuous operation and offers no interruption to the filling in of the concrete.

and there is no trouble in molding projections if desired.

The large warehouses recently built for the Arctic Oil Works, on the Potrero, were constructed in this manner by the patentee of the system. The fire-proof roofs of these warehouses were also built by him. Mr. Ransome has been of late building many concrete floors for foundations for machinery, etc., the largest floor being that of the Starr & Co. Mills, at Wheatport, Contra Costa Co., where they have 50,000 square feet of surface. The extreme foundations of this mill were also built of concrete. In the piers, arches and floor platforms there are 140,000 square feet of concrete.

Mr. Ransome, whose office is at 402 Montgomery street, is prepared to sell licenses and territorial rights for his various inventions in connection with concrete construction, and give suitable instruction so that people can build for themselves.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Cœur D'Alene Mines.

[Written by our Special Correspondent R. G. HUSTON.]

(Continued from last week.)

The quartz interests of the camp now seem to be very promising, and if they continue to develop in future as satisfactorily as they have thus far, it will not be long before the outside world will find out where the Cœur D'Alene mines are. In the short space of two seasons there have been nearly 2000 locations made, and, of course, many more will be made. Many will certainly be worthless, but undoubtedly there are some good ones now known of. The ores are galena, chloride, carbonate, grey copper, native and antimonial silver and free milling gold ores. Several properties have been disposed of to parties who evidently mean business, and by the opening of another season there will surely be several mills erected on the different properties as they have already contracted for them. Of course, for the most part, the quartz to this date is purely speculative, with one exception—the Golden Chest—but there is no doubt in my mind but there are some fine properties here. I will note

A Few of the Districts

And the locations and development. For the main I am indebted to Mr. H. G. Longer, assayer in Murray, and Phil. A. Marksar. Canyon Creek district is some 25 miles southeast from Murray. The first, and really the best developed, lead in the country is called the Tiger mine, having a tunnel in 350 feet. They have a true fissure vein five feet wide, and have from 2500 to 3000 tons of ore on the dump which assays, as you take it from the pile, from 40 ounces to 200 ounces silver to the ton. This property has just been sold to Messrs. Glidden and Burke, of Montana, for \$40,000, and is considered a very cheap bargain to the gentlemen investing. Many think that they will get their money out of the ore on the dump alone. They are gentlemen of ample means, and will, no doubt, develop it as rapidly as possible.

The Diamond Hilt is in the same district and carries some chlorides and native silver, and from choice rock assays have been obtained that ran as high as 3000 ozs. silver to the ton. It is a fine prospect but not developed enough to be a satisfactory showing for mine buyers.

Orinogo, owned by Colonel Wallace, is a galena ledge and is claimed to assay very high; is also very wide but comparatively undeveloped.

The Poorman is an extension of the Tiger lode but is not so well developed, but contracts have been let for tunnels to be run in it this winter. There seems to be no reasonable doubt but that it will, on development, show up well.

The Nigger Prairie district is some six miles south of the Tiger mines on the old Mullan road, and shows large deposits of galena and chlorides, and there is some talk of a smelter being erected at Placer Center, the trading point of this district.

Yreka district is close by the latter and the ores are similar, the peculiarity of these locations being that they are in such immense bodies, mostly a low grade silver ore and carrying about 50 per cent lead. The location is very late and consequently there has been but little done to develop it as yet.

Beaver Creek District.

Sunset lead is a well-defined vein; croppings the full length from five to twenty feet wide; solid galena and assays run from 30 ounces to 70 ounces of silver per ton, with 70 per cent lead. This may, on further development, make a very fine showing.

Silver Tip is an extension of the Sunset, and the character of the ore is similar.

The Tough Nut has a tunnel in 75 feet which shows nine feet of galena ore mixed with quartz and is also thought to be valuable. There are many others in this district, but nothing has been done only to make the location, and these are not worth mentioning. The woods are full of prospective millionaires, and I hope they will all realize their fullest hopes.

The Buckeye Boy lode, located on Dream Gulch, was owned by Frank Reed, who has just sold a one-half interest in the location for \$40,000 to Murray Keller, who also contracts to erect a mill immediately. He is from Louisville, Ky., and from all that can be seen, should certainly congratulate himself on the possession of as fine a piece of free-milling gold ore property as there is in any country. Specimens I have seen are literally spangled with gold. I think Mr. Reed has at least \$10,000 worth of fine specimens which he has picked out whilst developing his lead.

The Skookum lode is located on the Main creek near Osborne; is also free milling gold ore and is a well-defined ledge. It has also been disposed of to Louisville parties for \$12,500, and they have contracted for a mill. To all appearances next season will be the opening day for the quartz mines in the different districts in and around the Cœur d'Alene.

Summit District.

The Golden Chest mine is on Reeder gulch, and is a free-milling gold lode. It has the only

mill that is in the camp, and at the present time is working only five stamps, although it is a ten-stamp mill. The reason for only working five stamps is want of water, but the large ditch being brought around to these hill placer diggings will soon be down that far, and then they can get plenty of water. The results are thus far very satisfactory. The Golden Chest Mine and Milling Company is composed of Louisville, Ky., parties. The Kentuckians seem to have the nerve to put their money in, and they are satisfied thus far with returns.

The Mother lode is located on the main creek opposite the mouth of Reeder gulch, and some think is an extension of the Golden Chest mine. As much of it as has been uncovered is virtually sheeted with gold, but the owners have only made a small showing, running a tunnel in on one side of the ledge for about 40 feet, and have not touched the ledge proper. Whether it is because it looks pretty and they are afraid they will spoil the looks of it, or that they fear their wealth will vanish into thin air on development, is a conundrum I was unable to solve to my satisfaction. I can only say that I never saw any free-gold rock its equal in richness. There are six men interested in this mine—enough muscle to develop it without the aid of capital. It was one of the first locations of quartz in the camp, and yet it is only a prospect. Other mines have been located and developed, so that parties could satisfy themselves that they were bonafide mines and have been sold, but the Mother lode still lies dormant, and it looks as if the only thing the owners knew how to do was to hold their breath and ask a fabulous sum for their mine.

The Cœur D'Alene Bedrock Flume Pool.

The main creek is the base of operations of the most gigantic placer mining scheme I have ever seen. A company have organized with \$5,000,000 capital to push this enterprise to a completion as rapidly as ample capital will admit of. The proposed length of this flume is nine miles; it is to be in three compartments, two of five feet each and one of four feet for a clear-water channel. It is to be rifled with railroad iron. At the time I was down at the works there were about 400 men at work, and they were hiring every man who came along and wanted work. One gang was chopping down the trees on the right of way; another gang followed those and cut these trees up into lengths that could be handled. After them came the log-rolling gang and grubbers, and then came a gang loading these stumps with giant powder and blowing them into atoms, and then came a regular army of graders, and they were strung along for a mile—two men to each 25 feet of the ditch, throwing it out some 20 feet wide and to a regular grade of about one and three-fourths or two inches to the rod. The place looked like a hive of bees, and is certainly very ably operated. The general foreman on the works is Mr. Patrick Flynn, and he is evidently an old hand with a crew of men, as he has them so well arranged that he can see at a glance as he passes along that each man is doing his duty. The men, as a rule, are first-class men, and do their work with a will.

Mr. John Ryan is the contractor. The first contract signed was for the sum of \$650,000—pretty large contract for outside camp like this. The officers of the company are as follows: C. A. Weed, Manager, New York City; A. G. Sanford, Secretary, New York City; Thomas J. Burke, Manager, Denver, Colorado; R. L. Hopkins, Manager, Murray, Idaho; W. B. Hepburn, Counsel, Murray, Idaho; John Ryan, contractor, Albany, New York. They evidently mean business, as they have bonded a large quantity of ground up the gulch, and are paying their men off promptly twice a month—1st and 15th. That gives it an air of solidity that they could acquire in no other way. The proposition was so extensive that the most of the people were inclined to look upon it at the start with suspicion, but at the present they have settled down to facts, and are happy to know that bedrock is likely to be reached in the main creek.

The agricultural interests I found almost monopolized by an old mining friend of the early placer mining days of Montana. Mr. W. G. Stagner and his worthy lady are located on a ranch a short distance below Eagle City. I spent a very pleasant evening with them, and next day Mr. Stagner went with me, and together we secured a number of staunch subscribers to the MINING AND SCIENTIFIC PRESS. May their crops never be less in quantity and price than this year, is the worst wish I have for them, as potatoes are worth three cents per lb., and cabbages six cents per lb.; hay and grain are about three and a half to four cents per lb. So it is just now a paradise for a rancher.

Eagle City, at the time I was there, was looking up a little and they had some hopes that this movement by the Flume Company would permanently help Eagle, but the only question I see about it is whether they will strike bedrock near Eagle or not. I am afraid that is an impossibility when the amount of fall the gulch has is considered.

Murray has some 1200 or 1400 inhabitants, and is well supplied with the usual business houses. The Palace hotel is owned by Caldwell & McCorkindale; restaurants are run by Messrs. Bennington and Beusendefery; saloons, by Messrs. Garrison, Wolf, Goetz & Hanley; merchandise by R. McKenzie, G. N. Culver, J. R. Marks & Co.; drugs, by Messrs. Bass & Ingalls, and the financial interests are ably taken care of by the Bank of Murray, C. L. Dahler President, Chas. Hussey Secretary, Warren Hussey Cashier.

The news interest is ably represented by an old San Franciscan, Adam Aulbach, who edits the Cœur d'Alene Sun, with whom I spent a pleasant hour, and he also gave me all the points that an old resident would naturally be able to give a transient new-comer. I was surprised when I was told that the elevation of Murray was less than 3000 feet, as I imagined from the amount of climbing I did getting in there that it was not less than 5000. Appearances are many times deceitful, particularly when climbing mountains.

The Thompson Falls have great hopes of their becoming a quartz camp of no mean proportions, and there is a strong probability of their realizing their hopes. The Silver King mine is ten miles northeast from Thompson, and some four miles from the railroad. From developments and assays obtained it will surely be heard of in the mining world. They will soon have a tunnel in 100 feet, and from a beginning the size of a person's hand the ledge has enlarged to two feet of solid ore. The assays are surprisingly rich, running from 150 ounces silver as the lowest, to 4712 ounces silver as the highest, and from \$20 to \$22 gold, and 40 per cent copper. Samples of the rock which I have seen were simply all mineral. They have nearly 100 tons of ore on the dump. The lucky owner of this property is Mr. W. H. Anderson, of Portland. Mr. Anderson was formerly a conductor of the N. P. R. R., but thinks he is now well enough fixed to quit railroading, and there seems to be no reasonable doubt of his realizing on his mine, as there are a number of parties looking after it. There are many other locations in or near this point, but this is the principal one, and the only one that had made any developments worthy of note.

Cobalt and Nickel Mines.

EDITORS PRESS:—A great deal has been said of late in the papers concerning the nickel and cobalt mines in Churchill county, Nevada, and considerable of it is entirely false. In the fall of 1881, I went into the east range of mountains in Churchill county, to expressly prospect for nickel and cobalt, and on the 29th of November, 1881, I located the following claims: British Queen, the Monarch, the London, Emperor, President and Empire. The London fell into the hands of Wm. Bell and A. J. Mason; in what way it is not necessary to mention. The Emperor is the richest mine by far among the lot; is very large and well prospects down to water level; is 38 feet between walls, and there has been about 140 tons of as rich cobalt and nickel ore shipped to Liverpool as ever went from any country. I have about 2000 tons of second class ore now on the dumps, and am still taking out ore for shipping.

GEORGE LOVELOCK.

PROSPECTING.—Glorious weather for going into the mountains, holling the hard-hearted bean and hunting up deposits of gold, silver, copper and lead. The days are warm and the nights just cool enough to keep one's nose in fine snoring condition. There is here a large territory to prospect. Most of it has been scanned, but that is all. "Float" will have to be found and some digging done in order to find "blind" ledges, which are generally the richest. Prospecting in fine weather such as we usually have in Arizona is glorious employment. You take a donkey, load him down with provisions, tools, bedding and a little stimulant, put your gun across your shoulder and go into the deep woods; make camp, cook your meal, take a smoke and a stroll for indications that will lead to quartz, ore or game. You need have no fear of Indians, for there are none outside of Tombstone. If you see a mouse, don't shoot; but if you see a squirrel, jack or cotton-tail rabbit, deer or bear, let him have it. The water you will find will be good and pure; the scenery will make you feel that, although you are a man and master of almost everything around you, "creation is much greater than you are, and the Creator, who made great trees to protect you in life and furnish your coffin when death takes you, is grander, greater, more merciful, than imagination can picture." We like prospecting, but fate has divorced us from it and detailed us to scratch down stuff for "wise" men to pick to pieces.—Prescott Courier.

WASHINGTON TERRITORY COAL.—The output of coal from Washington Territory mines during the year ended June 30, 1885, was 380,250 tons, from the following mines: Newcastle, 149,048; Renton, 30,397; Cedar River, 14,573; Black Diamond, 10,562; Carbon Hill, 135,926; South Prairie, 34,313; Tacoma, 5431. The Newcastle, Renton, Cedar River and Black Diamond mines are in King county; the Carbon Hill, South Prairie and Tacoma mines, in Pierce. During the year under review the King county mines yielded 204,480 tons; the Pierce county mines, 175,770. The Cedar River and Black Diamond are new mines, the others old ones. During the current year the new Franklin mine will go to still further swell the production of King county coal. About 2,500,000 tons of coal have thus far been mined in Washington Territory, 1,700,000 of which were from the mines of King county; about half of the remainder from Pierce county, and the other half from Whatcom.—Portland Oregonian.

THEY have made a new and rich strike in the Drum Lummon mine, M. T.

The Original Discovery of Gold in California.

It was in Alvarado's time, and about March, 1842, that gold was first discovered in Alta California. It is true that among the various reports of Drake's voyage, there is one which, in speaking of his landing at New Alhion, in 1578, says that "there is no part of earth to be here taken up, wherein there is not a reasonable quantity of gold or silver." But it seems probable that this statement was an interpolation. Whether so or not, it is very certain that Drake saw neither gold nor silver on the coast. There is no pretense that he did in a very minute and circumstantial narrative, entitled "World Encompassed," by his chaplain Francis Fletcher, who would hardly have omitted a matter of so much importance, if known; nor is there any reference to gold or silver in any of the narratives of the sailors appended to and published with the "World Encompassed." For these reasons, and on account, also, of the very general, indefinite, and interjectional character of the statement itself, it must be rejected as a fabrication. It is further true, that there were reports that Captain Jedediah S. Smith, the first American who arrived in California overland, found gold in the Sierra Nevada mountains about the year 1826; but his discovery, if it were true, took place on the eastern side of the Sierra, and not within what is now known as California. But in 1841, Andres Castillero, the same person who afterwards discovered the New Almaden quicksilver mine in Santa Clara county, while traveling from Los Angeles to Monterey, found near the Santa Clara river a number of water-worn pebbles, which he gathered up and carried with him to Santa Barbara. He there exhibited them, said they were a peculiar species of iron pyrites, and declared that, according to Mexican miners, wherever they were found, there was a likelihood of gold being also found. A ranchero named Francisco Lopez, who was living on Piru creek, a branch of the Santa Clara river, but happened at the time to be at Santa Barbara, heard Castillero's statement and examined his specimens. Some months afterwards, having returned home, he went out on a search for strayed cattle. At noon, when he dismounted from his horse for the purpose of resting, he observed a few wild onions growing near where he lay. He pulled them up, and in doing so noticed the same kind of pebbles as those to which Castillero had called his attention. Remembering what Castillero had said about them, he took up a handful of earth, and upon carefully examining it, discovered gold.

The news of the discovery, the exact location of which was a place called San Francisco, about 35 miles northeast of Los Angeles, soon spread; and in a few weeks a great many persons were engaged in washing and winnowing the sands and earth in search of gold. The auriferous fields were found to extend from a point on the Santa Clara river, about 15 or 20 miles above its mouth, over all the country drained by its upper waters, and thence easterly to Mt. San Bernardino. On May 14, 1842, Alvarado wrote to the prefect of the district, reproving him for not having given official notice of the discovery, and directing him to gather and forward an account of all circumstances of interest relating to the gold for transmission to the supreme government. From that time to this day, there has been more or less working of these mines; but no places of very great richness have been found, and none to compare with those afterwards discovered on the tributaries of the Sacramento and San Joaquin. Taking the whole country together, however, from the Santa Clara river to Mount San Bernardino, a very considerable quantity of gold has been extracted. During the first year, though the methods of working were exceedingly rude, it is said that Lopez and a partner, named Chas. Barec, with a company of Sonorians, took out about \$8000. In November, 1842, a package of about 15 ounces of the gold was sent by Abel Stens to the United States mint at Philadelphia; and, upon assay, it was found to be worth a little over \$340.—Theodore H. Hittell, in November Overland.

A PROSPEROUS INSTITUTE.—Reports have been forwarded as follows to the trustees of the Mechanics' Institute: The librarian reported the receipts for October to be \$1886.17; rents received for the Pavilion, \$970.77. The report of the ticket committee showed that 37,000 children had been admitted free during the late fair. The amount taken in at the door was \$35,625; outside subscriptions and sales raised the amount to \$43,226. Total amount, including sales of privileges, \$48,470.40. The Treasurer reported that \$23,000 had been paid by the institute since the fair on mortgage debts. The Committee on Lectures and Classes reported in favor of holding a mechanical drawing, a Spanish and a geometry class, and that each scholar should be assessed \$5 for the season.

THE MANUFACTURERS.—At the annual election of the Manufacturers' Association, the following were elected Directors: W. T. Garratt, N. W. Spaulding, James Spiers, Irving M. Scott, William Harney, A. W. Starbird, Charles J. Woodberg, Charles Bundschu, A. S. Halliday, Charles R. Steiger and William Fanll.

MECHANICAL PROGRESS.

Bending Cast-Iron.

The quality of cast-iron in softness—yielding to tool working—and in toughness has been greatly improved within the memory of many workers who are not old men. The crisp, brittle, hard character of cast-iron has been changed to a material of a purer condition, and therefore better nature.

One of the peculiarities of modern cast-iron for machinery purposes is its flexibility, its capacity of being moved from its unaltered position and retaining its new contour. In the older time it was necessary to peen a casting in order to permanently bend it, and this peening was rarely more than skin deep. The action of peening is simply to expand the surface of the casting by the quick, sharp blows of the peen end of the machinist's hammer—this unattached part must, perforce, give to this persuasion. The consequence is that the hammered side is stretched, just as hammering will stretch lead, or silver or copper, or any malleable metal. But the objection to this peening process is that the after-working by the file or the planing tool may destroy all the work done by the peen end of the hammer.

But it is possible to permanently bend cast-iron without resort to such heroic methods as peening, and the ruders of beating to redness in a forge fire, bending while soft, and plunging into cold water; the last so risky of breaking the casting that it is seldom tried except on cheap stuff like grate-bars or similar traps. Good cast-iron can be bent and keep its bend without the slow process of peening or the risky one of bending under intense heat and chilling in cold water with the chance of breaking. And this quality is sometimes handy.

In a cotton-mill for spinning peculiar yarn, the leaders on a spooler require to have a decided curvature near their heads. For convenience in finishing and fitting, and for economy in production, castings were preferable to forgings. These castings were made flat, but after being finished they were heated over a blaze and bent under a lever. The amount of bend was more than 30°.

A casting was made recently which required two turns or bends in its length, the casting weighing something over three hundred pounds. The superintendent determined to make the casting straight, plane and finish it, and afterward bend it to shape. This was successfully accomplished. The curved pattern would have been costly, the resultant casting might have been faulty, and the band dressing and finishing of the double curved casting would have made the piece cost more than if forged. But a forged piece of wrought-iron was just what was not wanted; it was a casting, and it was made.

Where the bends were to be made were stationed alcohol lamps, the piece being suspended between proper supports. After the underside being heated to a degree that would have drawn bared steel to a straw color—as a supposable degree of heat—a pressure, by weighted lever, was introduced on the upper side of the casting. As the lamp was moved from point to point, it was surprising to see how the iron yielded to the pressure and the heat. A curve was made that could not have been finished by planing, and yet the bent casting retained its finish, only the discoloring by the lamps being necessary to be removed by emery cloth rubbing.

A crooked casting, withdrawn out of line by injudicious pattern making and lack of sensible molding in the foundry, was about to be thrown on to the scrap heap, at a loss of nearly a hundred dollars. It was straightened to usefulness simply by the careful use of two gas flames, diffused by wire netting, and by the use of weight. It is quite possible to bend or to straighten cast-iron to an appreciable extent by quite a low degree of heat, if the heat is judiciously applied; a gradual heating of the side to be elongated by the heat that can be controlled, and the simultaneous persuasion of weight, lever or crew, will do wonders on such a material as this cast-iron that is usually considered to be of too friable, untamable and brittle a nature to be much beyond stone in resistance to tension, but even stone will bend.—*Scientific American*.

TEMPERING BRASS.—A correspondent of *Mechanical Progress* having stated in an article written for that journal that "brass cannot be tempered," another correspondent replies as follows: This differs with my daily experience. Brass, not hard by mixture, but by compression, either rolling, hammering, wire-drawing, or any other process which compresses the particles of metal, can be, and is, tempered regularly, just as easy and in the same manner as you would temper an equal-sized piece of hardened steel, viz., by heat. By placing a small piece of polished steel on the brass object to be tempered, and applying the heat so as to affect equally the brass and steel, you will know by the color of the steel the temper of the brass, which by this process may be tempered in exact proportion to every shade of color of the steel.

TEMPERING FROST DRILLS.—A cotemporary says: Drills, reamers, taps, etc., are first hardened by heating in a bath of prussiate of potash and salt, in about equal proportions, melted (without water) in a cast-iron crucible, and held at just as low heat as will answer,

and will have the steel harden. The degree of heat varies considerably with different kinds of steel. The temper can best be drawn by placing the articles in a tight oven kept at the required temperature, as by this method the operation may be carried on very slowly. After drawing the temper the work has to be straightened. This can be done by heating the drills up to nearly that point of drawing the temper which makes them about as pliable as annealed steel.

A Possible Large Demand for American Iron in China.

There are strong influences at work that are quite likely to lead the Chinese Government to begin the construction of an extensive system of railways with a view to provide for military exigencies as well as for commercial ends. It is reported that the plan for such a system of railroads has been so far advanced that already the Chinese are negotiating for the means in Europe for its execution, and with such a plethora of idle money as now exists it would seem that such a government as China should have no difficulty in placing a loan to be thus employed to ends that are creative and not destructive.

In that event, a demand for a vast quantity of iron and steel will be created which, with proper management, might be turned to the material advantage of the American iron and steel industry. We certainly should be able to compete favorably with Europe in a very great deal of the material and appliances used in the building of Chinese railroads. Every exertion should be made in this country to win a liberal share of the industrial advantages to the West that are sure to be the result of an extensive construction of railroads in China.

The *Railway Register* is quite sure that most of the railway construction of the next ten years is to be in China. The rulers of that ancient nation, for a long time supposed to be in its dotage, have determined that it shall be supplied with modern transportation facilities.

Our iron men are not indifferent to the possibility of this trade. Gen. Wilson was recently sent to China as the accredited agent of an alleged syndicate for constructing Chinese railroads. Should he offer better terms than the English and German syndicates, that are known to be competing for Chinese favor, we shall obtain a new opening, not only for the investment of American capital, but also for American iron and steel rails, and American locomotives, along with employment of American engineers, and whatever other material and personnel may be requisite for providing "cheap John" with all the railway facilities he may desire—to say nothing of watered stocks, of which, no doubt he will get a plentiful supply in due time.

A MECHANICAL STRIKER.—A colored man, Minnis Haden, of Montgomery, Va., has invented a mechanical striker which is worked by foot while the smith has both his hands free to hold his iron and use the small hammer. To a listener, it is said, the blows come as naturally and as rapidly as if there were two men handling the hammers in the old-fashioned way. The machine, by an easy motion of the foot on the treadle, strikes a harder blow than any man can strike, and can be made at will to strike as light a blow as may be needed. The device can also be used in driving a drill for blasting purposes at any desired angle. The machine is said to be cheap, profitable and not heavy.

TEMPERING SPRINGS.—A correspondent of the *Blacksmith and Wheelwright* says: "My way of tempering springs for use above or below water is as follows: I first forge from good cast-steel, hammering edgewise as little as possible, and then heat evenly in a charcoal fire. I do not blow the bellows, but simply lay the spring in the fire and let it come to a cherry red. I next dip it in pure lard oil, then take it out and hold it over the fire while the oil flares all over the spring. I then lay it in the dust on the forge and let it remain there until it is cold. Then the job is done. Springs should never be filed crosswise, but should be always filed lengthwise for a finish.

TO TEMPER COLD CHISELS, TAPS, ETC.—When tempering cold chisels or any other steel articles, heat to a very dull red and rub with a piece of hard soap; then finish heating, and harden in clear, cool water. The potash of the soap prevents the oxygen of the atmosphere from uniting with the steel and forming rust or black oxide of iron. The article will need no polishing to enable the colors to be seen. This will be appreciated when tempering taps, dies or very complex forms not easy to polish. Never "upset" a cold chisel. It is sure death to the steel.

EFFECT OF CONTINUOUS HEAT ON CAST IRON. M. L. Forquignon, in the *Comptes Rendus*, states that from experiments on heating cast-iron in vacuum to a temperature of from 900 C. to 1000 C. for several days without melting, he finds that metal becomes malleable and its surface uniformly black, and dotted with black grains of amorphous graphite, the formation of carburet of iron or plumbago being a function of the temperature.

FARADAY proved the magnetic condition of all matter, and that magnetism, unlike electricity, cannot be insulated.

SCIENTIFIC PROGRESS.

The Late Flood-Rock Explosion.

Elaborate preparations were made at various points within a range of about 200 miles of New York to detect and record any tremors of the Flood Rock explosion which might reach their respective stations. Seventeen parties were thus stationed. Of this number about one-half seems to have given up watching after eight or ten minutes past the time set for the explosion arrived. The task of watching their instruments was too great for the majority of the observers, although this delay did not exceed thirteen minutes, and much valuable information was thereby lost to the world. The instruments were very delicate, and capable of exhibiting the slightest undulation which might reach the same. The observations were expected to be of much value in the study of the force, speed and extent of earthquake disturbances. It appears that the disturbances were quite extensive for one whose initial point was so near the surface. One of the most interesting reports was made by Prof. W. A. Rogers, at Harvard College, Cambridge, Mass. This report was read at the meeting of the American Society of Arts, held at Boston, Oct. 10th, and given in *Science* as follows:

Professor Rogers stated that at 11:17:30 by the chronometer a very decided commotion of the surface of the mercury was observed. About 15 seconds later the rumble of an ice-wagon was heard at a distance of 1000 or 1300 feet from the observatory. From this instant the effects of the disturbances by the wagon and of the explosion were combined, but the disturbance waves from the latter cause were so greatly magnified beyond anything he had ever before observed that he thinks there can be no reasonable doubt of their reality as the result of the explosion. A second and still more violent commotion was observed 10 or 15 seconds later, and a third even greater disturbance occurred about the same length of time following the second. At 11:18:15 A. M., the entire surface of the mercury under the objective appeared to sway back and forth over a space certainly as great as one five-hundredth of an inch. This action continued eight or ten seconds, and at the end of about twenty seconds there was almost an entire subsidence of the commotion. From this instant the recurring disturbances gradually diminished, and at 11:20 A. M. they had entirely ceased. At this time the ice-wagon was directly opposite the observatory.

The waves of disturbance certainly increased in amplitude until 11:18:15 A. M., and gradually diminished after that time. The intervals between the waves appeared to be about 15 seconds, but attention was not withdrawn to the chronometer to be accurate as to this. Prof. Rogers is not quite certain whether there were three or four waves preceding the one having the greatest amplitude. The direction of the waves as indicated by the movement of the spot reflected on the mercury surface, was certainly not due east and west, but rather about 15 degrees from the north and south line; that is, north of east and south of west. On the following day, by arrangement with the driver, an ice wagon was started from about opposite the observatory, to be driven rapidly away. Under these circumstances, only a very slight tremor of the mercury surface was visible, while the cart was traversing a distance of about 750 feet, after which the tremor ceased. The readings of the chronometer were corrected to given Eastern time, as above stated.

Modern Discoveries in Science.

Prof. G. C. Stokes, Secretary of the Royal Society of England, recently delivered a very interesting address before that body, in which he gave an interesting account of the progress of physical science during the past quarter of a century, and in reviewing the results, especially noted that as scientific truth developed, so had men to give up the idea that there was any opposition between the Book of Nature and the Book of Revelation.

He remarked that for the last twenty years or so, one of the most striking advances in science had been made in the application of the spectroscopic, and in the information obtained with regard to the constitution of the heavenly bodies. The discovery that there were in such bodies the particular chemical elements, which were also present in our earth, exalted our idea of the universality of the laws of nature, and there was nothing in that contrary to what he had learned from Revelation.

Entering with some particularity into the composition of the sun, the professor said this gave an idea of an enormous temperature, since iron existed there in the form of vapor. This was wholly inconsistent with the possibility of the existence there of living beings, at all approaching in character the inhabitants of the earth. Are we then to regard this as a waste of material? Might we not rather argue that as in animals, we ascend by greater specialization, some could consider the differentiation of office in different members of the solar system as marks of superiority, and could regard the sun as performing most important functions for that system? In fact, all life on our earth was ultimately derived from solar heat. Referring to the doctrines of conservation of energy and dissipation of energy, he pointed out, at a

length, how the sun, so far as we could see, was not calculated for an eternal duration in the same state, and performing the same functions as now. We must regard the universe on a grand scale, and then there was progress. If we contemplated nothing but periodicity, perhaps we might rest content, and think things would go on forever as at present.

HUMAN ELECTROTYPES.—M. Kergovatz, a chemist of Brest, has proposed a new method of disposing of the human body after death, which he considers preferable in every way to either burial or cremation. His system is an antiseptic one, much simpler and less expensive than the old process of embalming, and is nothing more than a new galvanoplastic application. The body is coated with a conducting substance, such as plumbago, or is bathed with a solution of nitrate of silver, and after decomposition of which, under the influence of sunlight, leaves a finely divided deposit of metallic silver. It is then placed in a bath of copper sulphate, and connected for electrolysis with several cells of a gravity or other battery of constant current. This result is that the body is incased in a skin of copper, which prevents further change or chemical action. If desired, this may be again plated with gold or silver, according to the taste or wealth of the friends of the dead. M. Kergovatz has employed the process eleven times on human subjects, and on many animals, and states that in all cases it was perfectly satisfactory. In spite, however, of his warm recommendation, this idea is repulsive. It seems a mockery to give permanence to the temple where all that once made it valuable is gone.

ARCTIC EXPLORATIONS.—There can be but one opinion among men of science in regard to a certain sort of arctic expedition. A vague "patriotic" impulse to plant the flag of any given country at the pole, taken by itself, is no more entitled to respect than is the motive which prompted the wanderings of "Sergeant Batee" over regions generally accessible. An expedition fitted out for mere glory, without any definite scientific object or well-matured and clearly understood plan officered by men whose courage, enthusiasm and inexperience are their only qualifications, is in no respect to be commended. Such expeditions have had their share of the glory they sought, and have contributed an enormous proportion to the total of arctic disaster. It is to be hoped that there will be no more of them, in spite of the fact that they have also contributed something to the common stock of knowledge. Scientific exploration of the arctic regions will go on. Like other undertakings which depend for the stimulus of war upon national or individual interest and liberality, it will have its periods of activity and inaction. But that the crown of the sphere shall be left to solitude and the auroras, while science with her questions and man with his ambitions coexist upon this planet, is a proposition requiring no refutation.—*Science*.

WHAT AN EDUCATED MAN OUGHT TO KNOW.—According to Ruskin, an educated man ought to know these things: First, where he is—that is to say, what sort of a world he has got into, how large it is, what kind of creatures live in it? Secondly, where is he going—that is to say, what chance or reports are there of any other world besides this, and what seems to be the nature of that world? Thirdly, what had he best do in the circumstances—that is to say, what kind of faculties he possesses, what are the present state and wants of mankind, what is his place in society, and what are the readiest means in his power of obtaining happiness and diffusing it? The man who knows these things, and who has his will so subdued in the learning of them that he is willing to do what he knows he ought, is an educated man; and the man who knows them but is uneducated, though he could talk all the tongues of Babel.

THE MAGNESIUM LIGHT.—Magnesium, says *Nature*, which has more than once been abandoned as a source of light, appears about to be employed again. A Mr. Graetz has succeeded in producing pure magnesium by electrolysis, and at a price much less than that at which it has hitherto been sold. So there are serious thoughts of using it for lighting purposes. The Bremen aluminum and magnesium factory that is working the Graetz process has just offered two prizes for magnesium lamps with clockwork movement; \$125 and \$50 will be awarded to the constructor whose lamp shall be adjudged the best and most practical. The Bremen manufactory reserves to itself the right of working the two systems that are rewarded.

SOME CURIOUS HAILSTONES.—A Minnesota correspondent of the *Scientific American* writes of a hail storm experienced over a narrow district of that State, on September 14th, where the hailstones falling reached a size of 9 to 11 inches in circumference. On being broken open, the interior was like frozen snow, but surrounded by different rings of clear ice, as though they had, in formation, been suspended some time in the upper air, and during this period had passed through clouds of greatly varying temperature.

AN AMALGAM FOR ELECTRIC MACHINES.—Equal parts of zinc and tin filing mixed with sufficient mercury to form a thick paste, and pulverized when they are partly hardened, make an excellent amalgam for electric machines.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... .2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 14, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Concrete Construction; Not Wasted, 321. Passing Events; Utilizing Electricity; Blasting Appliances; Patents Electricity and Amalgamation, 324. New Smelting Furnace; The Huntington & Koch Process, 325.

ILLUSTRATIONS.—Isometric View of Concrete Building in Course of Construction, 321. The Huntington & Koch Amalgamator, 325.

CORRESPONDENCE.—The Cœur D'Alene Mines; Cobalt and Nickel Mines, 322.

MECHANICAL PROGRESS.—Bending Cast-Iron; Tempering Brass; Tempering Frost Drills; A Possible Large Demand for American Iron in China; A Mechanical Striker; Tempering Springs; To Temper Cold Chisels, Taps, etc.; Effect of Continuous Heat on Cast-Iron, 323.

SCIENTIFIC PROGRESS.—The Late Flood Rock Explosion; Modern Discoveries in Science; Human Electrocutes; Arctic Explorations; What an Educated Man Ought to Know; The Magnesium Light; Some Curious Halitones; An Amalgam for Electric Machines, 323.

ENGINEERING NOTES.—American and English Bridges; A Novel Steamboat; The Largest Sewer in the World, 327.

USEFUL INFORMATION.—The Ocean Fleet of the World; Photography Then and Now; Shaving Recipes; Walnut Hair Dye; Carbolic Acid in Paste and Glue; Non-Poisonous Vegetable Fly Paper; Test for Watered Milk; To Remove Iron Stains from Marble; Mummy Wheat; Variety in Stoves; Cutting India-rubber; Lawn Mowers, 327.

GOOD HEALTH.—Scep Mechanically Considered; It Pays Doctors to Cure; A Mustard Sponge; Inoculation for Hydrophobia, 327.

MISCELLANEOUS.—The Original Discovery of Gold in California, 322. Practical Hydraulics, 323.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 323-29.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 332.

Business Announcements.

Prof. S. North's Earphone—S. F.
Quartz Mines—Almarin B. Paul, S. F.
See Advertising Columns.

Passing Events.

The recent heavy rains all over the coast have, of course, raised the rivers and streams, and filled the ditches, etc. The influence of a good water season is not now so much noticed as in the days when hydraulic mining was permitted.

They have made ten-hour shifts the rule in the Con. Virginia and California mines, on the Comstock, an example set some months since by the leasers; but this is the first time the mine managers have done such a thing. Lack of good ore is given as a reason. The eight-hour shift has been so long a custom on the Comstock that this innovation will scarcely be regarded favorably by miners.

The talk of the hour is the success attained in a number of towns on this coast in getting rid of the Chinese within their limits, by simply giving them notice to leave at a certain date. The President has issued a proclamation concerning the Seattle affair, and United States troops have been placed in readiness to prevent violence. The Chinese thus driven out are mostly coming to this city.

SEVERAL shipments of bullion were made from the Bernice, Nevada, mines during October, aggregating \$9000. The mill is at present running on ore from several mines, which are under the management of G. W. Bothwell.

Utilizing Electricity.

There is a constant tendency to press electricity into service in all directions, and in many cases successful results have been accomplished. It is possible, however, to overdo this. There is something mysterious to most people about electrical action, and in the hands of the charlatan it is an agent which is useful to mystify his dupes. It is so easy to explain results as due to electricity. People do not like to confess their ignorance of electrical action, and take for granted a great deal that is told them concerning its wonders.

Miners and metallurgists are utilizing the agent in many ways already. The miner uses it for firing shots, lighting, transmission of power, underground railways, signaling, etc., while the metallurgist uses it in assaying, in the electrolytic separation of metals, in precipitating fumes from furnaces, in amalgamating, etc.

We have of late described the use of electricity in the Wiswell process for working ores, and in preparing electric amalgam for milling purposes. In another column of this number of the PRESS is a description of Barker's method of utilizing electricity for keeping the pulp agitated while amalgamation is going on. In the Cassell process electricity is called in to assist the metallurgist in another way. A current from a dynamo is made to pass through the finely pulverized ore and salt water revolving in a drum. Chlorine is liberated, and attacking the gold, converts it into the soluble terchloride; this passes through an asbestos cloth filter, and, on reaching the negative pole, the solution is decomposed and the gold deposited in the form of a black powder. The addition of lime prevents iron and other metals from passing into solution. This ingenious invention cannot be said to have gone beyond the experimental stage, and it remains for actual practice, on a large scale, to decide how far it will prove capable of treating refractory gold ores with profit.

It will be seen from these few examples that electricity is being utilized by the mining community, though a good deal of it is yet in the experimental stage. It will not do, however, because one is told that there is "electricity," to believe it is going to cure all the evils and revolutionize everything.

Blasting Appliances.

A good many systems have been tried to avoid the dangers from explosions from fire-damp while blasting in coal mines. Some try to get rid of the flame of powder by a water cartridge inserted upon it, whilst Mr. Clark, with the same object, surrounds the explosive by a compound containing carbonate of soda and other chemicals. Compressed lime cartridges have, in some kinds of coal, proved an efficient, and, of course, safe, substitute for gunpowder, and mechanical appliances may also be used. Another plan is an apparatus like the plug and feathers, except that the two parts corresponding to the feathers are forced open by two wedges drawn together by a right and left-hand screw, instead of by one wedge driven in by a sledge.

In the mining and metallurgical department of the recent Novelties Exhibition in England, there was exhibited a new instantaneous fuse and igniter, the object of which is to fire several holes simultaneously, a matter of importance in blasting out a large central core, when driving a level or sinking a shaft. Hitherto this has been done by electricity, but the new fuse enables the miner to attain his purpose without such aid. The igniter is a tin cylinder, from which proceed, like the arms of an octopus, small lengths of a special kind of fuse which burns instantaneously. One of these is inserted into each hole, and a piece of ordinary fuse serves to convey fire to the igniter. After lighting the ordinary fuse, the miners have plenty of time to retire, and when the fire reaches the igniter it flashes down in an instant to each of the separate charges, and they explode simultaneously, doing more work than if they had been exploded singly.

Another new thing exhibited there, was an ingenious blasting plug to take the place of tamping. It is a hollow cylinder of thick india-rubber, which is placed in the bore-hole after the powder, and swells out when a conical brass plug is screwed into it. As the progress of

tamping is the most dangerous operation in blasting, any attempts to avert the risk overhanging the miner must be welcomed; but it is a question to be decided by practice whether such plugs will last long enough to make them economically available. It will take time to find the plug after a blast, but, on the other hand, no time is taken up in tamping.

Patents.

The Patent Department of the United States is a source of profit, inventors really paying in more than the Government pays out to run the Department. The total receipts last year were \$1,075,798.80, and the expenditures \$970,579.76, leaving a balance of \$155,219.04. There were 35,600 applications for patents, and 20,297 granted and issued. During the year 12,301 patents expired.

It will be interesting to note how many patents were issued by residents of this coast, and the proportion of patents to population. We have compiled the following table to show these results last year:

	Patents and Designs	One to every
Arizona.....	9	4,493
California.....	514	1,682
Colorado.....	110	1,766
Idaho.....	4	8,152
Montana.....	10	3,915
Nevada.....	17	3,602
New Mexico.....	6	19,927
Oregon.....	42	4,161
Utah.....	24	5,395
Washington Territory.....	23	3,265

It will be seen by this that California is a State where the proportion of inventors is large. She is beaten in this respect by very few States. Connecticut last year had one patent for every 694 people in the State; District of Columbia, one for each 558; Massachusetts, one for every 930; New Jersey, one in every 1,184; New York, one in every 1295; Rhode Island, one in every 909, and these are all the States that lead California in this respect.

The 514 patents granted to inventors in this State do not by any means represent the business of California with the Patent Department. There are reissues, trademarks, labels, etc., and more or less miscellaneous business. Moreover the bulk of the patent business of Arizona, Idaho, Montana, Nevada, Oregon, Utah, and Washington is done by San Francisco agents. It is for this reason that the Mining and Scientific Press Patent Agency of Dewey & Co. has been enabled to take the position it has. Being the oldest patent agency here, it has a clientele all over the coast, and attends to the largest proportion of the patent business here. With experienced specification writers and draughtsmen, complete and full records, works of reference, full sets of specifications and drawings of all patents issued, the agency is enabled to conduct the business of inventors in a most satisfactory manner.

When people are applying for patents they should go to a reliable agency of established reputation, where they will be able to consult the records and see for themselves how they stand. There is nothing gained by employing people who profess to be able to get a patent for a few dollars less than others in the business who have all the facilities. Respectable agents make no over-charges, but attend to the clients' business promptly and with intelligence. A little sensible advice from men of experience on patent matters can often save many dollars to inventors. The patent business on this coast has grown to large dimensions, and, as we have shown, the proportion of inventors to the population in this State is very large, and creditable to the future of our industrial advancement.

ABANDONMENT.—The failure to perform the amount of work on a mining claim required by the local mining laws or regulations established and in force in the district where the claim is located, amounts to an abandonment of the claim, and thereupon it may be occupied and appropriated by another. Not to work a mining claim may be a circumstance of some weight, tending to show abandonment; and this abandonment of a claim, resting for validity only upon possession, may be sufficient to defeat the title.

The necessary legal papers for the princely endowment to be made by Senator Stanford for the establishment of a great university at Palo Alto, and the deeding of his ranches in the southern part of the State for the support of the institution have been engrossed and signed. All the details of the gift will shortly be made public.

Electricity and Amalgamation.

Some little time since, some experiments were made in Hungary with a system invented in London, which permits of direct amalgamation by means of electricity, so that gold, silver and copper can be recovered from low-grade ore in a simple way. This plan was found to be a little better than the Desnolles system, at that time in use. The trials were made in this presence of many engineers and experts, and it was found that only two per cent of gold was left in the tailings. The principle was shown in London, also. There clear mercury was put in a china bowl with a lot of oil, and the whole heated until a kind of ointment resulted, and a piece of gold put in, which the mercury, of course, would not touch. The bowl was then filled with water, and the negative wire from a battery was plunged in the mercury and oil, while the positive wire was put in the water. As soon as contact was made the oil began to rise, and in a short time all collected on top of the water, leaving the mercury pure at the bottom.

The machine in which the use of electricity for amalgamating is used is called Barker's electro-amalgamator. It has been put in use in the Australian colonies, and, judging from the reports of the Government officials, seems to be successful there. It has even been put advantageously to work on tailings. It has been patented in this country.

The apparatus does its amalgamating by the combined use of electricity and mercury. A table is used, insulated or not, in which are two or more riffles or batbs containing mercury, at convenient distances from one another, and fitted with ordinary agitators. Over this apron or table the pulp is crushed in the ordinary method. A current of electricity is passed through the apparatus by one or more suitable conductors, in the following manner:

The negative pole (or cathode) of the battery is connected with the mercury in its riffles, and the positive pole (or anode) is introduced into the water immediately above the mercury and sufficiently close to it to cause an energetic action, the electric current being allowed to pass through the water by placing in it at convenient distances, plates or wires of copper, or other good conductors of electricity. The introduction of an electric current into the water, as specified, causes continual agitation of the auriferous material and sand at the surface of the mercury, prevents it from "sickening" in the presence of arsenic, sulphur, oil or other known substances which are deleterious to the action of mercury in amalgamating, and also prevents titaniferous or titanic sand, or other heavy mineral deposits from remaining on the surface—that is to say, the surface of the mercury immediately under and around the copper plates, wires or the like are kept thoroughly bright and capable of amalgamating readily with the gold and silver despite the foreign substances. The conducting plates are made either stationary or movable, and attached to the riffles, taking care, however, that, if revolving or otherwise in motion, the plates or wires shall never come in contact with the mercury.

The machine which was tried before the Government mining officials at Melbourne consists of a common riffle-table, such as would ordinarily be placed next a battery of five bead stamps, the length and width being about the same as the tables now in use. The table has riffles and is covered with electro-plated copper plates, such as those now used on the ordinary riffle-tables. Across each riffle is a bar or band of carbon, which comes down to within a quarter of an inch or so of the surface of the quicksilver in the riffle. There are likewise sliding carbon bars, which, by a mechanical motion, are made to move up and down directly above the surface of the copper plates that are between each riffle, so as to touch the water that flows over the tables, but not to touch the surface of the plates. The negative wires from the battery are placed in the quicksilver and to the copper plate, while the wires from the positive pole are attached to the carbon bar or bands that are placed across the box, thus sending the current through the water into the quicksilver. The official who examined it mixed up some mercury with grease in a dish to test the effect that the electricity had upon it, and although the mercury was so sickened with the grease that it was perfectly useless for amalgamation, in a few minutes after the current was turned

on the effect produced was almost magical: the grease and impurities came boiling out of the mercury, and left it in a pure and bright condition.

New Smelting Furnace.

Three subjects of the Queen of Britain, residing at Melbourne, Victoria, have recently patented in this country a furnace for smelting and reducing metallic ores, especially those which form oxides or compounds that may be reduced by heated charcoal—such as ores of antimony, bismuth, copper, tin and zinc. It consists essentially in a furnace wherein there are a fire chamber, a fine and a reverberatory reducing hearth, and interposed and extending through said flue, but not in internal communication therewith, a series of smelting pots, chambers or crucibles, open at bottom over an independent hearth provided with a tap-hole, and an independent flue connection with the chimney, said crucibles being at top outside the furnaces and provided with a luting cover.

One part of the device shown in the patent drawings (relating to the production of oxides from sulphides, arsenides and other oxidizable ores) consists of a hearth on which the raw ore is treated. When the ore is easily fusible—such as sulphide of antimony—the method of treatment differs from that of ores not readily fused. In the case of sulphide of antimony, the hearths in use usually consist of a solid surface with a tap-hole in some convenient portion for drawing off the fused sulphide, which is then smelted in a crucible or furnace. The hearth is not solid, but has perforations through it which allow the fused sulphide to pass on to a solid bed underneath, when the sulphide is converted into oxide; or, if required for any purpose, may be drawn off as sulphide. When the ores do not fuse readily, the oxide may be formed in any of the ordinary ways now in use.

Another part of the device shows means whereby the oxides may be converted into metal, whether natural or artificial. This is accomplished by smelting them in a furnace so constructed that the draft is downward through the oxide in process of smelting and through the carbonaceous material used in such processes. The furnace is so arranged and constructed that the heat from one fire is utilized for roasting the ore, perfecting the oxidation and producing the metal from the oxide.

PLUMAS COUNTY NOTES.—At Quincy, Plumas county, one of our traveling correspondents finds that, as a rule, miners are not being very well rewarded for their perseverance. Many are still hopeful, however, as evidenced by Mr. J. B. Higgins, who owns the Michigan Hill claim with Mr. Robert Martin—both subscribers of the MINING AND SCIENTIFIC PRESS—who are making substantial preparations for next season's run. They are expending a considerable sum for iron piping for their claim. Our correspondent mentions a natural soda spring that is passed on the road from Crescent Mills, which produces a most excellent natural mineral water. There are others like it in the neighborhood. All the scenery from Crescent Mills to Quincy is well worth a tourist's trip, and at Quincy the Plumas house, our correspondent writes, furnishes accommodations second to none outside of San Francisco. He also sends us word that many kind inquiries are made regarding the publishers of this paper, who are well known wherever he has gone.

The Ontario stockholders are lucky individuals. The regular monthly dividend, No. 112, of 50 cents per share, has just been paid, and also an extra dividend of 50 cents, making a total of \$150,000. For several months past the output of this Utah mine has exceeded the expenses and the dividends, and this extra dividend is declared in order to dispose of part of the surplus on hand. With these two dividends the stockholders will have received a total of \$6,875,000.

A TABULAR statement of the net receipts on ore shipped by the Sierra Grande Mining Company from Lake Valley, N. M., within the year, taken from their annual report, shows that they shipped 16,287 tons of ore, receiving therefor \$523,500. There still remains on the dump 5000 tons of ore.

The Stetefeldt furnace at Bullionville, Nev., will be completed before very long.

The Huntingdon & Koch Process.

The Huntingdon & Koch machine is one intended for amalgamating roasted ore on the same principle as that known as the "Jourdau process." The ore is ground dry, in a bath machine, to a fine powder, and passed through a screen having about 2000 holes to the square inch. The dust is then forced up through a column of mercury in the following manner: There is a hollow tube which forms a vertical shaft having two short, hollow arms near the lower end, which revolves in a column of quicksilver about 18 inches in depth, at a speed of from 250 to 280 revolutions per minute. The arms at the lower end of hollow shaft have openings on the sides on the same principle as the primitive turbine wheel of the very old type. The

where ore passes through into mercury; *k*, vertical and horizontal screen to prevent the rotation of the amalgamating metal; *l*, slits in orifice *h*. The drawing shows a section through the center of the amalgamator.

Since writing the above we have seen in the London Mining World an account of trials with the Huntingdon & Koch process for treating pyrites, made at the metallurgical laboratory of King's College, in the presence of several gentlemen connected with the mining industries. The World says:

"This process, it is ascertained, has been successful in dealing with the ores of Australian mines, and notably with those of Victoria, where it has been pronounced in the Government Blue Book of 1885 'the best amalgamator ever seen in the Colonies, and the only amalgamator capable of treating tailings efficiently

through it was said to give up all the gold that could be amalgamated. No ocular demonstration of this assertion was forthcoming. This amalgamator, 15 inches in diameter and about three feet high, it was stated, will pass one and one-fourth tons per hour, together with the volume of water flowing from the stamps, without diminishing its amalgamating efficiency. One of 20 inches diameter will pass two and one-half tons, and so on, in proportion to their respective areas. With a reduced percentage of water the output of ore would, of course, be greater. The large quantity of ore which these amalgamators can treat is owing to the height and body of the column of mercury through which it passes, together with the principle of distribution employed. The 15-inch machine will take all the pulp from eight heads of stamps direct. The expenditure of power is about two-horse power per machine of this size. The action of the invention is automatic and continuous, one man being able to look after several machines. Another feature is said to be that there is no appreciable loss of mercury; the saving on this head, compared with other systems, alone represents a large revenue. The cost of a machine is about £300. It is put together with great simplicity, and there appears to be nothing about it that is likely to get out of order. The gold is extracted without any additional treatment—chemical, electrical or otherwise. Very little labor is required, and even that employed need only be of the most unskilled kind. The experiments at King's College on this occasion seemed to impress those who were present with the idea that by the Huntingdon & Koch patents a most important step in advance has now been taken; but, we repeat, no results have been announced, although promised—a circumstance which somewhat detracts from the glowing statements made about these processes."

TEN HOUR SHIFTS have been made the rule in the Con. Virginia and California mine, by the proprietary management working the lower levels conforming to what has been the rule in the Jones lease section for months past. The decrease in the quantity and quality of the ore is the cause assigned. In the old upper levels of the mine, under the Jones contract, 10-hour shifts have been the rule for months past. So also in the Gold Hill mines. In Sierra Nevada, Mexican, Union, Ophir, Best & Belcher and Gould & Curry eight-hour shifts rule. In the hot lower levels of the Hale & Norcross and Chollar the miners work six-hour shifts.

NORTH CAROLINA COPPER.—The copper mining interests of the counties of Ashe and Watauga, N. C., have not proved successful. After a loss of about \$1,500,000 at Ore Knob, Ashe county, work has been suspended. Other mines in the same county have likewise ceased to operate. The enterprise at Ore Knob was a joint stock company, owned principally in Baltimore and Philadelphia. The Elk Knob mine is in Watauga county, and has a capital stock of \$500,000, but the price of copper has been so reduced that it will not pay to work the mine, and operations have been suspended.

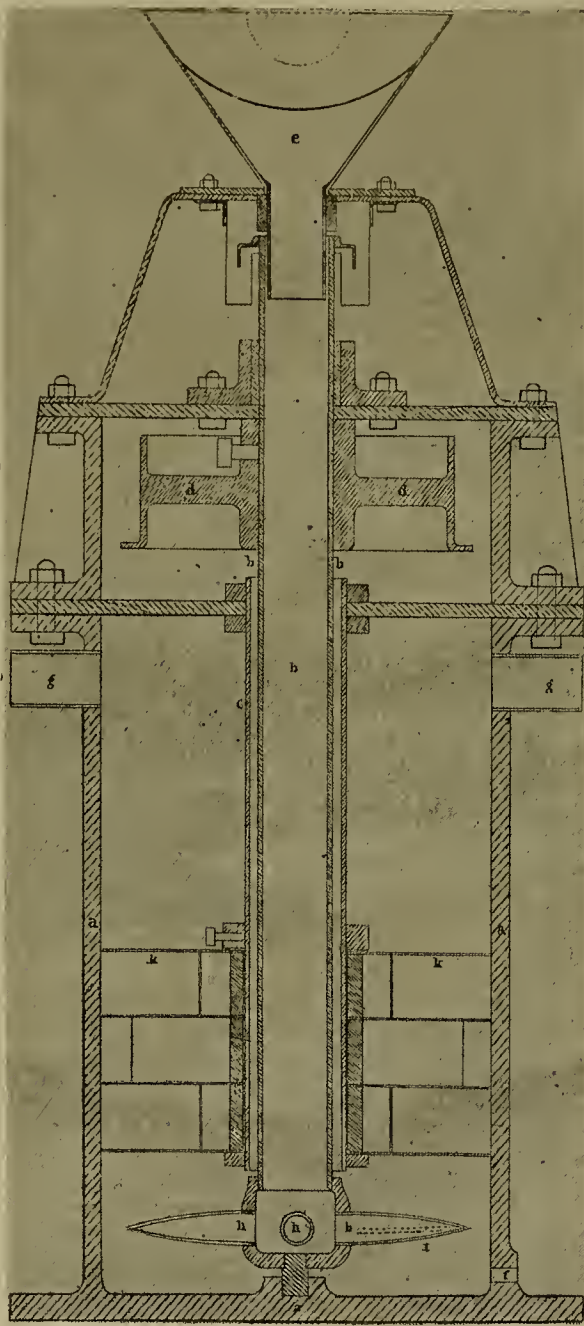
N. Y. ANTI-MONOPOLY LEAGUE.—A circular shows that this league is still active. It announces the following principles: "We advocate and will support and defend the rights of the many as against privileges for the few. Corporations, the creation of the State, shall be controlled by the State. Labor and capital— allies, not enemies, justice for both." Parties wishing information of this league should address William L. Snyder, Secretary, No. 150 Nassau street, New York.

As the coming winter will undoubtedly be an exceedingly hard one on Wood river, all who are out of employment and have no means of support would do well to seek work elsewhere. The mines have their winter forces on, and are not likely to employ any more men than at present until next spring.—Wood River Times.

A GENERAL convention of the Knights of Labor will be held in this city on the 30th inst. The circular calls for an anti-Chinese and anti-convict labor association by the representative assemblies of the Knights of Labor, trades and labor unions and Grangers' associations.

ABOUT thirty-five miles east of Chelatchie Prairie, on some of the headwaters of the Lewis river, north fork, a party of men are at work on a new mineral belt, which has never been found before this season, says the Vancouver Independent.

The Superintendent of the mint has received instructions from Washington to purchase, on Tuesday of each week, an amount not exceeding 50,000 ounces fine of crude or dore silver bullion for granulating purposes.



THE HUNTINGDON & KOCH AMALGAMATOR.

great velocity at which the shaft and arms revolve draws in the dust, which is fed through the hollow vertical shaft, and the quicksilver, having the greatest density, forces the lighter particles to the top, and retains the gold. Mr. Langtree in his report on Victorian mines, states that this machine has been publicly tested, and over 100 tons of ore put through in competition with the ordinary appliances, at Sandhurst. The results were, according to the nature of the ores, from 11.32 to 18.2 per cent more gold than from batteries, tables, riffles, blankets, etc.

The engraving on this page shows the machine: *a*, is a cast-iron basin filled with mercury; *b*, hollow shaft into which the ore passes from hopper; *c*, a stationary pipe or sleeve; *d*, driving pulley fixed on hollow shaft *b*; *e*, hopper in which ore is placed; *f*, outlet for drawing off mercury and amalgam; *g*, outlets at top of basin where tailings are discharged; *h*, orifice

and economically.' The report adds: 'With ore containing pyrites, a very large percentage of the gold therein is saved. In late workings, the pyrites in tailings showed there was not sufficient gold left to pay for treatment.' This merit of this process may be described in a word. Every particle of ore is brought into contact with the mercury, whereas by other processes much of it is allowed to escape. By the Huntingdon & Koch patents both pyrites and float gold ore can be successfully treated, and little water is required in the process. The advantage of this in remote regions, where it is difficult to obtain an adequate water-supply, must be apparent to all acquainted with even the rudiments of mining work.

"The experiments upon this occasion were conducted upon about half a cwt. of quartz, taken from Moodie's reef in the Transvaal Goldfields. The quartz had first been ground as finely as possible, and was then mixed with water, passed through a hopper, and brought into contact with mercury by means of a revolving tube worked by a pulley. The tube, it was seen, communicated with a cylinder at the bottom containing the mercury, and the ore rising

PRACTICAL HYDRAULICS.*

NUMBER 6.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]
[COPYRIGHTED.]

The equation of the parabola, in which x and y are co-ordinates, is:

$$y^2 = 2px; \text{ whence } y = (2p)^{\frac{1}{2}} x^{\frac{1}{2}}. \quad (64)$$

The equation of flow is:

$$dQ = c (2g)^{\frac{1}{2}} (2p)^{\frac{1}{2}} x^{\frac{1}{2}} dx. \quad (65)$$

Integrating (65) between limits $x=0$, and $x=h$; and substituting the values of $(2p)^{\frac{1}{2}} = \frac{b}{h^{\frac{1}{2}}}$, $(2g)^{\frac{1}{2}} = 8.025$.

$$Q = 4.0125 c b h^{\frac{3}{2}}. \quad (66)$$

Let $Q =$ the flow in weir represented by Fig. 12.

$$dQ = c (2g)^{\frac{1}{2}} (2p)^{\frac{1}{2}} h^{\frac{1}{2}} \left(1 - \frac{x}{h}\right)^{\frac{1}{2}} dx. \quad (67)$$

Integrating (67) between limits $x=0$, and $x=h$, and substituting the values of $(2p)^{\frac{1}{2}} = \frac{b}{h^{\frac{1}{2}}}$ and $(2g)^{\frac{1}{2}} = 8.025$,

$$Q = 3.1546 c b h^{\frac{3}{2}}. \quad (68)$$

Assume any ratio, n , to exist between the base b , and the height on head, h ,

$$\text{as } b = nh. \quad (69)$$

$$\text{Then } Q = 3.1549 n h^{\frac{5}{2}}. \quad (70)$$

This formula is adapted to the finding of the flow of water over both shallow and deep weirs. Thus by making n successively equal to 1, 2, 3, 4, 5, 6, 7, etc., the represented flow in (76) becomes correspondingly affected. To accomplish a similar result by the semi-circular weir, would be no easy task, requiring the employment of a very intricate and unwieldy formula or extensive table.

Making in Eq. 70, $n=2$, there results:

$$Q = 6.3092 ch^{\frac{5}{2}}. \quad (71)$$

In this case, $b=2h$, and hence:

Comparing equations (71) and (35), and making $c=.616$,

$$Q = 1.4734 Q. \quad (72)$$

TO FIND, BY TABLE 4, THE FLOW OF WATER OVER A PARABOLIC WEIR, WITH AN OPEN TOP—THE WIDTH BEING EQUAL TO TWICE THE DEPTH OR HEAD.

Rule 21.—Multiply the flow in Table 4 for the head or depth, equal the given head, by 1.4734. See formula (72).

Ex. 32.—In a parabolic weir, with open top, the head is 11 inches, and the width 22 inches. What is the discharge of water through it in cubic feet per second?

Cal. by Table 4—Flow corresponding to head of 11 inches, 2.1696 cubic feet.

Then by Rule 21:

$$2.1696 \times 1.4734 = 3.1967 \text{ cubic feet.—Ans.}$$

COMPARING EQUATIONS (70) AND (35), AND MAKING $C=.616$,

$$Q = .73705 Qn. \quad (73)$$

To find by Table 4 the flow of water over a parabolic weir, with open top—the width being a given number, n times, the head or depth.

Rule 22.—Multiply the flow in Table 4, for the head on depth, equal to the given head, by .73705 times the ratio between the given head and width. See formula (73).

Ex. 33.—In an open parabolic weir, the head being 10 inches, and the width 50 inches—that is, 5 times 10 inches ($n=5$), required the cubic feet flow per second.

Cal.—By Table 4, flow due 10 inches, 1.6713.

By Rule 22.— $1.6713 \times .73705 \times 5 = 6.1592$ cubic feet.—Ans.

Comparing Equations (66) and (35), making $b=nh$, as in (69), and $c=.616$,

$$Q = 9375 Qn. \quad (74)$$

TO FIND THE FLOW OF WATER THROUGH A PARABOLIC WEIR, WHOSE APEX, A, FIG. 11, IS AT THE LEVEL OF STILL WATER.

Rule 23.—Multiply the flow in Table 4, due the head or depth equal to the given head, by .9375 times the ratio, n , between the given head and width.

Ex. 34.—In a parabolic opening or weir, whose apex reaches the surface of still water, the head or depth being 23 inches, and the width 230. inches—that is, 10 times 23 inches ($n=10$), required the flow in cubic feet per second.

Cal.—By Table 4, flow due 23 inches, 13.4089.

By Rule 23, $13.4089 \times .9375 \times 10 = 125.71$ cubic feet.—Ans.

FLOW OF WATER THROUGH A SUBMERGED TRIANGULAR OPENING, HAVING ITS VERTEX BELOW THE BASE.

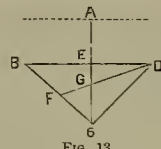


FIG. 13.

Let, in Fig. 13, BCD represent the opening, in which $b=BD$, the width at top; $h=AE$, head on the top of orifice; $h_1=AC$, head on its bottom; c =coefficient of discharge; $(2g)^{\frac{1}{2}}$ =acceleration of gravity; Q =discharge in cubic feet per second; x =any part of EC, estimated from E; $a=EC$, depth of opening.

$$\text{Then } dQ = c (2g)^{\frac{1}{2}} (h+x)^{\frac{1}{2}} \left(\frac{a-x}{a}\right) dx. \quad (75)$$

Integrating (75) between the limits $x=0$, and $x=h_1-h$,

$$Q = \frac{2c(2g)^{\frac{1}{2}} b}{a} \left\{ \frac{2h^{\frac{5}{2}}}{15} - \left(\frac{h_1}{3} - \frac{h}{5}\right) h^{\frac{3}{2}} \right\} \quad (76)$$

If in (76), we make $h=0$, and $b=2a$, there results:

$$Q = \frac{8}{15} c (2g)^{\frac{1}{2}} h_1^{\frac{5}{2}} \quad (77)$$

Equation (77), derived from the general equation (76), is seen to be identical with equation (35), for the flow of water over a quadrantal weir.

In equation (76), denote the ratio between the head on the bottom and the head on the top of the triangular opening by m ; thus $\frac{h}{h_1} = m$, and substitute the value of $(2g)^{\frac{1}{2}} = 8.025$.

$$Q = 16.05 \frac{cb}{a} \left\{ \frac{2}{15} - \left(\frac{1}{3} - \frac{m}{5}\right) m^{\frac{3}{2}} \right\} h_1^{\frac{5}{2}}. \quad (78)$$

TO FIND THE FLOW OF WATER THROUGH A SUBMERGED TRIANGULAR ORIFICE, HAVING ITS VERTEX ABOVE THE BASE.

Rule 24.—From $\frac{1}{3}$, subtract $\frac{1}{5}$ of the ratio of the given heads or the bottom and top of the orifice, and multiply this difference by the cube of the square root of the same ratio; subtract the product from $\frac{2}{15}$; multiply the remainder by 16.05 times the product of the ratio between the depth and width of the orifice, the fifth power of the square root of the head on the bottom, and the coefficient of discharge.

Ex. 35.—In a submerged triangular orifice, represented by Fig. 13, the head, AC, on the bottom= $h_1=2.25$ feet; the head, AE, on the top= $h=1$ foot; the width, BD= $b=5$ feet; the depth EC= $a=1.25$ feet; and the coefficient of discharge, $c=.616$. What is the flow in cubic feet per second?

Cal. 1st.—By formula (78) and Rule 24, derived therefrom:

$$\text{Ratio of heads, } \frac{h}{h_1} = m = \frac{1}{2.25} = \frac{4}{9};$$

$$\text{Difference } \left(\frac{1}{3} - \frac{m}{5}\right) = \frac{11}{45};$$

$$\text{Cube of square root of ratio, } m^{\frac{3}{2}} = \left(\frac{4}{9}\right)^{\frac{3}{2}} = \frac{8}{27};$$

Product of this difference, and the cube of the square root of the ratio of the given heads,

$$\frac{11}{45} \times \frac{8}{27} = \frac{88}{1215};$$

$$\text{Difference, } \frac{2}{15} - \frac{88}{1215} = \frac{74}{1215};$$

$$Q = 16.05 \times .616 \times \frac{5}{1.25} \times \frac{74}{1215} \times \frac{243}{32} = 18.29 \text{ cubic feet.—Ans.}$$

Cal. 2d.—Assuming that the effective head is the mean of the given heads on the top and bottom of the

orifice, then will the velocity be as per equation (25) or Rule (8)?

$$v = 616 \times 8.025 \left(\frac{h_1+h}{2}\right)^{\frac{1}{2}} = \left(\frac{2.25+1}{2}\right)^{\frac{1}{2}} = 6.3 \text{ feet per second.}$$

Area orifice= $5 \times 1.25 \div 2 = 3.125$ square feet.

Discharge equal to the product of the velocity and the area of the orifice, $Q = 6.3 \times 3.125 = 19.69$ cubic feet per second.

Cal. 3.—Assume that the true head is on the center of gravity of the opening geometrically considered. In a triangle, the center of gravity is at the intersection of right lines drawn from any two angles and bisecting the opposite sides. Its distance, estimated from an angle, is equal to two-thirds the length of the bisecting line; or estimated from the middle of a side, is equal to one-third the length of the bisecting line.

$$\text{In Fig. 13, } AG = h = h_1 = \frac{a}{3} = 1 + \frac{1.25}{3} = 1.4167.$$

By formula (13), modified by coefficient $v=.616=8.025 (1.4167)^{\frac{1}{2}} = 5.8836$ feet per second, area of orifice, $5 \times 1.25 \div 2 = 3.125$ square feet.

Discharge equal to the product of the velocity and the area of orifice, $Q = 5.8836 \times 3.125 = 18.39$ cubic feet per second.

Comparing these results, it is seen that the second is seven and six-tenths per cent (.076) too great, and the third fifty-four one hundredth of one per cent (.0054) too great.

The rule generally adapted is, that "in all cases when the centre of gravity of an orifice lies at least as deep below the fluid surface as the figure is high," the depth h_1 (that is, the depth at the centre of gravity), of this point may be regarded the head of water. This rule may approximate the truth sufficiently close for ordinary practice, but is not to be employed when a high degree of accuracy is required.

FLOW OF WATER THROUGH A SUBMERGED TRIANGULAR ORIFICE HAVING ITS VERTEX ABOVE THE BASE.

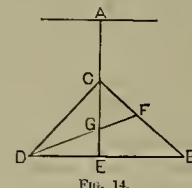


FIG. 14.

Let, in Fig. 14, BCD represent the opening, in which $b=BD$, the width at bottom; $h=AC$, head or vertex; $h_1=AE$, head on bottom; $a=EC$, depth of opening; $(2g)^{\frac{1}{2}}$ =acceleration of gravity; c =coefficient of discharge; Q =flow in cubic feet per second; x =any part of $a=EC$, estimated from C:

$$\text{Then } dQ = c \frac{(2g)^{\frac{1}{2}} b}{a} (h+x)^{\frac{1}{2}} x dx. \quad (79)$$

Integrating (79) between the limits $x=0$, and $x=a=h_1-h$,

$$Q = \frac{2c(2g)^{\frac{1}{2}} b}{a} \left\{ \frac{2h^{\frac{5}{2}}}{15} + \left(\frac{h_1}{5} - \frac{h}{3}\right) h^{\frac{3}{2}} \right\} \quad (80)$$

Denote the ratio between the head on the bottom and that on the vertex by m .

$$m = \frac{h}{h_1}; \quad h = mh_1.$$

Substitute the value of h in (80), and the value of $(2g)^{\frac{1}{2}} = 8.025$.

$$Q = 16.05 cb \left\{ \frac{2m^{\frac{5}{2}}}{15} + \left(\frac{1}{5} - \frac{m}{3}\right) m^{\frac{3}{2}} \right\} h_1^{\frac{5}{2}}. \quad (81)$$

If in the general equation (80), we make $h=0$, and $b=2a$, there results:

$$Q = \frac{4}{5} c (2g)^{\frac{1}{2}} h_1^{\frac{5}{2}}, \quad (82)$$

which is identical with formula (48) for the flow of water through a quadrantal weir having its apex at the water's surface.

To find the flow of water through a submerged triangular orifice having its vertex above the base.

Rule 25. From $\frac{1}{5}$ subtract $\frac{1}{3}$ of the ratio of the head on the bottom to that on the apex of the orifice; add this difference to the $\frac{2}{15}$ part of the fifth power of the square root of the same ratio; multiply this sum by 16.05 times the product of the ratio between the depth and width of the orifice, and the fifth power of

ENGINEERING NOTES.

American and English Bridges.

A very pretty fight is in progress in Japan over the question of American vs. English bridges. Early in the year Prof. J. A. Waddell of the University of Tokio published an elaborate work in two volumes for the purpose of pointing out to the civil and mechanical engineers of Japan the superiority of American to English types of bridges, and the mistake of the Japanese in following the practice of the latter. On account of defects which the author points out in detail the author concludes that "the trouble with English bridges, and, consequently, with those of this country (Japan), is that they are designed by railroad engineers, who have not made a special study of bridge designing, and are therefore incompetent to do the work intrusted to them." On the other hand, the author points out in detail his reasons for the assertion: "That the United States leads the world in bridge building is a fact undisputed even in Europe." Prof. Waddell's hook set several British engineers to writing letters to the *Japan Mail*, in which the statement that American engineers now lead the world in designing bridges work is called in question. Prof. Waddell replies in a very pungent letter, and taking up his opponents' arguments answers them in detail. He remarks that actual inspection of English bridge work in Japan shows a quality of workmanship that is even worse than the cheapest highway bridges of America; one case mentioned, a railway bridge, has its bottom chords so warped that "the floor beams bear on both sides of the same," shims of $\frac{1}{2}$ and $\frac{1}{4}$ inch iron are freely used, and there are open joints in the top chord that paint will not hide.—*Age of Steel*.

A NOVEL STEAMBOAT.—A steamboat of novel construction has recently been designed and built by Mr. Emil Adam, of Prague, Austria, and with which astonishing results were obtained. The inventor set out to reduce the resistance of the water as much as possible, and for this purpose constructed the hull of his vessel of two hollow cylinders, which are tapered from the middle toward both ends, whereby a shape resembling that of a cigar was obtained. Each cylinder is provided on its outer surfaces with a screw thread, formed of metal plates riveted on the cylinder, this line of inclination of the thread being about 45° to the longitudinal axis of the cylinder. Annular recesses or breaks are formed in the cylinders at suitable intervals for the bearings supporting the frame of the vessel. The cylinders are rotated by a suitable engine, of any desired construction, on the deck or platform of the vessel. The water in which the cylinders revolve acts as a nut for the screw threads, whereby a rapid motion in either direction is obtained; especially as the frame, decks, etc., are entirely above the surface of the water, and thus offer little or no resistance.

THE LARGEST SEWER IN THE WORLD.—There is being built in Washington City a sewer which is larger by seven feet than any other sewer in the world. Its smallest part is larger than the largest of the sewers in Paris. For over 2000 feet it is a circular sewer of 22 feet in diameter. There is connected with it a sewer 5000 feet, or nearly one mile in length, of 20 feet in diameter. A fully equipped palace car, locomotive and all, could be run through it without difficulty. This enormous sewer is intended to drain the immense watershed lying to the north of the city. Besides that it will carry to the eastern branch of the Potomac all the contents of the smaller system of sewers in the northern part of the city. It will take probably a year to complete the work. The Boundary street sewer, with its connecting systems, will cost when completed over \$700,000. At present the excavation is made by machinery operated by steam-power, which lifts the dirt out and lands it on the completed part of the work by means of a system of cables. The same cables also are used in lowering the bricks and cement to the workmen.

The last spike on the Canadian Pacific Railway was driven on the 5th of October, and the line opened for traffic from the East to the heart of British Columbia. The stations along the north shore of Lake Superior are all named, divisional headquarters have been selected, and preparations made to meet any demand on the company's facilities. Although nominally completed, it is not intended to open the line west of the Siskiwits for traffic until next May. This step is rendered necessary in consequence of the amount of work still to be done in the way of hallasting, erection of water tanks, station buildings and shops. It has also been deemed prudent to study the action of the snow in the Selkirk at least one winter before commencing operations. The terminal arrangements on the Pacific are yet to be provided.

TRAFFIC over the East River bridge has increased something like 20 per cent within the last four months. At times the passengers number over two per second one way. It took two years after the opening of the bridge to roll up the first 25,000,000 passengers. Up to this time the increase of traffic has exceeded expectations.

USEFUL INFORMATION.

THE OCEAN FLEETS OF THE WORLD.—In the following figures are given, first, the sea-going merchant fleets (sailing vessels) of all nations; second, the sea-going steamships of all nations; Great Britain owns 22,800 sea-going vessels, with an average capacity of 500 tons. The United States owns 6600 vessels, with an average capacity of 410 tons. Norway, 4200 vessels, averaging 357 tons. Germany, 3000 vessels, averaging 466 tons. France, 2900 vessels, averaging 380 tons. Italy, 3200 vessels, averaging 312 tons. Russia, 2300 vessels, averaging 260 tons. All nations own 41,700 sea-going vessels, aggregating 23,000,000 tons.

It will thus be seen at a glance how largely England outrivals every other maritime power. She owns one-half of all the ocean sailing marine of the world, within this small fraction of one-twentieth; while her preponderance in the steam marine is even vastly greater. Great Britain owns 4649 sea-going steamships, while all the rest of the world besides own but 2038. We itemize the steam vessels as follows: Great Britain, 4649 steam vessels, averaging 1275 tons; France, 458 steam vessels, averaging 1434 tons; United States, 422 steam vessels, averaging 1424 tons; Germany, 420 steam vessels, averaging 1133 tons; Spain, 282 steam vessels, averaging 1084 tons; Italy, 135 steam vessels, averaging 1230 tons; Holland, 127 steam vessels, averaging 1220 tons; Russia, 194 steam vessels, averaging 768 tons.

PHOTOGRAPHY THEN AND NOW.—It has been said that the sun always gives us true pictures, and so it does if they are not falsified by this hand of the artist. Twenty-five years ago, when photography was quite new, everybody was photographing trus to nature. But of late years science and art have both been improving upon the works of nature, and it is safe to-day to offer a large premium for a true photograph of a human subject. But it is a question whether a man or woman can be found who would be satisfied with such a picture. The man or woman does not live who would be willing to put his or her photograph on view untouched. The honest amateur develops everything, wrinkles and all, and gives you a picture in open and cold unrelief. The professional takes all the pimples and carbuncles and crows' feet off, and you want a couple of dozen. Nobody ever wants more than one of an amateur photograph. If the sun had his own way photographing would die out very fast. Perhaps most people would like to have honest pictures if they were not so blamed homely.

SHAVING RECIPES.—To make shaving cream that can be used without water: Melt 20 lbs. of lard in a steam bath at a temperature of 212 degrees, then let 5 lbs. of caustic potash lye of 36 degrees Baume run in very slowly during constant stirring with a wooden paddle; when the paste becomes thick, 5 lbs. more of lye are added in the same manner. After several hours' stirring, the mixture becomes firm, and is finished. It is then transferred to a mortar, and triturated until the soap becomes perfect ly even throughout, and assumes a pearly appearance. Attar of almonds is the perfume for almond cream, and attar of rose for rose cream. They are dissolved in a little alcohol, and added during trituration.

A recipe for making a shampoo mixture is given as follows: Salts of tartar 4 cunss, pulverized borax 4 ounces, soft water 1 gallon; mix and bottle.

Something to make the hair grow on the face: Take cologne 2 ounces, liquid barts horn 1 drachm, tincture of cantharides 2 drachms, oil rosemary 12 drops. Apply to the face daily and await results.

WALNUT HAIR DYE.—The juice of the walnut rind has been used from time immemorial as a hair dye. Bernschen and Semper have recently communicated to the Berlin Chemical Society a method of preserving it for use in the shape of a hydroglucoside, prepared as follows: The rinds of the ripe nut are digested in sulphuric ether until their coloring matter is extracted. A solution of chromic acid in water is added to the ether solution, and the mixture thoroughly agitated. The ether is then distilled off, and the residue purified by solution, first in hot ether, and afterward in a mixture of chloroform and petroleum ether, from which latter it is obtained in a crystalline form as hydrogen glucoside. This substance colors the hair and skin exactly as does the juice of the fresh rind.—*National Druggist*.

REDUCED POSTAGE and other causes have increased the correspondence of the world. Less than 50 years ago the average of letters received by each person per annum was only three in the United Kingdom, and it is now 37 letters and 4 postal cards. The latest reliable ascertained comparison (for 1882, when the average was 35 in Great Britain) gives the average per head in the United States at 21; Germany, 17; France 16; Italy, 7, and Spain, 5.

CARBOLIC ACID IN PASTE AND GLUE.—The effluvia from decomposing paste and glue is as unwholesome as it is offensive. If, when making the paste or glue, a small quantity of carbolic acid is added, it will keep sweet and free from offensive smells. A few drops added to mucilage or ink prevents mould. In white-

washing the cellar and dairy, if an ounce of carbolic acid is added to each gallon of wash, it will prevent mould and also the disagreeable taints often perceived in meats and milk from damp apartments. Another great advantage in the use of carbolic acid in paste for wall paper and in whitewash is that it will drive away cockroaches and other insect pests. The cheapest and best form of carbolic acid is the crystals, which dissolve in water or liquefy at an excess of temperatures.

NON-POISONOUS VEGETABLE FLY PAPER.—It can be made as follows: Powdered black pepper is mixed with syrup to a thin paste, which is spread by means of a broad brush upon coarse blotting paper. Common brown syrup will answer, but syrup made from sugar is preferable, as it dries quicker. For use, a piece of this paper is laid upon a plate and dampened with water. The paper may also be made directly at the mill by adding sugar to the pulp, and afterwards $\frac{1}{2}$ to $\frac{1}{4}$ of powdered black pepper, and rapidly working it into a porous absorbent paper.

TEST FOR WATERED MILK.—A German test for watered milk consists in dipping a well-polished knitting needle into a deep vessel of milk, and then immediately withdrawing it in an upright position. If the milk is pure, a drop of the fluid will hang to the needle; but the addition of even a small proportion of water will prevent the adhesion of the drop.

TO REMOVE IRON STAINS FROM MARBLE.—Take hutter of antimony, 1 ounce; oxalic acid, 1 ounce; dissolve them in one pint of water, add flour, and bring the composition to a proper consistency. Then lay it evenly on the stained part with a brush, and after it has remained for a few days, wash it off and repeat the process if the stain is not quite removed.

MUMMY WHEAT.—The story of Egyptian mummy wheat having germinated has never been confirmed and is not credited by any one who is warranted by knowledge and experience in such matters to give an opinion. Innumerable attempts to stimulate mummy wheat into vitality have each and all failed.

TOO LARGE BELTS are often used on emery wheels. A belt half as wide as the face of the wheel is large enough. The belt should be loose enough to slip if the wheel is unduly crowded.

VARIETY IN STOVES.—Over 300 styles of stoves are now in actual use and the number is constantly increasing. There are nearly 100 kinds of fire-places heaters, differing from one another mainly as regards the grate.

CUTTING INDIA-RUBBER.—When it becomes necessary to trim a piece of rubber, it will be found that the knife will cut much more readily if dipped in water.

LAWN MOWERS.—The United States produces nearly 50,000 lawn mowers annually, and exports to every civilized country on the globe.

GOOD HEALTH.

Sleep Mechanically Considered.

Whether sleep can in any way be compelled, when the state of mind and body is opposed to it, is a question which we are inclined to answer in the negative. All the devices which have been employed or proposed, such as counting, repeating the multiplication table, reciting passages of familiar literature and the like, are no doubt frequently effective in hastening sleep which would have come more tardily of its own accord; but if the stomach, or heart, or brain, is in a morbidly active condition, such as will not allow unconsciousness to steal upon the system, we doubt if any artificial means will bring about that result. A writer on this subject declares, and we believe truly, that sleep is prevented by an excess of blood in the brain. His remedy is to pump the blood back from the brain by a peculiar method of breathing, for which directions are given as follows: Having assumed the usual posture of repose, inhale and exhale slowly and steadily long breaths, devoting the whole attention to making the inhalations and exhalations exactly the same length. The length should be much greater than that of ordinary breathing, although not sufficient to disturb the circulation by working the lungs to their utmost capacity. In support of this theory reference is made to the feeling of faintness produced by filling the lungs with all the air they will hold and then expelling it, repeating the operation rapidly three or four times. The resulting faintness is attributed to the withdrawal of blood from the brain, and the same effect, substantially, follows any sudden and extreme emotion. So violent a disturbance of the system, however, is not advised for the purpose here sought, but a steady and gradual diversion of the blood from the brain to the lungs and body; and it is confidently asserted that insomnia can be overcome in this way by a resolute and persevering effort.

We believe it will be found true in nearly every instance of sleeplessness, where no actual pain, mental disquiet or other apparent cause exists, that the action of the heart is very rapid and that until it abates sleep will be sought in vain. When a person lies down, the pulse

should within a reasonable time, say, not more than a quarter of an hour, show a reduction of about 10 beats per minute. If in the waking hours it is 80, it should, when one goes to bed, fall to 65 or 70, and sleep will almost certainly follow. But if the heart continues to pound away at the rate of 80 or 90 strokes per minute, there will be no healthy sleep, let the pillows be never so carefully arranged and the conditions of temperature light, exclusion of sound, and so on, the very best imaginable.

How to regulate the system so that the heart will abate its activity at the right time is a question the settlement of which will usually solve the problem of sleeplessness also. Temperance and discrimination in eating and drinking will go far toward removing the difficulty. A due amount of fresh air and exercise is also essential; but violent and exhausting exercise, taken without interest or enjoyment, will often do more harm than good. There are some physical needs which can be supplied at will, by mechanical appliances; but sleep is not one of them. The body may be warmed or cooled, hunger and thirst may be allayed, and some of the functions of the system may be stimulated or checked, to a degree which with some persons almost amounts to artificial control. But sound and satisfying sleep is conditioned upon the general health. To bring it about, one must begin at this beginning; and the work can not be abbreviated, nor the result attained by any patent device which sets the laws of physiology at defiance.—*Mechanical News*.

It Pays Doctors to Cure.

"Do doctors ever practice on their patients?" The above question was asked of a prominent physician. "The number of physicians of sense and reputation," he replied, "who experiment on their patients is quite small. Indeed, I do not know such a practitioner. There is a very erroneous impression among the middle and lower classes of persons on this point. Nothing is more common than to hear some one say, 'Why, I wouldn't think of going to a doctor. When they once get hold of you they'll never let go.' No general statement could be further from the truth. It is to the best interests of a physician to cure the one upon whom he is in attendance, because every cure he effects increases the confidence reposed in him. Almost every day some new disease or some hitherto unknown manifestation of disease is developed in practice, and it is not surprising, therefore, that even the best equipped and most experienced doctor is compelled to occasionally grope around in the *materia medica* before he finds the proper remedy. But the suspicion of the desire for experimenting is so uppermost in the mind of the average patient that it would be difficult to impose upon him, even if it was so desired."

"Do you think that medicine will eventually be able to successfully cope with every kind of disease?"

"I am not at all certain about that. But I would not put myself on record as denying that such a time may come. The practice of medicine has undergone marvellous revolutions since its establishment. Other equally wonderful revolutions are to come. While I believe that some methods will ultimately be discovered for arresting the progress of every disease, no matter how mortal as now considered, I do not put much confidence in the theory entertained in some quarters that anything can ever be done to replace a part or organ of the human body, which has been actually deadened, destroyed or obliterated. For instance, it will not be possible to restore to vitality a lung vitiated by consumption, or to supply a new gizzard in place of one consumed by a malady. But if such things are within the realm of the possible, then there is no doubt that human life can be indefinitely prolonged."

A MUSTARD SPONGE.—In referring to a sponge as a carrier of poultices, Dr. Richardson considers that it makes the best of mustard carriers. Mix the mustard in a basin with water until the mass is smooth and of even consistency. Then take the soft mass all up with a clean sponge, lay the sponge in the center of a white handkerchief, tie up the corners neatly, and apply the smooth, convex surface to the skin. This mustard sponge warmed again by the fire and slightly moistened, can be applied three or four times, is good for several hours, and saves the trouble of making a new poultice during the weariness of night watching. The sponge can afterward easily be washed clean in warm water.

BUNIONS are exceedingly troublesome and painful. They usually result from pressure and irritation by friction. This frequently causes a permanent enlargement of the joint, which it is difficult if not impossible to remove. The treatment for corns applies to bunions for removing the soreness; but in consequence of the greater extension of the disease, the cure is more tedious. When a bunion is forming, it may be stopped by poulticing and carefully opening it with a lancet. Gezow's corn cure consists of: Salicylic acid, 30 grains; Ext. Cantharis indica, 10 grains; collodion, $\frac{1}{2}$ ounce, mix.

INOCULATION FOR HYDROPHOBIA.—The telegraph informs us that at the meeting of the Paris Academy of Sciences, held Oct. 27th, M. Pasteur furnished proof of his theory that inoculation was easily practicable, and had been successful in preventing hydrophobia.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA

Amador.

KENNEDY.—Amador Ledger, Nov. 7: An agreement has been recorded between the Kennedy Mining Company and F. Reichling; the company agreeing to deed the mining property for the sum of \$100,000, to be paid one half in nine months, the balance in 12 months; the party of the second part to have the privilege of extracting and working ores in the meantime; if the purchase money is not paid at the expiration of the time stated the agreement to be void, and all improvements placed upon the mine are to become the property of the company.

MISCELLANEOUS.—We were shown on Saturday a specimen of ore taken from the New York mine, west of Jackson. It is of a dark-colored quartz, containing a quantity of black metal, similar in appearance to that met with in the Nevills mine, but not so heavy. No gold is visible to the naked eye; but Mr. Anderson says it shows free gold in considerable quantity on being roasted. It carries also a heavy percentage of sulphurets, but of what quality we are unable to say. A quantity of the rock has been sent to San Francisco for treatment. W. Boxall has commenced running a prospect tunnel into the east side of Matley's hill.

El Dorado.

GRIZZLY FLAT.—Cor. El Dorado Co. Republican, Nov. 5: The Melton mine during the last few days have struck in their winz; a vein of ore 4 feet in width that excels anything in richness that I have seen in this vicinity. J. M. Oxley is driving his tunnel in the divide between Middle Creek and the little north fork with prospects beyond what he expected. So encouraging is the present showing that he is now constructing a ditch several miles in length from Middle Creek for the purpose of washing drift dirt. Jo Myers is preparing to run a tunnel near the head of Barney Ravine joining Oxley's claim. Kendall & Russell are driving their tunnel into the Hill near Dogtown and expect in a few weeks to strike a channel of rich gravel.

Humboldt.

HYDRAULICKING ON THE KLAMATH.—Humboldt Standard, Nov. 4: Mr. A. Jacobs, who has during the past year been engaged in prospecting the gravel deposits along the Klamath river with a view to interesting capital in working the same for gold by the hydraulic process, returned on the Chester. He is accompanied by Dr. Star and Mr. Frank Perkins, who will operate under the name of Perkins & Co. These gentlemen bring with them a complete outfit for hydraulic work. They expect to put in a ditch and thoroughly prospect the ground about 22 miles above the mouth of the Klamath. Their principal work will be done on Blue creek, where the best gravel is found. Mr. Perkins says they expect to spend the most of the winter in prospecting and getting on water, preparatory to active work by spring. They will have their apparatus and winter supply of provisions conveyed to the Klamath by pack trains from Arcata. We learn from these gentlemen that there is considerable inquiry among hydraulic miners with reference to the water facilities and prospects of the gold bearing deposits along the Klamath and they think there will be many persons anxious to invest in this gold field upon the least encouraging outlook. The "stickens trouble" is turning attention in this direction, and they expect to see active hydraulicizing inaugurated on the Klamath at an early date.

Inyo.

PANAMINT.—Inyo Independent, Nov. 7: A great deal of assessment work will be done during the next month. The re-opening of the Panamint mines is already infusing a little life into some old claims in that region, and a good deal of prospecting and assessment work will be done there from this time forward. The Jacobs Wonder mine produced large amounts of ore formerly, and still contains plenty more that will be worked when milling facilities can be had.

PINE MOUNTAIN.—Inyo Register, Nov. 6: Mr. S. P. Roberts was in town, a day or two since, his visit being for the purpose of obtaining a pack train to pack out about a carload of the fine silver-lead ores he digs out at Pine Mountain, and which lot, as others that have preceded it, is to go to the Selby Works at Oakland. Roberts has spent seven years on his mines at Pine Mountain, much of the time entirely alone, always firm in the faith, and never more so than at this moment, that there was a fortune in store for him in those mines whenever it was in his power to properly work them and reduce the ores on the ground. The bulk of ores, running about 40 ounces in silver, are especially suitable for concentrating. The higher grades have always paid quite well for shipping, although at the very outset, they have to meet the heavy expense of packing and hauling some 17 miles to the railroad.

Kerr.

KRAMER ITEMS.—Calico Print, Nov. 7: Operations have commenced on some of the gold mines at Kramer. Mr. Kilgore has sold to Col. Hewitt, of Los Angeles, Division Superintendent of the Southern Pacific, a one-third interest in the Tip Top mine and a one-third interest in the Keystone, and also a one-third interest in the Tip Top to Mr. Campbell. The Tip Top is down 50 feet and the Keystone 25 feet, both showing up well. Mr. Fancher, of Los Angeles, recently bought an undeveloped claim of Mr. Kilgore and now has three men at work on the same. Jesse Umls is working some mines on shares with Mr. Kilgore. The Koffman Bros., now in Ventura county, will return shortly with a complete outfit and resume sinking on the Coffman mine, which is down 50 feet, and looks well. Mr. McAlleney writes from Oregon that he will return soon to work his mines in Kramer. While up north he visited Trinidad, New River and other camps and declares that so far he has not seen any prospects equal to those of Kramer. The prospects of Kramer are good and it is confidently expected that considerable developments will be made there during the coming year.

Mono.

GOLD LEDGE.—Inyo Register, Nov. 7: A friend, lately down from Mono Lake, describes a gold ledge located about two and a half miles west of the lake,

and about 17 miles from Bodie, as follows: It is known as the Grover Cleveland, and adjoins another location called the Levenfelt. A joint tunnel, but on the Cleveland ground, in a length of over 400 feet, taps the ledge at a vertical depth of 200 feet, and cuts it from wall to wall 60 measured feet, every inch in ore, all about alike in appearance and value. Carefully sampled to determine its probable working value, the assays gave an average of a little over \$11 per ton. Heretofore ores running no higher than that have not been considered of any avail on this side of the mountains, but the time is at hand when such immense ledges of low grade ore are being particularly sought after by capitalists, and for that reason, we wish to call attention to this. A few hundred dollars expended in an actual working test of the ores now exposed is all that is needed to very likely show up a most valuable property. There are about 300 tons of ore now on the dump. Near by are placer diggings that are being regularly worked to fair pay, and the locality is easy of access.

Nevada.

INTO THE OLD CHANNEL.—Grass Valley Union: The superintendent of the Centennial gravel mine, Washington township reports to the company as follows: After passing through the stratum of blue clay and sand, and a streak of fine gravel about four inches thick, of white quartz, well water-worn, four feet below that I have struck old wood that can be cut with a knife, all going to prove an old channel. The best posted gravel miners in this section agree that this shaft is going down directly into an old channel, and that the good gravel should be near by. I am working all the men I can, and pushing the work as rapidly as possible.

MINING NOTES.—The Crown Point mill is running steadily on good paying ore. The new water wheel for the Horseshoe mine is completed and ready for work. The sinking of the Orleans shaft, on the new 100 foot contract is making good progress. Upon the completion of the contract drifting for a new level will be started. The utmost confidence is expressed by those who are best informed on the subject that the Allison Ranch mine will be taken by the French company before the expiration of the term of the bond they have on the property. A crushing from the Boston mine, made this week, gave a yield of over \$30 per load for 36 loads.

ANOTHER RICH STRIKE.—Transcript, Nov. 4: F. Johnston, of North Bloomfield, and A. M. George discovered a big gold bearing quartz ledge about a month ago on Filmore hill, between Wolf creek and the Middle Yuba, a short distance above Moore's Flat. It is a north and south vein and dips east. The owners have already worked into the ledge about 18 feet and have not yet reached the foot or hanging wall, which shows that the vein is an unusually large one. The ledge prospects rich, and at a distance of 700 feet down the hill from where the ledge was discovered the prospect is equally as good. The finders of this mammoth ledge are poor men, and no doubt it is a good opportunity for a company of means to get hold of a good property.

Placer.

IOWA HILL INKLINGS.—Cor. Placer Argus, Nov. 7: A casual mention of some of the work that is going on here and near here will show to the outside world that mining in this vicinity, instead of being a thing of the past, is at this time just in its infancy. The Golden Gate mine at Damascus, never looked so well nor paid so handsomely as it has done during the past year, with every proof of a continuation. It is expected that within a few days this mine will change hands to a French syndicate who have held a bond on the mine for several months past. The Colfax Company whose claim is located some three miles further down the ridge, on the American river side, are at work at present raising an air shaft. When they have completed this work, it is understood that the company will push their main tunnel ahead, with reasonable expectations of striking the Damascus channel. McIntyre is opening a claim a little further down the ridge. He has a tunnel recently driven in some 300 or 400 feet and has struck blue gravel and a splendid prospect. He thinks he will soon be into the Damascus lead. Willis Gould is still driving ahead. He is getting some very good pay, but he works only a small crew. Willis believes in working it slow and making it last. The Watt Bros. a mile below Willis Gould and near Monona Flat, still continue to take out good pay. This is a good mine, and if worked with a larger force of men, would compare dividends favorably with most of the best mines in the county. But the boys only work four or five men besides themselves. Some good looking gravel is being taken out of the Sucker Flat mine, but unfortunately they have no water to wash their dirt for the present, consequently it is impossible to tell just what they are taking out in the way of pay. There is no question but the company have some splendid ground to work whenever they get ready and feel disposed to work it. But at present, for some reason, they seem to prefer to prospect their mine for further developments. The Anglo-American Company have started work in their old tunnel, which is in some 800 or 900 feet. They propose to push it ahead until they strike the main channel further back in the ridge. The Golden Gate Co. are taking out some fine looking nuggets. They have crossed and driven gangways up both rims of the channel some 400 feet, but as yet have done no breasting. The pay channel is thoroughly defined, with high rim-rock on each side. Judging from the pay that is being taken out running the gangways, this mine bids fair to surpass her early day yield many times over, and it is authentically stated that the front ground produced several hundred thousand dollars, and from present outlook is destined soon again to be one of the banner mines of the county.

Shasta.

IGO ITEMS.—Cor. Shasta Courier, Nov. 7: Abbott Hubbard & Co. have out about 20 tons of ore, and have started their amstra to grinding the same. E. L. Ballou is running his amstra on Manzanita ore. J. Woodfield has out a run of good ore. J. Hollister also is taking out fair ore. J. P. Wright is taking out ore, and expects to start his amstra soon. Robinson & Co. are working on the Central, and will start up as soon as water permits. Robinson & Cooper are still taking good silver ore from their Chico ledge. F. and H. Shirland are taking out some good ore also. The Chicago folks are waiting for water to start the mill.

NOTES.—Siasta Co. Democrat, Nov. 4: Judge Bell & Co. re-opened their French gulch mine with a view of putting a mill on it. Last week Peter

Scheerer sold \$1100 worth of land adjoining Distlehorst's old reservoir west of town. Merithew & Co. at Lower Springs have started up their mill but cannot run regularly on account of the scarcity of water. Tom Green was in town yesterday morning and shipped another seven-pound chunk of amalgamated gold, the clean up from another week's run. Clark & Co.'s mill on the old Harrison mine at Quartz Hill is now running night and day. sufficient water having been obtained in the new working shaft. Theodore Popejoy of Copper City was in town a few days ago and reports the old camp lively. He says preparations are being made to work three placer claims in that district the coming winter, owning one himself. A. C. Ellis and Wm. Murray have bonded the mining property on Flat creek formerly owned by Dent Young and will commence work on the same immediately. There is little doubt but they will soon take out good rock—enough to keep their mill at work. An old California miner named Becker, who has mined all over the Pacific Coast, last week struck what he believes to be a rich mine about one and a half miles west of Centerville near Clear creek. It is an immense deposit, claimed to resemble greatly the rich tellurium ore in the Salt creek mine belonging to Scheerer and Ratler. It is certain that some of the ore carries free gold for we panned it out. Becker has a good claim in New River and one on the Klamath in Siskiyou county also, which he discovered the past summer.

Sierra.

CLEAN UP.—Mt. Messenger, Nov. 7: The Bald Mountain Extension Co. cleaned up nearly 123 ounces for four days' work, \$30 per load. The company had seventy-two names on the pay-roll last month. Since the new pump started the air in the mine has been good. Next week the work of taking out gravel will be again temporarily suspended to put in about 2000 feet of new steel track—T rail, taking perhaps ten days. Then the mine will be in thorough working order for the winter, supplies to last until next July having been laid in. The water at the Extension shaft is 120 feet below the top. It takes about three and one-half cords of wood per day to raise a little over 20 inches of water. Wm. Fore has been running a tunnel on his claim down Rock creek during the past summer. South Fork company have their tunnel in 32 feet, and will resume work on it as soon as their blacksmith shop is finished. The course of the tunnel will be through the Oregon and Live Yankee ground to the South Fork ground. The Oregon and Live Yankee claims have been purchased by the South Fork Company. Pay gravel is expected about 800 feet ahead.

Tuolumne.

GOLD.—Tuolumne Independent, Nov. 7: The Buchanan mine is looking fine. Rock is being taken out at the 500-foot level, which is sprinkled with chunks of free gold. The same character of rock is also found in the 400-foot level. It was expected that the mill would be ready to start this week.

CLEAN UP.—Union Democrat, Nov. 7: They cleaned up at the Lamphier mill last Sunday, after a nine days' run. The rock paid handsomely, and there is enough in sight to keep the mill going for some months. A drift is being run from the main shaft to tap the south chute on the 217 foot level, which is expected to open up a considerable extent of new pay ground.

Trinity.

DEADWOOD.—Cor. Trinity Journal, Nov. 7: All the mines look prosperous and every quartz mill is turning out its usual amount of gold. Minear & Co. are doing good work while everything looks prosperous. Everything looks lively around the Black Bear mine and from all appearances it has the old-time prosperity. Wm. Blagrove still holds his own. Some of the ore already crushed yielded about 100¢ per ton. Westlake & Cosgrove are hauling their quartz to be crushed in the Black Bear mill, and will soon hear of a good clean-up. Bothby & Hendricks are doing well, and this winter will make the amstra turn out some bullion for them.

NEW RIVER.—Humboldt Standard, Nov. 6: Jno. McCulloch, who went to New River a week ago yesterday, returned Saturday night. He says there is nothing of great importance to report. The Toughnut, Hardtack and Ridgway mines are running. The lack of water is the greatest drawback and all are anxiously waiting for the winter rains to set in. When they begin, a number of amstras will be started. Mr. McCulloch says New River City doesn't seem to him to be so dull as on his previous visit. There is plenty of work for everybody and few idle men are seen.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Nov. 7: On the 3000 level the main lateral drift north has made a few feet further progress north, showing no material change, and the water is getting pretty well drained out of the crosscut west. Work will be resumed there shortly. On the 3100 level the main lateral drift north has been advanced about 40 feet, making a total length north, beyond the winze station, of about 75 feet. Face in very favorable vein material, with streaks and bunches of pay ore. It is very dry, no water being encountered in this drift thus far. Crosscut No. 2, on this level, has been pushed at a very lively rate through a strong, solid vein of mineralized quartz. It is in about 120 feet, and no water met with as yet. The indications continue favorable for the finding of a large, paying ore body sooner or later.

CHOLLAR.—The main lateral drift south on the 3100 level is in about 260 feet from the switch where it departs from the Combination west drift and continues following along the west side of the ore vein, keeping in the west country rock, which is dry and favorable, allowing of excellent progress. The ore vein, which lies all to the east, is demonstrated to be over 60 feet wide, all solid quartz, and carrying mineral enough to entitle it to be designated as low grade ore. No crosscutting is intended at present, and will not be while such good advancement can be made toward the Potosi line. There is every indication, however, that a good concentration of ore will be eventually found in that section of the vein.

CROWN POINT.—The repairs to the hoisting machinery being completed, a force of about 140 miners were put to work in this mine and the Belcher the first of the week, and a few more have been added from day to day as required. Ore enough is thus

being extracted to keep about half the stamps of the Mexican, Vivian and Santiago mills running, and as soon as the Carson river raises sufficiently to allow the remaining stamps to run, the ore yield and the mining force will be correspondingly increased. Some work is being done on the 1700 level, with a view to breasting out ore at that point in conjunction with similar work and explorations on the 1700 level of the Belcher, Kentuck and Yellow Jacket.

ORE SHIPMENTS.—Eureka Sentinel, Nov. 7: During the week ending yesterday ore shipments were made from the mines of the district to the two reduction works in town as follows: to the Richmond—Republic mine, 15 tons; Mimbres, 10; Whippoorwill, 48; Bowman, 14; Silver Lick, 39; Lord Byron, 7; Hoosac, 15; Dunderberg, 15; Geddes and Bertrand, 21; Eureka Star, 3; Prospect Mountain Tunnel, 5; and Frazier and Molino, 30. To the Eureka Company—Paul mine, 3 tons; Frazier & Molino, 14; Marguerita, 4½; California 32; Queen, 1½, and Silver Gate 1.

OPHIR.—As stated in last week's report, the main west drift on the 400 level from the Mexican shaft is being steadily pushed westward through the vein matter, not having obtained proximity to the west wall as yet. It has a considerable distance to go yet before reaching that point. The lateral drift south, starting from this main west drift, is running in a very favorable formation, allowing of excellent progress, and is already in over 100 feet, cutting occasional streaks and spots of ore. Upraising above this level will soon be commenced after the good ore known to overlie it as high as the 250 level.

YELLOW JACKET.—The usual amount of ore is being extracted from this mine to keep the Brunswick mill steadily running, about 170 tons being extracted daily. Most of this is being taken out without assorting, just as it is found. This is done by way of experiment, in order to ascertain the actual average yield and value, consequently less men are needed, and about 70 were drafted from the mining force on the first of the month. The drift from the Crown Point through the Kentuck ground, to explore and develop the value of this mine on the 1700 level, is making good progress, considering the intense heat and difficulty of supplying good air.

ALTA.—The main west drift or crosscut on the 700 level has been making unusually good progress the last two weeks, the ground being softer and more favorable, on account of its advance now being into the west ore body development sought for. The face of the drift is in low grade ore, but too low for working, but improves with further advancement, and a week or two more of exploration at this point will tell the story.

CON. CALIFORNIA AND VIRGINIA.—The 1750 continues its good regular yield of over 100 tons per day, extracted on company account, assaying about \$19 per ton. This is shipped to the Morgan mill on the Carson river for reduction. Some 50 or 60 tons per day are being extracted from the Jones lease section, above the 1550 level, and shipped to the Eureka mill, on the Carson river for reduction.

SIERRA NEVADA.—On the 520 level the lateral drift started north from the west crosscut is now in about 200 feet, showing no particular change of importance to report. Considerable repairing to the main lateral drift has had to be done.

BEST AND BELCHER.—On the 1000 level the lateral drift south, started from crosscut No. 2 about 250 feet west of the main north lateral drift, is now in about 80 feet, following the strong vein of mineralized quartz it was intended to explore.

MEXICAN.—The middle crosscut on the 500 level continues in very promising vein matter—decomposed quartz, vein porphyry and heavy clay. It is now over 500 feet in length.

KENTUCK.—The usual amount of ore continues to be extracted from the old upper workings, keeping the Rock Point mill well supplied and steadily running.

UNION CONSOLIDATED.—On the 500 level the crosscut east, 100 feet south of the Sierra Nevada south line, is in over 200 feet. Material, vein porphyry, clay and quartz.

GOULD AND CURRY.—The crosscut west on the 1000 level is in 650 feet. No change of importance to report. Material, soft vein porphyry, clay and decomposed quartz.

Columbia District.

MOUNT DIABLO.—Candelaria True Fissure, Nov. 7: We are cutting out the station for the 7th level from the incline. On the sixth level the east drift has advanced 11 feet, and the west drift has been driven 18 feet during the week. The upraise from the east drift on the second level shows a bunch of \$95 ore that looks promising. The east drift from the south crosscut in the Mount Diablo adit is in 62 feet.

AJAX.—This mine is located on Potosi Hill. Messrs. Hastie and Davey have the incline down 100 feet, with about four inches of \$150 ore in the bottom. The east drift is in about seventy feet and the west drift about fifty. Both are looking well.

BLACKBIRD.—William Dunlap and James Colligan have leased this mine and are doing well. They shipped nine tons of ore to Selby & Co. during the week, and are taking out another shipment.

SILVER BOY.—Johnny Leidy and his father are working away at their claim, and the prospects warrant them in believing that they will soon uncover a bonanza.

POTOSI.—The lessees are jubilant over their good luck. The mine is panning out well.

NEW ENGLAND.—The lessees are making excellent progress. Jimmy Davis is working his claim with encouraging prospects. Considerable prospecting is being done in the foothills about Columbus. Kent & Co. are still shipping their regular amount of ore to Selby & Co.

El Dorado District.

GRAND VICTORY.—Placerville Observer, Nov. 7: The Grand Victory mine, after being shut down for a period of one month, resumed operations on the 6th inst. During this period the mill underwent many radical changes. The old Blanket concentrators, through which, probably, one-half of the gold was allowed to escape, were substituted for the more modern and gold saving Canvas concentrators. The motive power was also greatly improved by the introduction of a Turbine wheel, manufactured at the Placerville foundry, which is sufficient guarantee. As the management under-

went a parallel change, we may properly expect "Grand Victory" news in the future.

Hawthorne District.

THE NEVADA.—Walker Lake *Bulletin*, Nov. 4: The Nevada mine in Hawthorne District, owned by Wm. Adams, is creating considerable excitement. The tunnel is in 100 feet on the ledge with a winze sunk 60 feet from the mouth of the tunnel. The winze is down 30 feet from the tunnel with a six-foot ledge at the bottom, improving as it goes down. The rock averages \$50 per ton.

Jackson District.

MILL.—*Silver State*, Nov. 4: Dan L. E. Barron, the discoverer of Jackson District is in town. He is an indefatigable prospector, well posted in mineralogy and geology and knows good ore when he sees it. He discovered the Pennsylvania mine in the Jackson mountains, which is now partially developed by tunnels and shafts. One of the tunnels is run on the lead a distance of 53 feet, and at the face the lead carries a foot of ore that averages \$150 per ton, and from 8 to 12 inches of ore that averages \$30 per ton. There is a shaft 40 feet deep on the vein, in which the lead is strong and the ore good. John Carroll has agreed to put a 10-stamp mill on the mine for an interest in the property, and they expect to have the mill running this winter. Mr. L. E. Barron says that other good prospects have been found in Jackson district, but they are yet undeveloped, and on the other side of the mountain from where the Pennsylvania is situated there are extensive copper leads, which will doubtless be worked when copper becomes more valuable.

Santa Fe District.

PROSPECTING.—*Inyo Independent*, Nov. 7: There is a good deal of prospecting going on in the Santa Fe district, east of Luning. Last Wednesday F. L. Perkins, a mining expert from San Francisco, came down on the train to Luning to examine a mine out near Finger rock, in the interest of San Francisco parties.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, Nov. 7: Have commenced drifting north on the ledge in the 300 level—it is in 18 feet. This is about all the work that has been done in the mine this week, as the engine and other machinery is being repaired. It will be all ready to run again to-morrow—when work will be resumed in the mine.

ARIZONA.

MINING ITEMS.—Prescott *Courier*: Ryland's Southern Belle is opened by a 40-foot shaft, in which the quartz is 6 ft thick. He recently worked 6 tons of rock in an arastra, and it paid at the rate of \$50 per ton, gold. Frank is now near Wickenburg, doing assessment work on a very rich silver ledge. Jacob Henkle, who has just returned to Prescott from the Bradshaw mountains, 45 miles south of Prescott, tells us that considerable rain, hail and snow came down there recently. He visited John Luke's mine and was shown a great many tons of rich silver ore. The Rapid Transit mine is proving to be one of the best mines in a district that boasts of the Cougar, Eclipse, Tiger and Gray Eagle. Del Pasco mill people are praying for a supply of water to run the mill and give them more gold. Messrs. Bigelow & Davis have gone to the Hassayampa district to do assessment work on their claims. The l-sses of the Pine Spring mine are taking out a great deal of rich silver ore. Native silver shows itself in every piece. The Bullwhacker, a few miles to the east of Prescott, is highly spoken of. It is a gold bearing vein. Bars of silver bullion, from the Peck and Azilum mills were sent in here yesterday.

RAYMOND'S CONCENTRATOR.—Mohave *Miner*, Nov. 8: On Thursday afternoon we paid a visit to the old Lone Star concentrator, which has been lying idle so long, and which was recently purchased by Henry Raymond & Co., and is now being renovated and overhauled preparatory to starting up for the winter. The battery has been thoroughly overhauled, and the Frue concentrators put in first class condition. Amalgamating plates have also been put in, as well as many other practical and ingenious devices for saving the precious metals. Mr. Ryan, who was lately in charge of the Benson Smelting Works, is the superintendent of the mill. The mill will be started up in a day or two, and will run on tailings until every part of the intricate concentrating machinery has been adjusted to a nicety. While the mill is intended principally for working free gold ores, Mr. Ryan tells us that he will also be prepared to concentrate low grade lead ores, and promises to make any ore carrying over 10 per cent pay.

COLORADO.

MONTEZUMA MINES.—Cor. Colorado *Miner*, Nov. 6: Never, in the experience of your correspondent, has this camp exhibited as solid a front, financially speaking, as at the present time. With three or four exceptions, where large companies are working, leasing is all the "go." A majority of the lessees are doing well, and I feel safe in predicting that for want of money with which to buy it, this camp will never run short of "grub" again. The Bell mine, under lease by John Burke & Co., is keeping up its record as one of the sturdiest producers in the State. The crosscut that is being driven to cut the lode will cut it at great depth, and when that is done, look out for a mineral wonder. The Chataqua Company are employing a large force of men, and a big strike is looked for daily. The Sarsfield is being worked under lease, but your correspondent is not acquainted with the condition of that property. The Silver Worth mine is coming into prominence as one of the best paying mines in the county. A car of ore shipped from that mine last week netted 180 ounces silver and 45 per cent lead per ton. The Winning Card lode never looked better than at present, and the boys are making more money than a politician could spend.

UTE CREEK MINES.—The outlook for a bright future is very flattering. In the Great Eastern lode there is now exposed a fine vein of solid ore, which returns \$30 to the ton. The Hell Bros., who are leasing on the Humboldt lode, are preparing to make a large shipment from their workings about the last of the present month. A contract to sink the shaft upon the Andes lode 100 feet further, is in contemplation. The mines on Williams Forks have been actively worked all summer, and many of them are preparing for the winter's campaign by taking in sufficient provisions to last during the snowy season.

There is a perceptible increase in the activity among miners in Clear Creek county. Several prospects that have lain idle for years have been started up in the past few weeks. One cause for this sudden commencement of operations is the fact that the smelters are offering extra inducements to owners of low-grade mines, and run well in lead or iron. Mines on Griffith mountain that have not yielded a pound of ore for years are being brought into market as active producers, and will continue so, we have no doubt, for some time to come.

PITTSBURG NOTES.—*Elk Mountain Pilot*, Nov. 7: The tramway at the Augusta mine broke down when they were stretching the wire and it will be a week before it will be ready to make the trial trip. Scott McCullough is laying in supplies for the winter in Dark canyon for a Pennsylvania company. A. B. Mathews, superintendent of the Augusta mine, reports a rich strike of ore in that mine—richer and more extensive than any body of ore yet opened in the mine. David Smith has returned to his home in Iowa. He shipped 50 sacks of ore to the Jumbo smelter in Gunnison before he left.

CRYSTAL CITY NOTES.—Our camp is coming to the front in good shape, and those interested have gained more confidence than ever in the future of Roek Creek and it is safe to predict that this section will be one of the most important in the State. The Black Queen, is more than proving up the south slope of Sheep mountain, and with such a body of rich ore as there is to be found in this mine we can look for activity around the property. A. G. Sinsborough is fixing up for winter and will push work on his property; he has a large vein that carries copper and iron. Work has been put upon the Governor Tabor in a new opening that shows a large body of the finest kind of galena and carbonate ore. The Lost Horse is being worked and has a strong vein that is showing up well. Vic. Anderson is taking out some fine ore from the Square & Compass, and has ore that will pay to treat with a local smelter. Work is being done on the Bob Tail up North Fork, and shows considerable iron and copper.

IDAHO.

IN FROM LAVA.—Wood River *Times*: C. Clawson, W. G. Seamands and J. W. Epley got in from the Dry Fork of Antelope about 8 o'clock last evening—having made the trip in about 12 hours, by the trail. During his brief stay there Mr. Clawson made a somewhat thorough examination of the district, and he is confident that it has a very prosperous future. Only about 150 men are there now, but a large population will be supported by next spring. The ore-bearing belt is about 10 miles north and south, by 8 to 10 east and west. There are three distinct belts—the Horn Silver, at Era, which is in porphyry; the Antelope, in black lime, shale, slate and porphyry; and the Lava, which carries considerable gold in porphyry, lime and slate. Some of this ore averaged \$25 in gold in an old-fashioned Mexican arastra. These belts are all connected, and the district of about 10 miles square will be very lively when its boom shall strike it. The gentlemen named are in after supplies and will remain three or four days, Mr. Clawson returning to assay for the Snowstorm Company.

YIELD OF THE CAMAS No. 2.—Wood River *Times*, Oct. 21: Superintendent Doniphan, of the Camas No. 2 mill, came in to-day, bringing \$1400 worth of fine bullion as the result of the last seven days' run of the 10 stamps of his mill. In a few days 10 additional stamps will be started up, and the yield then brought up to \$400 per day.

HURRAH FOR THE GOLD BELT!—Ole Rorem is going to Salt Lake City to-morrow, to incorporate the Donovan mines and mill into a company. The success of the company is assured, as they have a large body of ore in sight. The Wiswell mill to crush this ore is on the way here from Boston. As soon as it arrives it will be put in place, as the mill building, blacksmith shop, boarding-house, etc., are already erected.

THE CARRIE LEONARD MINE.—Thomas J. Covert was in town to-day. Mr. Covert owns one-sixth of the Carrie Leonard mine, which has yielded about \$30,000 worth of ore this summer—of which fully two-thirds has been divided among the owners. A small force will be kept at work doing dead work in the mine until next spring, when it is expected that the force will be increased to 40 or 50 men, as there is a large quantity of stopping ore in sight already. The Carrie Leonard will therefore yield much more largely next year than this. On his return from the East Mr. Covert will open up the Tinker claim, near the King of the West, in which he owns a half interest. The Smoky mines, Mr. Covert says, will produce heavily next year, as they are pretty well developed.

THE BIG COPPER.—Hoiston *Free Press*, Nov. 7: Notwithstanding the general impression that has gone abroad that the Big Copper mines are to stop all work for the winter, we are informed that there will be a force of men kept steadily employed in taking out copper and silver ores; the recently found gold ledges will be stripped and experiments made to ascertain beyond a doubt, the true value of these finds, and a large amount of flux will be mined and baled to the smelter. About 25 wood-choppers will be given work in the timber on the claims, and several kilns will be constructed in which to transform the wood into charcoal. It is also the present intention of the company to start up the reduction works sometime this month, or so soon as there is a sufficient quantity of charcoal ahead, and run uninterruptedly on silver ores until spring.

MONTANA.

RED MOUNTAIN.—Helena *Independent*, Nov. 6: Traveling along down Beaver creek, we are right at the base of Red Mountain. Scarcely a prospect hole can be seen upon its precipitous side; but down next to the creek are several old cabins, where prospecting was done in years gone by. Following the track made by the bursting reservoir, we are soon in sight of Little Red Mountain, and shortly after strike the road leading from Rimini to the Red Mountain tunnel, which can be plainly seen. The tunnel is about 240 feet long, where a load has been cut, showing a fine quality of ore. The ore vein is well defined, very red in color and carries lead silver and copper. The location seems very favorable for the discovery of leads. The mountain is quite steep, and to the

west are many known leads, carrying valuable ores, which presumably run through the mountain. Rimini is about two miles distant. Two thousand feet from the Red Mountain tunnel, nearly due south and 1500 feet from the line marked out is the Grand Central. This tunnel is now about 40 feet in length, but as yet has not penetrated the shale and slide-rock. It is well timbered and the chances of striking leads seem quite favorable. The mountain here is very steep and many valuable mines exist on the western slope which the tunnel will strike if they extend so far into the mountain, and of this there seems to be no doubt. East of the Grand Central and southeast of the Red Mountain Tunnel is the Mineral Belt tunnel site. At the time of our visit no work had been done, but the projectors are sanguine of striking it rich and have men now at work boring into the mountain. On the south side of the mountain, opposite the other tunnels and running toward them is the South Side tunnel. It is favorably located, will strike the veins at a great depth, and if they prove rich it will be a valuable property. About four miles southeast of here is the Katie Tutnam lode, which has been stocked and a tunnel company organized. The mountain is very steep on which it is located and some very good ore has been found. It is situated close to the Frohner and Nellie Grant mines. Having looked over these prospects and taken a general survey of the rich group of mines on the west side of Red Mountain, we rode down to Rimini.

NOTES.—*Inter-Mountain*, Nov. 7: Eugene Russell & Co. have a placer claim on Three Mile creek, about eight miles northeast of Stevensville, Missoula county. It is eight to ten feet to bedrock and contains fine gold from the surface down. This season the diggings have averaged \$5 per day to the man. The Welcome creek placers, in the same vicinity, also pay. The Hudson smelter at Neihart, commenced work this week. The company has seven or eight men employed in its mine, the Mountain Chief, and have about 120 tons of high grade ore at its smelter ready for treatment. A six foot body of free milling gold ore has been struck in the Belmont, near Helena. The mine has been idle for two or three years. Burghart will work both his mines on Snow creek—the Whippoorwill and Uncle George—this winter, giving employment to from thirty to fifty men. The Big Chief, near Jefferson City, has been tapped by a 370-foot tunnel at a depth of 200 feet. The ore is 50 per cent galena, carrying about \$50 in silver and \$15 in gold. Several leads discovered at the head of Welcome gulch yield a free milling whitish gold quartz. The surface rock of a four-foot (or thereabouts) vein assayed from \$23.24, the lowest, to \$440.76, the highest, in gold. A 15-inch streak of ore in the Pleasant View mine, Sweetwater district, Missoula county, assays 350 ounces in silver to the ton. J. B. Catlin and others recently sold a placer mining bar at the confluence of Trail and Ruby creek, in the Big Hole country, to a Salt Lake company for \$5000. Silverman's new sampling works at Helena, bought their first lot of ore last Thursday, from the Bullion mine, near Elliston, paying for the galena, which assayed 58.33-100 ounces of silver, \$4.53 gold and 50 per cent lead, \$68 per ton; and the carbonates which assayed \$39.81 silver, \$4.50 gold, and 23 1/2 per cent lead, \$23.50 per ton, net cash.

NEW MEXICO.

BLOWN IN.—Socorro *Bullion*, Nov. 7: Stack No. 2 of the Billings works, which has been idle for some days, has blown in. Barries is dumping high-grade argentiferous galena from his Steel Dust mine in Water canyon. Within 60 days the Grapic smelter of this city is to be increased very materially in capacity. Colonel T. W. Hemans, in White Oaks. He meditates the erection of a stamp mill. Wm. Mahara is with us again to renew the work on his famous iron lode in the South Socorro district. This property yields 68 per cent iron ore containing \$15 in gold. The Socorro tunnel will resume work in a brief period. The exploration will be guided by means of a diamond drill. Col. J. S. Hutchason is working the Wade Hampton, March and Rattler properties in the Pueblo district. His Ambrosia, in the Magdalena district, is being worked, and the mineral is packed down the mountain side upon burros, and then shipped by rail to the Billings works of this city. McLeish & Leddy have commenced the shipment of mineral from their Bonaparte mine in Water Canyon district to the Billing smelter of this city.

COMMENCING WORK.—Jacksonville *Times*, Nov. 7: The rains of the past week have enabled some of the miners of Josephine county to commence work. Many of those in Jackson county expect to be busily engaged soon. The ground is so very dry that it will take a great deal of rain to soak it well. As the miners have been disappointed during the past few years, everybody seems anxious that they should have a benefit this winter. Whenever there is a good mining season, money is much more plentiful than otherwise. A quantity of rock from the Pilgrim ledge of Walsh & Bragdon, on Wagner creek, was submitted to the assay of Thos. Price, a well known assayer of San Francisco recently, with gratifying results to the owners of the mine. The report returned is: Gold, \$32.82; silver, \$15.30; total, \$348.21 to the ton. Alex. Watts is opening his mines in Josephine, and expects them to show up well this season. Riley Congle is in charge of them. Wimer & Sons, of Waldo, have started work at their hydraulic mines, and are making the gravel fly. This is one of the best mines in the State, and always pays well.

OREGON.

BULLION.—Bedrock *Democrat*, Nov. 7: A few days since the banking house of J. W. Virtue bought of E. M. White \$600 worth of gold bullion, the proceeds of 15 tons of ore from the Dolly Varden mine. This ore was crushed in an arastra, and there is a large quantity of similar rock now ready to be worked. As the work progresses the mine shows up splendidly.

PROSPECTING.—Mr. Watson, one of the gentlemen interested in the quartz mill to be erected on Burnt river this fall, mention of which was made in these columns some days ago, was in town this week. He is now on Burnt river making a selection of the mill site and will soon return to Portland to make the necessary preparations for the shipment of

the machinery. Ernest Nadeau, one of the owners of the Trail creek mine, has returned to the city to spend the winter. The other men will remain at the mine until the snow covers the ground, protecting the flumes from inquisitive persons who might desire to clean up what gold is left there. Messrs. Nadeau and Thibideau bought the J. B. Gardner interest in this mine last summer, and the other owners are James Odell and Walter Fernald. While he did not give us any figures, still we were led to infer that the result of the fall clean-up was highly satisfactory.

UTAH.

REVIEW.—Salt Lake *Tribune*, Nov. 9: The output of bullion, (exclusive of all ores) by operations centering in this city, as covered by current reports, has been as follows for the present year:

January	\$378,644.55
February	237,536.78
March	273,771.69
April	350,983.27
May	288,620.43
June	354,076.16
July	250,567.40
August	321,912.78
September	319,079.40
October	420,855.92

Total \$3,316,048.39
A number of bullion producers have made no reports so far, and large quantities of ore are sold of which no public account is rendered. The receipts of bullion and ore in this city for the week ending Nov. 4th, inclusive, were \$92,266.46, of which \$77,441.56 was bullion and \$14,825 was ore. For the previous week the receipts were \$138,057.72 in bullion and \$36,102.30 in ore, a total of \$174,160.02. The Ontario output for the week was fifty-two bars of bullion, of the value of \$26,112, bringing the total for the present year up to the sum of \$1,379,439.21. The double dividend for the month of October was paid on the 31st ult., and thus the stockholders have this year received \$5.50 per share or \$825,000. The Stormont sent up four bars of bullion during the week, valued at \$6980. The product of the Hanauer smelter for the week was nine cars of bullion, \$22,350; of the Germania, eight cars, \$18,517.46. Nothing new from the Horn Silver, but the claims in the neighborhood of it are looking well. Ore receipts were \$800 from the Crescent and \$1650 from the South Utah; \$6200 from the Queen of the Hills, and 35 tons, \$6175 from the Bannock, Idaho.

THE CHRISTY CO.—Southern Utah *Times*, Nov. 5: The mill has been running regularly on good ore, and we expect that the bullion output, for the month, will be better than usual. Owing to the unexpected though very favorable circumstances, the donkey hoisting engine will not be placed in position in the new shaft as soon as was expected. The ledge cut in the uprise to the station, a few weeks since, is fully three feet in width at the back of the station, and the manager found it would be necessary to stop this ore out before placing the engine in its position for working. Six inches of the ore on the hanging sampled \$594.40, and the whole vein will average over \$150 per ton. It is undoubtedly a big bonanza.

NEW LOCATIONS.—Within the past few weeks, speculative locators have been busily engaged in locating, recording and staking out prospective mines around the camp. Three locations were made last week, which take in the townsite of Silver Reef, and cover the last piece of vacant mining ground in the immediate vicinity of camp. This activity among land speculators, was brought about by the strikes in the working mines of late. The big body of ore, opened up in the Stormy King, is making north, and, at present, does not lie 800 feet from the lower end of town; but whether it will hold out, pinch or break, is simply a matter of speculation.

OTHER NOTES.—Sam Bennett shipped 12 tons of very good rock from the Thompson to the River mill this week. The 50-ton shipment, made by Josh Alphin, to the Stormont mill, from the old Bonanza mine on the White Reef, mailed \$48.70 per ton. The stopes in the Buckeye, Savage and Last Chance group of mines are looking well and are furnishing the mill with an average of 38 tons of fair grade ore per day. It is the intention of the management to start sinking the main incline from the six to the seven in a short time. Kimple & Lewis, lessees of the Leeds mine, are drifting on a six-foot vein of ore. Since they started to drift, a few weeks ago, they have broken over a hundred tons of ore. They say that the ore samples between 25 and 30 ounces per ton, and that they will begin to ship as soon as the leaching works is in operation. A train, composed of eleven teams, hauled the new tanks for the leaching works into camp last Monday. The tanks were made in San Francisco, out of California redwood. All the material is now on the ground, and the work of putting the apparatus together has been started and will be pushed forward to completion as soon as possible.

WASHINGTON.

LATEST EXCITEMENT.—Stevens county *Miner*, Nov. 6: The latest excitement among the prospectors of this vicinity is the new discovery made recently by Richard Chulson. This gentleman is an experienced miner. He has been prospecting on the Columbia above and below the Little Dalles, and on Saturday last arrived in Colville with a sack full of ore that set men on their nerves. The fact is the ore looked good enough to eat, and if they have any amount of it, it is a bonanza and no mistake. The ore contains carbonates, chlorides, bromides, galena and silver glance, and is some of the best looking rock ever brought into town. The location is about 1000 feet below Six-mile bar on the Columbia river and within a stone's throw of the river. H. M. McCartney, who has visited the strike, says a good wagon road can be built right up to the mine from the Little Dalles road for the small sum of \$50, as there is a natural pass all the way, almost free from obstacles. Interested in this find are R. Chulson, J. A. Reilly, A. E. Benoit, W. B. Moore, and one or two others whose names we have not learned. Al. Benoit and Mr. Reilly departed Wednesday morning with an assayers' outfit for the camp, where they will immediately put a small force of men to work, and open up the prospect. Deer and bear said to be exceedingly numerous in the vicinity of the mine; consequently fresh meat is plentiful.

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION

Of the City and County of San Francisco.



PREMIUMS AWARDED.

GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

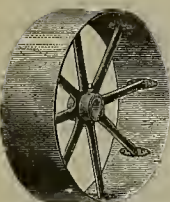
The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal. E. G. DENNISTON, Prop'r.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

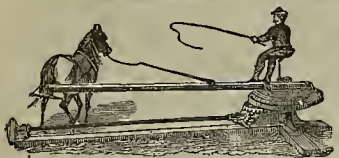
CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, San Francisco, Cal.

IRON CASTINGS OF ALL DESCRIPTIONS.



HORSE POWERS, WINDMILLS, TANKS and all kinds of Pumping Machinery built to order. Awarded First Premium for Windmills at Mechanics' Fair, 1885.

F. W. KROGH & CO., 51 Beale St., San Francisco.

L. PETERSON, INVENTORS. MODEL MAKER.

258 Market St., N.E. cor Front, up-stairs, S.F. Experimental machinery and all kinds of model, tin, copper and brass.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED For Best Slide Valve Engine and Boiler Combined.

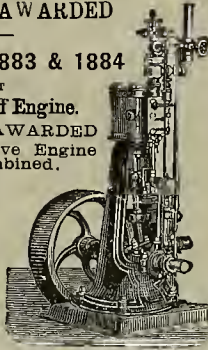
W. H. OHMEN,

WORKS:

22 Fremont Street, SAN FRANCISCO.

AUTOMATIC ENGINES

A Specialty.



IMPROVED PIPE TONGS.

[PATENTED OCTOBER 23, 1885.]

This cut illustrates a Tongs that can take any size pipe without screwing or setting it. It cannot slip, for the more you pull the tighter it gets. There is no need of pressing the handles together, for it has only one stock or handle. It is very simple and durable. For further information, address

HENRY F. W. SOHST, 1804 Dupont Street, San Francisco, Cal.

The most Complete Compound manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid and Alkali-Proof.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees, No. 310 California Street, San Francisco.



Property Owners are interested personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.

THE PACIFIC COAST

ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines, FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamoes, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

THE CONSUMERS' COMPANY.

VULCAN BB AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN BB POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

8 California Street, San Francisco, Cal.



THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

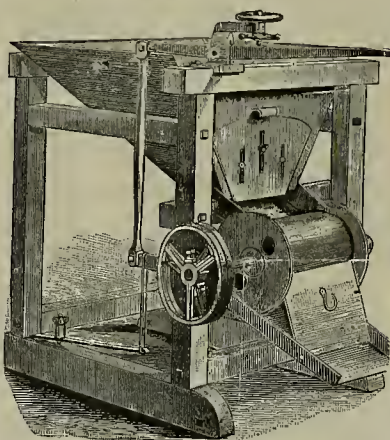
CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

THE ORIGINAL

Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore-Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

411 and 612 Front St., San Francisco

VALUABLE CHROMIC IRON MINE.

Within 2 miles of Railroad.

Thousands of Tons on Surface.

CAPITAL WANTED TO DEVELOP

Half share as equivalent, or will sell outright. Address G. W. SPAWFORTH, Lang Station, Cal.

THE FAMOUS

The most wonderful Curative Agent in the world.

Full Power Belt, for Lady or Gentleman, price \$10.

Cures without the aid of Medicine

General Debility, Nervous Prostration, Rheumatism

Neuralgia, the Liver, Disease of

Sciatica, the Kidney or

Paralysis, Bladder

Constipation

Semenal Weakness, Dyspepsia, Female Weakness,

Sick Headache, Insipient Catarrh, Insipient Consumption, Lame Back, and many other diseases.

For particulars and Circulars address

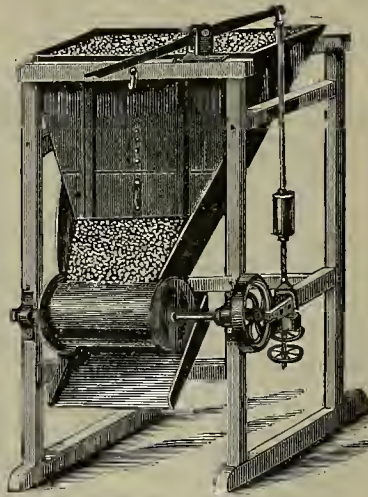
BELT PACIFIC ELECTRIC CO.

SOLE PROPRIETORS,

330 Sutter St., San Francisco.

THE ROLLER ORE FEEDER

(Patented May 28, 1882)



This is the best and cheapest Ore Feeder now in use.

It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Punker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacture, 237 First Street, SAN FRANCISCO, CAL.



INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 50 per cent more work than the Old Ingersoll.

MINING MACHINERY.

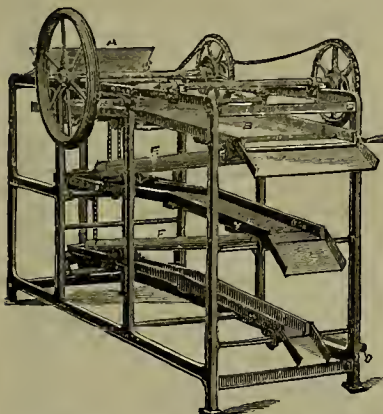
For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,
12 California Street, San Francisco, Cal.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.

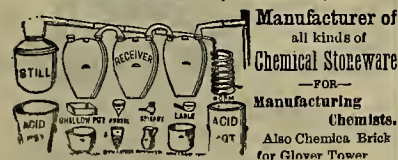
Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

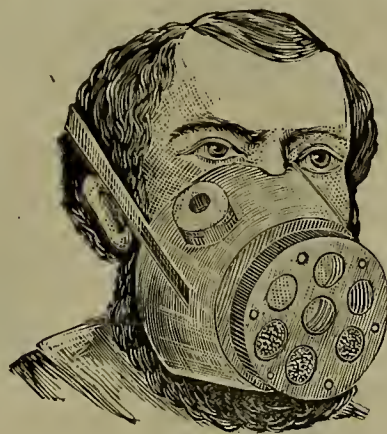
HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.



PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning
and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

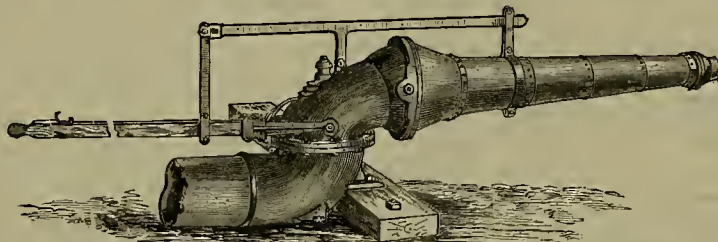
In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to
T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well known parties who are at present using them.

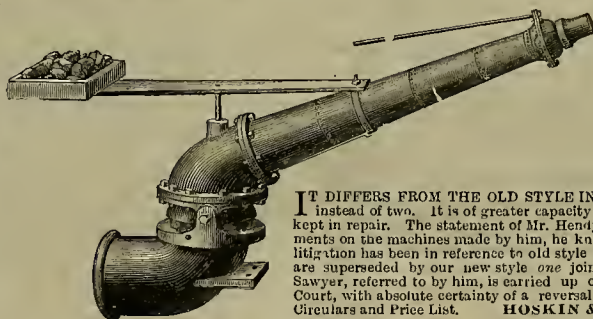
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

IMPROVED HYDRAULIC MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

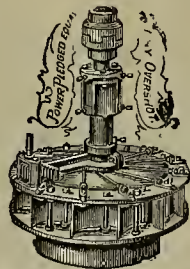
HOSKIN & CO., Marysville, Cal.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable."

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE



Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES.

AC'TS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steam Boat Belts and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF—

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machinee

Stodde Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

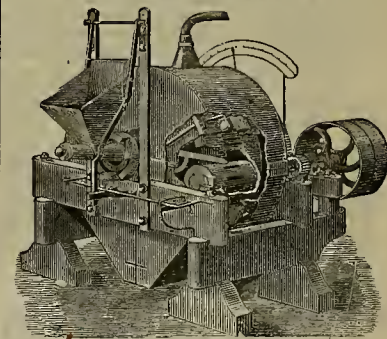
Kinds of Machinery for Mining Purposes.

Grinding Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Tustin's Pulverizer WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

Alaska.

Gov. A. P. Swineford, of Alaska, has made his first annual report to the Secretary of the Interior on the condition of affairs in that district. He arrived at Sitka, September 15th, and was cordially received, save by a very few persons who, in the language of the Governor, preferred a continuance of the old order of affairs, under which, presumably, they had persuaded themselves they might individually profit much more largely at the expense of the general Government than under the new. None of the appropriations made for the support of the civil Government, or for specific purposes, appear to have reached the hands of the ex-officio Treasurer. Consequently he has no record of disbursements, all of which, with a few exceptions, the Governor says, were made by the Collector of Customs. An increased appropriation for schools is asked. The children are said to manifest more than the average aptitude in study, and are especially anxious for the establishment of English schools. A careful estimate of the population of Southeastern Alaska places the number of whites at 1900 and the natives at 7000. Some of the native Alaskans are said to be educated to some extent in elementary branches, and to have become members of the Greek, Presbyterian and Catholic churches. They are not Indians and differ in appearance, habits, language and other respects from the Indians of the United States. The Governor dwells at length upon the great natural resources of Alaska, and severely arraigns those Government agents who have represented the country as inclement to the degree that precludes cultivation or the keeping of domestic animals. Never in his travels from Lake Superior to the Gulf of Mexico has he seen more luxuriant vegetation than in Southeastern Alaska. The hardier vegetables all grow to maturity and to an enormous size, while cattle are sleek and in the best possible condition. Work on the gold mines on Douglas Island, opposite Juneau, are in full operation. The deposits are represented to be truly phenomenal, and the Governor says the mines promise to figure more largely in the mining history of the world than any yet on record. Curing and canning cod and salmon have assumed large proportions, although the business has not yet been largely remunerative by reason of the sharp competition of the Columbia river fisheries. The Indian police system is highly commended. Attention is also directed to the needs of the Territory in the matter of mail facilities. The law prohibiting the liquor traffic is said to have been disregarded. The defects in the laws governing the Territorial organization are discussed at length.

GOLD AND SILVER.—Some time ago, for the purpose of increasing the amount of gold in the United States Treasury at New York, the Clearing house agreed to furnish the Treasury with \$6,000,000 in gold, in exchange for an equal amount at par value of subsidiary silver coin, and the amount of gold to be furnished by each bank was apportioned among the Clearing-houses, in proportion to the amount of deposits carried. All the banks responded with one exception—the Broadway—which refused to make the exchange, and the Treasury therefore obtained only \$5,915,000. The subsidiary coin was left in the Treasury in this city and certificates for the same were issued to the different banks by the manager of the Clearing-house. Until recently the banks were not permitted to exchange these certificates for subsidiary coin, but about 10 days ago permission was granted to deposit certificates for such amounts as the banks might wish to draw from the Sub-Treasury. The scheme failed to create the demand that was expected, the banks to the present time having called for only about \$1,000,000. Last week the Sub-Treasury began redeeming the certificates in legal tender notes (greenbacks), and about \$2,000,000 were thus redeemed during the day. The operation was continued, and about \$2,000,000 more were redeemed. This leaves about \$1,000,000 certificates yet outstanding, which will probably be presented for redemption in a short time.

Mining Share Market.

There is no special improvement to note in the condition of any of the Comstock mines, and therefore none to record on the mining share market. Work is being steadily prosecuted to produce a paying mine in the lower levels. The middle mining section remains about as it was; work goes actively ahead. There is nothing detrimental in the indications, however, and further explorations are being conducted at very interesting points. At the north end the development work in Ophir is going ahead lively, as usual, the proposition being to extract ore from the old upper levels before long. Work in the old bonanza ground, Consolidated California and Virginia, goes straight along as usual. At the south or Gold Hill end operations are actively resumed in Crown Point and Belcher, and about 200 men have been put to work. About 70 miners, however, have been let out of the Yellow Jacket.

Now is the time to send gold spectacles home; mas gifts. C. Muller, optician, 135 Montgomery street.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.									
COMPANY.	LOCATION.	No. AM'T.	LEVIED.	DELIN'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.		
Baker Divide M Co.	California.	10.	25.	Oct 29.	Dec 1.	Dec 21.	D M Kent.	330 Pine St.	
Buchanan M Co.	California.	14.	15.	Oct 29.	Dec 2.	Dec 23.	J W Sullivan.	121 Pos. St.	
Boyer Con M Co.	California.	8.	05.	Oct 23.	Nov 27.	Dec 17.	G W Sessio.	309 Montgomery St.	
Bulwer Con M Co.	California.	2.	20.	Oct 29.	Dec 10.	Dec 10.	J W Sullivan.	306 Montgomery St.	
Chollar M Co.	Nevada.	15.	50.	Oct 21.	Nov 24.	Dec 16.	C E Elliott.	309 Montgomery St.	
Con Amador M Co.	California.	10.	50.	Nov 2.	Dec 2.	Dec 13.	F B Latham.	327 Pine St.	
Del Norte M Co.	California.	1.	30.	Nov 8.	Nov 14.	Dec 7.	R B Cronau.	230 Montgomery St.	
Equitable Tunnel M Co.	Utah.	32.	10.	Aug 3.	Nov 15.	Dec 4.	C J Collins.	512 Montgomery St.	
Guadalupe M Co.	California.	1.	05.	Oct 12.	Nov 16.	Dec 14.	R B Cronau.	310 Pine St.	
Golden Jacket M Co.	Nevada.	1.	05.	Oct 27.	Dec 3.	Dec 26.	R G McClellan.	331 Montgomery St.	
Hale & Norcross M Co.	Nevada.	87.	50.	Oct 8.	Nov 12.	Dec 3.	J F Lightner.	309 Montgomery St.	
Holmes M Co.	Nevada.	10.	1.00.	Sept 28.	Nov 2.	Nov 27.	C T Bridge.	224 California St.	
Johnston Gravel M Co.	California.	2.	05.	Sept 3.	Oct 15.	Nov 20.	G W With.	313 Front St.	
Julia Con M Co.	Nevada.	21.	10.	Nov 4.	Dec 1.	Dec 30.	J Stadfeld.	419 California St.	
Mexican G & S M Co.	Nevada.	30.	25.	Sept 21.	Oct 27.	Nov 18.	C E Elliott.	309 Montgomery St.	
Mountain Tunnel G M Co.	California.	1.	10.	Sept 28.	Nov 2.	Nov 20.	A B Paul Jr.	328 Montgomery St.	
New York Hill M Co.	California.	9.	15.	Oct 30.	Dec 3.	Dec 24.	J B Leighton.	313 Montgomery St.	
Navajo M Co.	Nevada.	13.	2.	Oct 29.	Dec 2.	Dec 23.	J W Sullivan.	306 Montgomery St.	
Potosi M Co.	Nevada.	20.	40.	Sept 28.	Nov 4.	Nov 25.	C E Elliott.	309 Montgomery St.	
Russell Refue & M Co.	California.	1.	25.	Oct 15.	Nov 25.	Dec 18.	J Moritz.	328 Montgomery St.	
Summit M Co.	California.	8.	05.	Oct 23.	Nov 30.	Dec 21.	G W Sessio.	309 Montgomery St.	
Savage M Co.	Nevada.	64.	50.	Oct 5.	Nov 9.	Nov 30.	E B Holmes.	309 Montgomery St.	
Sierra Nevada S M Co.	California.	33.	25.	Sept 30.	Nov 4.	Nov 24.	J F Parker.	309 Montgomery St.	
Sulphur Bank Q M Co.	California.	4.	50.	Aug 29.	Oct 9.	Dec 3.	T W Wingham.	336 California St.	
Trinity M Co.	California.	1.	10.	Nov 2.	Dec 8.	Dec 24.	G W Pearson.	417 Kearny St.	
Tuolumne Con G M Co.	California.	1.	05.	Sept 15.	Nov 13.	Dec 15.	H J Hyland.	309 Montgomery St.	
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Dec 10.	H Dear.	359 Montgomery St.	
Willow Creek M Co.	Nevada.	2.	1.00.	Oct 12.	Nov 16.	Dec 14.	R B Cronau.	310 Pine St.	

MEETINGS TO BE HELD.									
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.				
Alaska M Co.	California.	A. Judson.	323 Sansome St.	Annual.	Nov 19.				
Challenger M Co.	California.	C. L. McCoy.	419 California St.	Annual.	Nov 19.				
Kentuck M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Nov 25.				
Pioneer M Co.	California.	A. Judson.	320 Sansome St.	Annual.	Nov 23.				
Silver Lick M Co.	Nevada.	L. J. O'Farrell.	420 California St.	Annual.	Nov 25.				

LATEST DIVIDENDS—WITHIN THREE MONTHS.					
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caledonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Nov 25.
Jackson M Co.	California.	D. C. Bates.	10.	10.	Oct 5.
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	06.	Mar 16.
Manhattan S M Co	Nevada.	John Crockett.	419 California St.	25.	Sept 1.
Mt Diablo M Co.	Nevada.	E. W. Heath.	318 Pine St.	20.	July 30.
Navajo M Co.	Nevada.	J. W. Pew.	310 Pine St.	25.	Feb 13.
Plymouth Con G M Co.	California.	W. Van Norden, Pres.	23 Nassau St, N. Y.	50.	Apr 6.
Silver King M Co.	Arizona.	J. Nash.	323 Montgomery st.	25.	Oct 15.
Syndicate M Co.	Nevada.	J. Stadfeld Jr.	419 California St.	10.	Sept 8.

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.		Red Bluff.		Sacramento.		S. Francisco.		Los Angeles.		San Diego.	
	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.	Rain.	Temp.
Nov. 4-11												
Thursday.....	.15	49 S	.06	53 S	.04	55 NW	.01	58 W	.—	68 NW	.14	62 W
Friday.....	.40	51 S	.13	52 S	.03	56 SE	.57	60 SE	.00	68 SE	.00	67 W
Saturday.....	2.27	54 NW	.77	62 S	1.29	63 SE	1.30	69 SW	.00	72 S W	.00	68 W
Sunday.....	1.33	62 S	1.26	58 N	.02	61 S	.05	68 S	.00	75 W	.00	66 W
Monday.....	.23	50 SE	1.39	51 NW	.—	63 E	.09	60 NW	.00	67 W	.00	64 W
Tuesday.....	.08	49	.57	58 NW	.29	61 S	.78	58 NW	.00	68 W	.00	64 NW
Wednesday.....	.00	43 SE	.00	56 NE	.00	57 NW	.00	57 NE	.00	71 SW	.00	64 NW
Totals.....	4.52		7.26		1.72		.80			.14		

EXPLANATION.—Cl, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Bullion Shipments.

Germania, Nov. 4, \$4718; Silver Reef (for Octo. ber), \$31,705; Hanauer, 4, \$2950; Stormont, 4, \$3500; Germania, 5, \$4710; Alice 6, \$16,830; Hanauer, 6, \$5630; Nevada, 6, \$750; Leon, 7, \$374; Vienna, 7, \$2,004; Hanauer, 7, \$3840; Stormont, 7, \$3610; Crescent, 7, \$4340; Queen of the Hills, 7, \$1700. The banks of Salt Lake report the receipts for the week ending Nov. 4th of \$77,441.44 in bullion and \$14,825 in ore, a total of \$92,266.44.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTELL—Amador and Calaveras Co's.
F. H. HORN—Nevada (State).
G. W. INGRAMS—Arizona.
E. L. RICHARDS—San Diego Co.
R. G. HUETOY—Idaho and Montana.
Geo. McDOWELL—Santa Clara and Santa Cruz Co's.
HUGO ELLAS—Nevada Co.
J. DE PUE, Butte and Yuba Co's.
B. E. LLOYD, Stanislaus and Merced Co's.
J. WINKLER, Alameda Co.
M. L. DENNY, Plumas and Sierra Co's.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some responsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE Fresno *Expositor* reports that discoveries of gold are being constantly made in that county, and believes that the mining interest will soon become important.

THE Nehalem coal discoveries made near Astoria, Or., are causing considerable interest in that locality.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 22.	WEEK ENDING Oct. 31.	WEEK ENDING Nov. 5.	WEEK ENDING Nov. 12.
Alpha.....	.60	.65	.65	.70
Alta.....	.30	.25	.30	.25
Andes.....	.25	.30	.25	.30
Argenta.....	.10	.15	.10	.15
Belcher.....	1.45	1.70	1.25	1.70
Belcher.....	1.20	1.65	1.25	1.35
Bullion.....	.35	.40	.50	.55
Bonanza King.....	..	..	..	..
Belle Isle.....	.25	.05	.10	.15
Bodie Con.....	2.25	2.70	2.45	3.10
Benton.....	..	..	..	..
Bodie Tunnel.....	..	.20	.25	..
Bulwer.....	.40	.50	.45	.50
California.....	1.20	1.40	1.20	1.35
Challenge.....	..	.20	.25	.30
Champion.....	..	.20	.25	.30
Chollar.....	1.10	1.30	.80	1.05
Confidence.....	..	.90	.90	1.00
Con. Imperial.....	1.20	1.40	1.20	1.35
Con. Virginia.....	1.20	1.40	1.20	1.35
Con. Pacific.....	1.25	1.45	1.15	1.35
Crown Point.....	1.25	1.45	1.15	1.35
Day.....	..	2.75	2.25	2.50
Eureka.....	..	2.75	2.25	2.50
Eureka Tunnel.....	..	2.25	.20	..
Exchequer.....	..	.25	.20	..
Grand Prize.....	..	..	..	.30
Gould & Curry.....	.75	1.00	.80	.95
Goodshaw.....	..	..	..	.10
Hale & Norcross.....	3.55	4.35	2.90	3.90
Holmes.....	..	..	..	4.15
Independence.....	..	..	..	4.20
Julia.....	..	..	..	..
Justice.....	..	.15	..	..
Martin White.....	2.60	4.30	4.10	7.50
Mono.....	..	.65	.70	.80
Mexican.....	..	.25	.20	.30
Mt. Diablo.....	..	2.50	..	..
Northern Belle.....	..	..	..	..
Navajo.....	.45	.50	.40	.60
North Belle Isle.....	..	.10	.15	.30
Occidental.....	..	1.00	..	..
Ophir.....	.85	1.25	.90	1.15
Overman.....	..	.30	.25	.35
Potosi.....	.25	.30	.15	.20
Pinal Con.....	..	..	..	.55
Savage.....	1.40	1.70	1.25	1.50
Seg. Belcher.....	..	..	..	1.50
Sierra Nevada.....	.70	.90	.60	.75
Silver Hill.....	..	.70	.60	..
Silver King.....	..	..	..	6.25
Scorpion.....	..	..	..	.10
Syndicate.....	.35	.40	..	.35
Tioga.....	..	..	..	.25
Union Con.....	.60	.75	.65	.70
Upham.....	..	..	..	.80
Utah.....	..	..	..	.75
Yellow Jacket.....	1.35	2.00	1.75	2.00

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Nov. 12.	225	Gould & Curry.....	.95c @ 1.00	
100 Alta.....	25c	1750 Hale & Nor.....	3.35 @ 4.05	
200 Alpha.....	65c	250 Mexican.....	.95c	
100 Belcher.....	1.75	50 Mono.....	.75	
100 B. & Belcher.....	1.50	350 Nevada.....	1.00	
305 Bodie Con.....	2.70	2.75	300 Ophir.....	1.35
100 Bodie Tun.....	15c	1100 Potosi.....	.65c	
100 Bulwer.....	35c	10 Silver King.....	.70	
250 Benton.....	10c	1850 Savage.....	1.18	
250 Con Va & Cal.....	1.55	345 Sierra Nevada.....	1.05 @ 1.10	
190 Chollar.....	75c	100 Utah.....	.70c	
100 Exchequer.....	25c	100 Union.....	.80c	

METALLURGICAL works are to be established at Latourelle Falls, on the line of the railroad.

Market Reports.

Lumber at Wholesale.

The Redwood Lumber Association has established no prices since the first of the year.

Redwood.—Cargo prices are at present as follows: Rough, merchantable, @ M ft., \$13.00; Rough, clear and surfaced, \$23.00; 1x10 Rustic, No. 1, \$24.00; 1x10 Rustic, No. 2, \$19.00; 1x3 V Rustic, No. 1, \$22.00; 1x6, tongued and grooved, \$21.00; 1x4, tongued and grooved, headed, \$23.00; 2-in. x3, Battens (board measure), \$30.00; Shingles, @ M, \$1.65.

Pine.—Rough, \$15.00; No. 2, \$12.00; do do in lengths, \$13.00; rough, 40 to 60 ft lengths, \$16.00; do 50 to 60 ft, \$17.00; T and G Flooring, 1x6, \$26.00; do do 1x8, \$23.00; do do 1x4, \$28.00; do do No. 2, \$21.00; Vertical Grain T and G Flooring, 1x6, \$30.00; do do do 1x8, \$32.00; Stepping, \$37.50; Furring, 1x2, per lineal ft, 1 c.

Lumber at Retail.

Prices fixed by the association April 1st. are as follows:

Pine, Rough.....\$16 00
" " No. 2....." 12 00
" " 2 in lengths....." 13 00
" " 40 to 60 feet lengths....." 16 00
" " 50 " 60 "....." 17 00
T. & G. Flooring 1 x 6....." 26 00
" " 1 x 8....." 23 00
" " 1 x 4....." 28 00
" " No. 2....." 21 00
Vertical Grain T. & G. Flooring, 1 x 6....." 30 00
" " 1 x 8....." 32 00
Stepping, 1 x 2, per lineal foot....." 37 00
Furring, 1 x 2, per lineal foot....." 03
Redwood, Rough....." 17 00
" " No. 2....." 13 00
" " 1 x 8....." 30 00
" " 1 x 6....." 28 00
" " T & C. 6 in. 12 ft. and over....." 26 00
" " " 7 to 12 ft....." 20 00
" " Rustic....." 30 00
" " No. 2....." 25 00
" " T. & G. Beaded 12 ft. and over....." 30 00
" " " 7 to 11 ft....." 26 00
" " " under 7 ft....." 20 00
" " Sliding, 1 in....." 22 00
Pickets, Fancy....." 25 00
" " Rough Pointed.....

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S
SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 3, 1885.

- 329,128.—Screw Propeller.—Joseph Belduke, S. F.
329,628.—Wash Boiler.—Martin F. D. C. Dannmeyer, S. F.
329,825.—PAVING BLOCK.—Alfred T. Elford, S. F.
329,563.—ENGINE.—Alfred E. Johnson, Austin, Nev.
329,571.—LAMP CHIMNEY CLEANER.—Mortimer D. Lamb, Butte City, M. T.
329,750.—ORE CRUSHING MACHINE.—Joel B. Low, S. F.
329,579.—EXTENSION BABY CARRIAGE.—Anthony McLean, S. F.
329,483.—APPARATUS FOR DYEING.—Ludwig Pfaff, S. F.
329,486.—PENCIL SHARPENER.—G. C. & W. C. Price, S. F.
329,602.—GRAIN SEPARATOR.—James M. Smith, Etna, Cal.
329,603.—DEFLECTOR PLATE FOR FIRE BOXES.—Andrew J. Stevens, Sacramento, Cal.
329,604.—DIVIDED CAR AXLE.—H. Thielens & H. W. Dalg, Portland, Or.
329,511.—APPLE PARSER, SLICER AND CORER.—John B. Tupper, Petaluma, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MILL-STOCK FEEDERS.—Geo. Cottrell, S. F. No. 329,364. Dated Oct. 27, 1885. This invention relates to that class of automatic feeders which are employed to deliver mill-stock of various kinds to rolls, purifiers and similar machines. The patent covers certain points of construction and combination of devices.

APPLE PARSER, SLICER AND CORER.—John B. Tupper, Petaluma. No. 329,511. Dated Nov. 3, 1885. This invention relates to that class of apple-parsers in which the apple is carried on a rotating fork and is pared and sliced by suitable knives, which travel in contact therewith; and the invention consists in a combination of devices for making an effective and rapidly operating machine.

WEIGHING DELIVERY WAGON.—Shubael Park, Oakland. No. 328,138. Dated Oct. 13, 1885. This invention relates to a device for transporting and weighing articles in bulk. It is a combination, with a vehicle having an opening made in its floor, of a scale supported within the opening and a lever, whereby the scale may be raised above the level of the floor or depressed beneath it.

ENGINE.—Alfred E. Johnson, Austin, Nev. No. 329,563. Dated Nov. 3, 1885. This invention consists of cylinders having their axes in line, pistons fitted to said cylinders and united by a rod which connects them, rotating disks loosely fitted to said piston rods, so as to be operated by eccentrics on the main engine shaft, which extends transversely between the cylinders, and in certain details of construction. The valves are kept in contact by steam pressure, which operates them in one direction and the eccentric in another.

CRANE OR DERRICK.—Wm. S. Doan, Sacramento, assignor of one-half to Wallace Doan, S. F. No. 329,148. Dated Oct. 27, 1885. The invention relates to the class of dredging machines, and it consists in a boom-supporting mast adapted to be rotated by means of a turntable at its base, or a novel boom supported by the mast and provided with a counter-weight extension, and in certain details of construction. The object is to provide a simple derrick adapted for use on land or water, which, by reason of its construction, can be readily and easily handled.

JAMES T. CHINNICK, Elk Grove, Cal. No. 328,127. Dated Oct. 13, 1885. This windmill

head consists of a hollow perforated main head, secured to the frame of the mill, and carrying anti-friction rollers on its top and steady rollers below, a rotating tubular head fitted in the main head, and having a top flange resting on the upper rollers, and a bottom flange bearing against the lower rollers, a peculiar bracket secured to the rotating head, and adapted to carry the regulating vane, and plates or bars secured to the bracket and head for carrying the boxes of the crank-shaft.

ANIMAL TRAP.—Smith K. Reynolds, San Jose. No. 329,082. Dated Oct. 27, 1885. The trap consists of a swiveling tray or platform adapted to receive the earth which is usually thrown up by ground animals, such as gophers and squirrels; or a hammer or lock engaged by said platform or tray, and adapted to be tripped by its movement; or a suitable seat or chamber for a cartridge containing a projectile and adapted to be exploded by the hammer, and in a peculiar grapple set and tripped by the lock. The object of the invention is to destroy small animals, such as gophers, moles, ground squirrels, etc.

APPARATUS FOR WORKING DERRICK FORKS.—Cassius Stone, Walnut Creek, Contra Costa Co. No. 328,530. Dated Oct. 20, 1885. The invention relates to an apparatus for working derrick forks, by the use of which the fork having been raised, or as to discharge its load, may be again drawn back to be set for a new load. It consists of a rope attached to the rear of the fork-head, passing around a pulley which is supported from an adjustable standard at the rear of the stack. Thence over a pulley fixed near the upper part of the derrick, and thence to a winding drum, which turns upon a clutch mechanism, and a means for operating the same, so that the drum may be caused to rotate with the shaft, or allowed to remain stationary at will. The whole apparatus is easily adjustable and greatly reduces the labor of handling the forks.

GAME BOARD.—Albert F. Knorp, S. F. No. 329,395. Dated Oct. 27, 1885. This improvement in game boards consists of a novel construction by which the surface of the table may be kept true and prevented from warping out of shape. In the construction of these tables it has been customary to take a board or plank of sufficient width and length, which usually renders it necessary to make a joint at some point between the ends. Such a surface is apt to warp and get out of shape, becoming uneven by the action of the weather. In Mr. Knorp's table the board is formed of boards or strips set on edge side by side, having plates or bars extending through openings made transversely through them, and supporting sills upon which the table rests, combined with screw-bolts extending through the sills and into the transverse bars.

BARK-MILL.—Wm. A. Woods, Santa Cruz, assignor to R. C. Kerby. No. 329,113. Dated Oct. 27, 1885. This bark-cutting mill embodies a two-part hinged casing or shell having an open bottom, a peculiarly located hopper set into the casing near its top, or to one side of its vertical center, a rotating open-ended cutter-head or drum mounted in the casing, and provided with adjustable hits or knives adapted to catch and slice the bark between themselves and the lower or long wall of the hopper, and to force the cut slice into the drum; and peculiar inclined ejector-wings on the periphery of the cutter-head, adapted to force the cut or sliced bark outwardly to the open ends of the drum, from which it falls into the casing and is discharged.

BARK-MILL.—Wm. A. Woods, assignor, to R. C. Kerby, Santa Cruz, No. 329,114. Dated Oct. 27, 1885. This invention relates to a bark-mill of that class in which a rotating cutter head or drum, slices or cuts the bark against the wall of the feed hopper; suitable ejectors within the drum guiding and discharging the sliced or cut bark. This mill is an improvement on the other one issued on same date, but applied for before. The present means of carrying out the invention consists in a novel circular or annular ejector-core, conical in cross-section and formed about the hubs of the drum and within its periphery, and peculiar side wings hinged to the inner surface of the periphery of the drum and to the inner surface of the base of the core and projecting into the space between the open ends of the drum and outer casing.

NEW BOOKS ON ASSAYING.

By C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist or the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Gold and Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular," is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Methods; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scouring; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Manipulation, etc.; Lead Ores; Copper Ores; Volumetric Assays; Parkes' Process; Amalgamation; New Process; Preparation of Potassium Zanthate; Electrolytic Determination of Copper in Ores, etc.; Assaying of Tin Ores; Assaying of Mercury Ores; Assaying of Zinc Ores; Assaying of Zinc Ores, New Method; New Assay of Nickel and Cobalt; Assay of Chromium; Assay of Bismuth; Assay of Arsenic; Assay of Antimony; Assay of Sulphur; Assay of Salt; Appendix to Part I; Notes on Crucible Assays; Weighing by Oscillation; Appendix to Part III; The Assay of Lead; The Assay of Copper.

There are 160 12mo. pages with illustrations in the volume, which is bound strongly in cloth. Price postpaid, \$1.75. Sold by Dewey & Co., Publishers, No. 252 Market St., S. F. These are much needed books for miners and other practical men, by an intelligent miner and assayer and careful writer. They are invaluable for the mill and mine worker, and equally good for scientific experts. They are thoroughly practical books.

DELINQUENT NOTICE.

The Orleans Mining Company.—Location of principal place of business, San Francisco, California. Localities of works, Grass Valley township, Nevada county, California.

NOTICE.—There is delinquent upon the following described stock on account of Assessment (No. 12) levied on the 17th day of September, A. D. 1885, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	Shares.	Amount.
Platt, Charles.....	9	59	\$295 00
Cuddehe, Thomas.....	30	10	50 00
Delano, M. H.....	31	10	50 00
Delano, M. H.....	32	10	50 00
Delano, M. H.....	33	10	50 00
Delano, M. H.....	34	10	50 00
Delano, M. H.....	35	10	50 00
Delano, M. H.....	36	10	50 00
Delano, M. H.....	37	10	50 00
Delano, M. H.....	38	10	50 00
Delano, M. H.....	39	10	50 00
Delano, M. H.....	41	12 1/2	62 50

And in accordance with law and an order of the Board of Directors, made on the 17th day of September, A. D. 1885, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, Nos. 934 and 936 Mission street, San Francisco, California, on Monday the twenty-third day of November, A. D. 1885, at the hour of two (2) o'clock p. m. on said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of sale.

GEO. P. THURSTON, Secretary.
OFFICE—Nos. 934 and 936 Mission Street, San Francisco, Nov. 3, 1885.

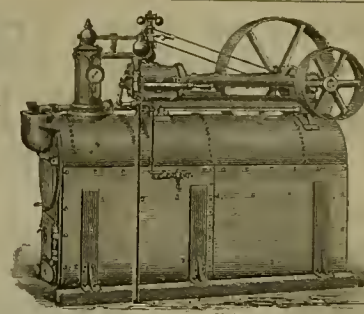
DEWEY & CO
PATENT
SOLICITORS
252 MARKET ST. S. F.
ELEVATOR 12 FRONT ST. S. F.

AN EXPERIENCED ASSAYER,

Speaking Spanish Fluently,

Desires an Engagement.

Address A. R., this Office.



SKINNER ENGINE COMPANY'S

CELEBRATED

PORTABLE ENGINES and BOILERS.

Three Gold Medals at the New Orleans Exposition over 25 Competitors.

ALL SIZES CARRIED IN STOCK.

STEEL BOILERS

All sizes and styles made to order. (2-sheet Steel Boilers a specialty.) 2000 H. P. sold on the Coast during past three months.

STEARNS MANUF'G CO.,

29 & 31 Spear Street, San Francisco.

CATARRH

HOLBROOK'S
ELECTRIC
CATARRH AND
ASTHMA CURE

A wonderful medicine. Instantaneous and lasting in its effects. Convenient of application. One bottle will cure any case. Ask your druggist for it, and if he does not keep it, order from the undersigned, who will forward it, post-paid, to any address, on receipt of \$1.00. If not found as represented the money will be refunded.

Pacific Electric Co.
Sole Proprietors
330 Sutter Street
San Francisco, Cal.

CURED

American Exchange Hotel,
SANSOME STREET.

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

MICA MINE.

Capital Wanted to Develop.

Half Share offered as equivalent.

ADDRESS

G. W. SPAWFORTH, Lang Station, Cal.

TO MINING MEN.

Competent man of practical knowledge desires position as Superintendent. Experience in Mexico and California, Speaks Spanish. Address

PACIFIC IRON WORKS.
127 First St., San Francisco.

HEALD'S

BUSINESS
COLLEGE,
24 Post St. S. F.
Send for Circular.



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples unished on application.

SAN FRANCISCO NOVELTY AND PLATING CO., 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St, San Francisco, Cal.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe,
Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

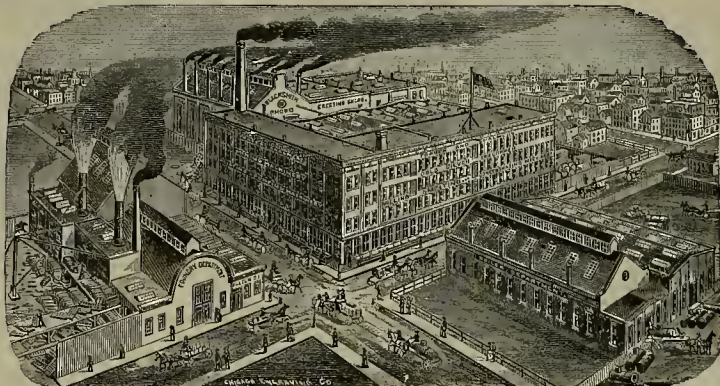
ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

**SELBY
SMELTING and LEAD CO.,**
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

**BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF

**Standard Shot-Gun Cartridges,
Under Chamberlin Patent.**

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

**Assayers' Materials,
MINE AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL

H. KUSTEL

METALLURGICAL WORKS,
318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on. Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

WM. D. JOHNSTON

ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Hubn & Luckhardt),

Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL

Location of Works: Melrose, Alameda Co., Cal.

OFFICE: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$10 upward per ton; Jewelers' sweepings and scrapings bought or worked for the owners at a fixed rate per ton. Rebellious ores especially solicited. Ores worked and practical working tests made by any process, to wit: Amalgamation in battery and copperplates for free gold ores. Amalgamation in pans for silver and gold ores, with or without roasting. Leaching of silver ores. Chlorination of gold sulphurets. Assaying, Chemical Analyses of Ores, Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

THOMAS PRICE,

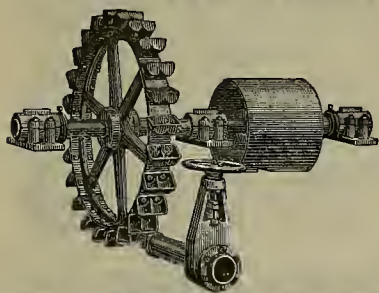
Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO, - CALIFORNIA.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.



**The California
Perforating Screen
Company.**

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

PROFESSOR S. NORTH'S

EARPHONE

FOR THE

DEAF.

Every deaf person should Try It!

Send for Circulars, or

CALL AT 615 POWELL ST., S. F.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven M'fg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matcher Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

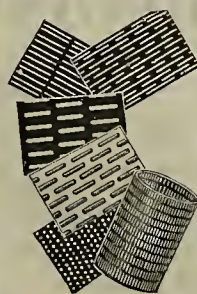
Lane and Bodley Saw mills.

H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES and LUBRICATING OILS.



Chicago Prices Beaten!
ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

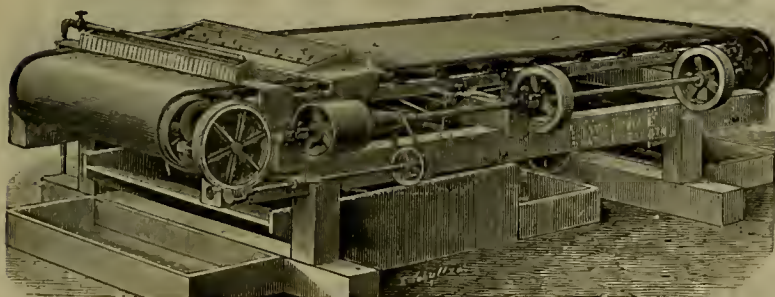
J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.



DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS,
(\$575 00), F. O. B.**

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embury), similar to the Triumph, the Frue Vanning Machine Company owns the Embury patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

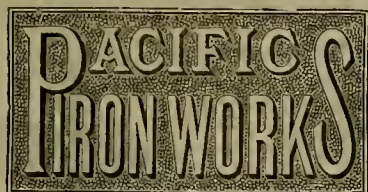
Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

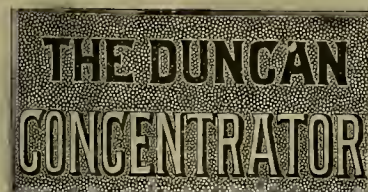
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



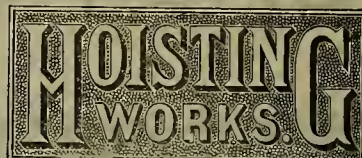
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Ruggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

Geo. W. PRISCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

Geo. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

—BUILDERS OF—

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE CHEAPEST AND BEST IN USE.

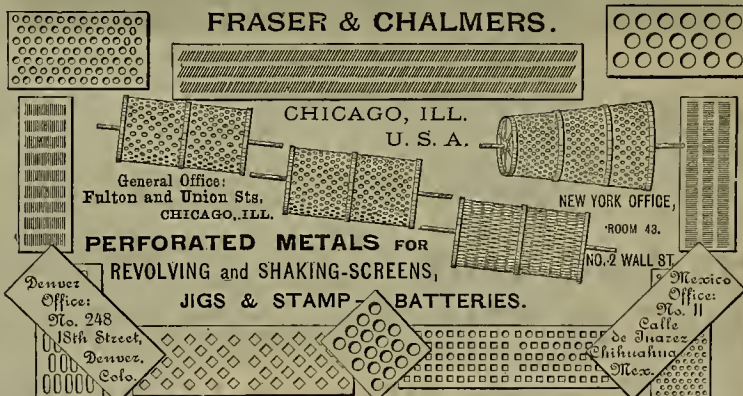
UNION IRON WORKS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

FRASER & CHALMERS.



CHICAGO, ILL.
U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



*ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.

JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Cauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

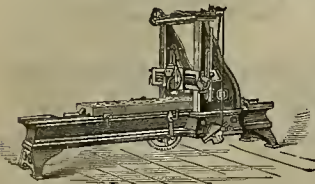
In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be discarded from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



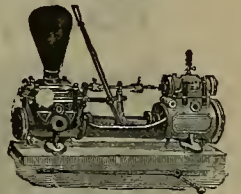
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

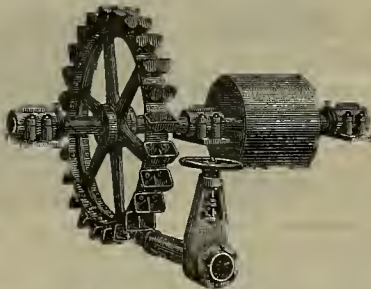
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

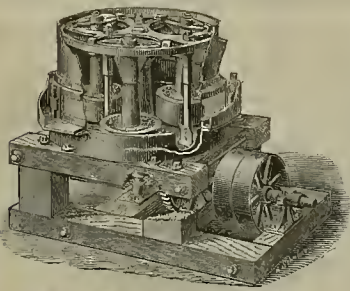
THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch
pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve, Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Hine" Patent Safety Boiler (Water Tube);
50,000 horse power now in use.
MACHETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-
iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.
WILSON'S PATENT GAS-PRODUCER.
STEAM BOILERS of all descriptions.
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship
Pumps, Steam Capstans, Cargo Winches, etc.
Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountai
Mining Company.
Send for Circular and Price Lists.

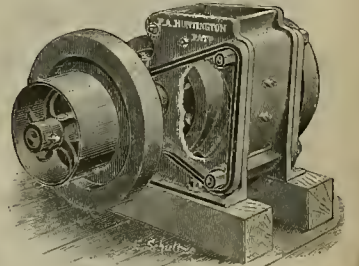


Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,
MANUFACTURER OF
Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,
Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 21, 1885.

VOLUME LI
Number 21.

"Economic" Portable Boilers.

The engravings on this page represent a style of return tubular portable boiler called the "Economic." Fig. 1 is a cross-section through the furnace which is lined with fire-brick, and Fig. 2 is a longitudinal section through the center of the boiler. The front end of this boiler is cylindrical in form and extends over the furnace, while the rear end is oval, the lower portion extending below the cylindrical part far enough to hold the short tubes leading from the furnace to the back connection. The furnace is brick-lined, and can be readily detached from the boiler when desired. The fire-brick lining is held in place by iron rods, protected from the fire, and can be easily removed and replaced when necessary. The furnaces and grate surfaces are large, and the form of the boiler and arrangement of the tubes give a very high degree of efficiency and economy. The products of combustion, going through the short leading tubes into the back connection, are carried by the return tubes through the upper section of the boiler to the smoke-stack.

Messrs. Tatnall & Bowen, of this city, agents for the coast, claim that the objection sometimes raised to a brick-lined furnace in a portable boiler, that there is a loss of heating surface, is rather apparent than real. In the furnace of the ordinary portable boiler the crown sheet is the only really effective heating surface. Owing to defective circulation the water in the side walls seldom reaches the boiling point. In the "Economic" the fire-brick lining soon becomes very hot and produces better consumption of the gases set free at a low temperature than can be had in a water-lined furnace, and the cylindrical crown sheet gives a large, effective heating surface. In the portable boiler, as usually made, the furnace is the great source of expense and danger. It is the most expensive part of the boiler to build, the part most liable to give out, and the most expensive to repair. The flat crown sheet, always subjected to the greatest heat, has the least water to protect it and is the first part exposed by low water. The sides of the furnace are ready receptacles of sediment, and are difficult to clean and liable to burn out. In the "Economic" the case is reversed. The furnace is the cheapest part of the boiler to build and repair; there are no sides to fill with mud and burn out, or flat crown sheets to be exposed by low water and cause explosions and loss of life. The crown sheet in the "Economic" is fully

protected and the boiler is as safe as a stationary. It combines with the safety of the stationary return tubular boiler, the convenience and portability of a portable. It occupies but little space, and is a rapid, economical steamer.

On account of the boilers being so short, when an engine is to be mounted on it, the dome will be left off, and a dry-pipe substituted (see dotted lines Figs. 1 and 2), and this will be done in all boilers when so ordered. These boilers are now made of steel.

Distribution of Ores.

A few weeks since we had a short article in the PRESS on this subject, in which attention

the Pacific Division are independent of volcanic action, but the association of eruptive rocks with ores is a rule, with comparatively few apparent exceptions, and in many cases the agency of solfataric action is manifest. This has long been recognized by observers.

That there are relations between the rocks inclosing ore deposits and the character of the ores has been known to miners for centuries, but the study of the nature of this dependence is comparatively new. The census collections and data appear to confirm such relations. Lead ores are almost invariably accompanied by limestone, and veins in granite present only a very small number of associations of minerals, which are possibly reducible to a rough ore.

Mineral and Agricultural Land.

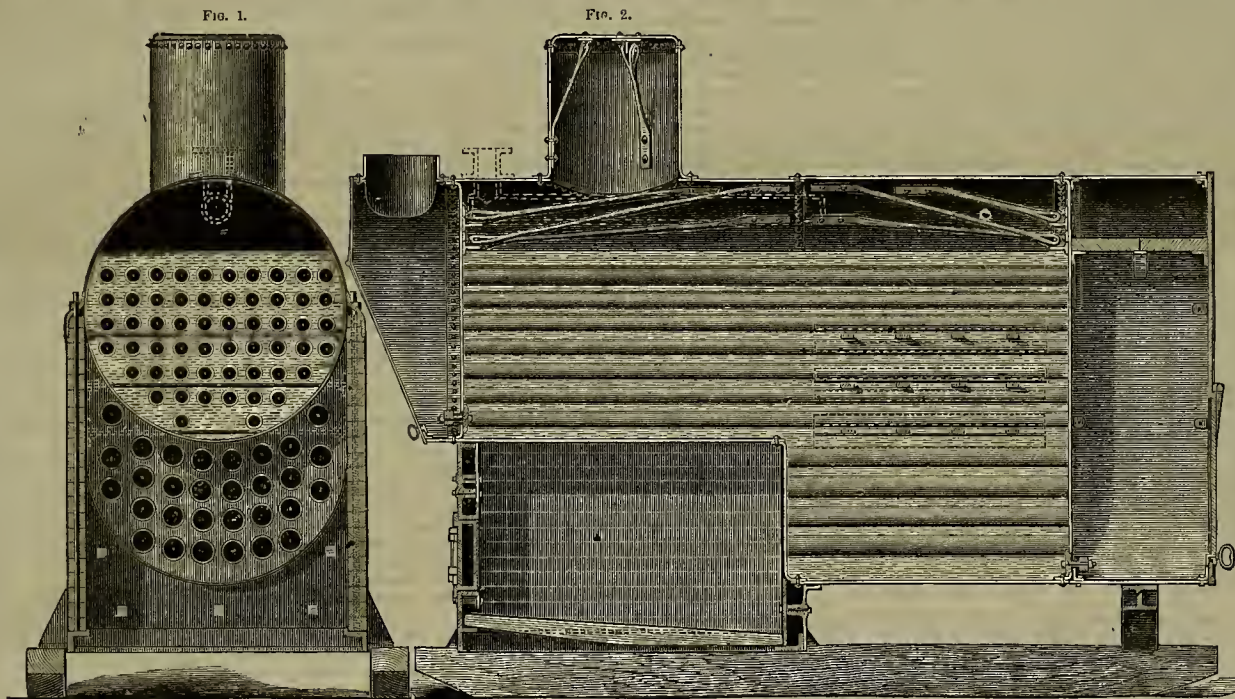
One of the few weak points in our code of mining laws is that relating to mineral lands, as opposed to those of an agricultural character. Owing to the system of taking proofs as to character of the land, a great deal of mineral land has gone into the hands of agriculturists. We recently gave an article concerning a case in Santa Clara county in this State, where farmers, with no knowledge at all of mines or minerals, had testified that certain tracts were more valuable for agriculture than mineral, where there were several mines on the tract, one of which was worth about half a million of dollars, fully developed, with machinery, furnaces, etc. Most

of these farmers were Portuguese or Italians. They knew nothing of mines or minerals whatever, so could swear that they thought it more valuable for farming than mining, with clear consciences.

Men with no knowledge of minerals, ore or mines but accustomed to agricultural pursuits only, can easily testify to the fact that land is better for agriculture than mining, because they would know nothing at all of its value in minerals. Unless some one has a mine on the tract or is going to mine there, there is no one interested enough to con-

tradict the evidence of the agriculturist, and the land passes out of the mineral land sections of the country. In this way a great deal of good mineral land has been taken up as agricultural.

In this connection a recent decision of the Supreme Court of the United States is of interest. The decision was rendered in two public land cases brought upon an appeal from the judgment of the Supreme Court of Dakota. The first was an action to recover a parcel of mineral land upon which is built the city of Deadwood. The land was entered and paid for in January, 1878, and in the June following the Probate Judge, acting as the trustee for the town, entered the same land. The Supreme Court holds that no title from the United States to land known at the time to be mineral land can be acquired under the pre-emption, homestead or townsites laws. The mining claim of the plaintiff in the case and the title thereto had actually passed to him before the Probate Judge took the initial proceedings. The United States had therefore nothing to convey. The judgment against the town is affirmed. The other case is similar, except that the town of Central City, Dakota, made no entry. The judgment against the town was affirmed.



"ECONOMIC" PORTABLE BOILERS.

was called by Government geologists to the fact that in the region west of the Rocky mountains there are four ore belts. These four distinct belts appear to have an intimate connection with the four great orographical changes which the region has undergone during its geological history. In the "Geological Sketch of the Pacific Division," by Geo. F. Becker, the features of these four belts are described. This theory of the relation between the ore belts and lines of uplift is, of course, not to be understood as equivalent to the assertion that the deposits are to be found only along a single line representing the actual main fissure of the uplift. One is apt to think of the dislocation attending an orographical change is confined to a single vertical or highly inclined surface, but every geologist is aware that this is not an exact view. Single fissures in the earth's crust are very rare, and parallel sets of fissures with cross fissures and stringers into the surrounding country are the rule, even in the case of insignificant cracks. In disturbances such as those of great uplifts a considerable belt of country is necessarily crushed and torn. The breadth of such a zone must be measured usually in inches.

It may be that some of the ore deposits of

Deposits in metamorphic rocks, too, though more varied than the others appear to represent but a few types.

In the "Geological Sketches of the Precious Metal Deposits of the Western United States," by S. F. Emmons and G. F. Becker (for the census), the determination of the ore and gangue minerals in the country rocks, and the kind of deposit, are introduced, county by county, and the tables given contain much information of value to miners and geologists.

PLUMAS NOTES.—Our traveling correspondent, who was last week at Quincy, Plumas county, writes us that mining matters thereabouts are quiet, chiefly for the want of water. There is a bright future, however, especially when the Mohawk railway, projected to the junction, is completed. Two miles of the road from the junction end is now graded. The recent rains brought rejoicings among the people, giving the miners a chance to reap a small harvest before the depth of winter. The town and surroundings of Crescent Hills seem to have caught the dull times, but our correspondent heard of claims being jumped, indicating that there must be something there worth having. At Eureka Mills there are many Cornishmen.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

An Experiment.

[Written for MINING AND SCIENTIFIC PRESS by C. H. AARON.]

It has occurred to me, as it has to others, that a convenient method of assaying zinc might be got out of the well-known interferences of that metal in the assay of copper by the method of decoloring an ammoniacal solution by a solution of potassium cyanide.

My plan was, to add to the assay solution of the zinc ore, previously freed from copper, if necessary, a fixed quantity of a titrated solution of copper; then proceed as in a copper assay. From the excess of copper indicated, above that known to be present, the quantity of zinc in the assay might be calculated very simply if varying proportions of zinc would produce a uniform proportional difference. The former I find to be the case, but only under conditions which seem to be practically unattainable in an assay.

I worked with solutions of copper sulphate, zinc sulphate, and potassium cyanide: the actual quantity of zinc and copper present being immaterial for my immediate purpose, which was to find out if, by taking a constant quantity of the copper solution, and adding thereto varying quantities of zinc solution, the quantities of cyanide solution required to decolor, would vary in any ascertainable ratio. It is not necessary to occupy your space by a detailed account of my experiments. I made several dozens of tests, at first with weak solutions and uniform volumes of ammonia, which gave results so nearly proportional that I was in great hope of success.

Continuing my experiments, with stronger solutions, startling discrepancies were found. In one series, it appeared as though a large proportion of zinc interfered less, relatively, than a small one. I was not discouraged by this, seeing an easy way out of the difficulty, provided the variations were regular; but in some special tests the reverse effects were observed. As is often the case in such empirical work, a number of coincidences occurred tending to mislead.

Such experiments generally result in something useful even if not in the attainment of the desired end. I have given up the idea of getting even an approximately reliable assay of zinc in this manner, but I have satisfied myself on three points.

1st. The presence of zinc does materially affect the result of a copper assay by this method, though some assayers entertain an opposite opinion, and it may make an enormous difference, especially when the ore is poor in copper and relatively rich in zinc.

2d. The variation produced by a given proportion of zinc to copper depends largely on the proportion of free ammonia present, a condition which can hardly be controlled in an assay, though it may be in a set experiment.

3d. In the absence of zinc, the presence of a great excess of free ammonia causes a higher result in the copper assay, but, within reasonable limits, the difference is not large.

In the presence of zinc, the effect of an increased proportion of ammonia is surprising. With one volume of my zinc solution to one of the copper solution, and a certain quantity of ammonia, a quantity of potassium cyanide solution represented by 27 was required in addition to that which was necessary to decolor that quantity of copper solution alone. With a larger quantity of ammonia, the coefficient of the cyanide solution was increased to 35, and with still more to 63. This may account for the diversity of opinion among assayers as to the extent to which zinc interferes in the assay of copper.

In one instance of an ore assay, some time ago, I got, apparently, 8½ per cent of copper by the cyanide assay, where other methods, including the Swedish, showed that only 2.3 per cent were present.

I also satisfied myself that the salts of ammonia have an influence on results, so that there seems to be no hope for this apparently promising rapid method for zinc.

The practical deduction from my experiments, aside from the consideration that it may save others the trouble of going over the same ground, is that, in assaying copper by the cyanide process, the proportion of free acid in the solution should be as small as possible, in order to avoid forming an undue quantity of ammonium salts on the addition or excess of ammonia; no more ammonia should be used than is necessary for the solution of all the copper, especially in the presence of zinc; and, if the zinc is in considerable proportion to the copper, the method is worthless as a copper assay, unless the copper be first separated by precipitation or otherwise from the zinc. The remarks as to acid and ammonia apply also to the making of the solution of a weighed quantity of pure copper for the purpose of standardizing the cyanide solution, and of check assays.

In the assay of copper, I think the cyanide process should only be used where rapidity of execution is important, approximating results will suffice, and zinc, beyond mere traces, is absent.

Montana Mines.

Missoula.

[Written for Press by our Traveling Correspondent, R. G. HUSTON.]

Missoula is situated on the right bank of the Hellgate river, a short distance below the mouth of the canyon, and contains about 1200 inhabitants. It is a general distributing point for the farming communities of the Bitter Root, Hellgate and Missoula valleys, and the repair shops and round-houses for this division of the railroad are here. At this point they are compelled to double up their motive power to go over the divide from Missoula to the Jocko. On his piece of road, some 15 miles from Missoula, they have the highest trestle that is in use by any railroad in the Union, being 226 feet high. It seems a dizzy height to run large and heavily loaded trains, but there seems to be no fear of its solidity.

The general merchandise interests are well supplied by Messrs. Eddy, Hammond & Co. and Messrs. Worden & Co. The town also supports two weekly newspapers—the *Times* and the *Missoulian*, each of which are up to the average county seat paper, it being the county seat of Missoula.

I was most surprised on being shown the fruit grown in town. Mr. G. B. Hartman has an orchard down on the bank of the river that is fully equal to our California orchards in variety and amount of production, and as for quality of apples, I think it surpasses anything that we have down in the valleys. He has all kinds of plums and cherries and pears, raspberries, strawberries and blackberries, and in fact, everything that we grow here can, except, perhaps, peaches. He had strawberries this year, 14 of which filled a quart measure. That sounds like a fish story, but was vouched for by so many that I made a note of it, anyway. Wheat producers have from 40 to 50 bushels to the acre; oats, from 70 to 80; barley, the same, and it is not an uncommon occurrence to see potatoes weighing three pounds. Cabbages run as high as 40 pounds to the head and turnips from 10 to 25 pounds those I saw myself.

Like all parts of this country, Missoula has her mining interests, which they think at some time or other will fill her coffers with gold and silver in plenitude. The Welcome placer mines on the east side of the Bitter Root valley, are yielding wages to a few men, and have some quartz that is said to be good. One lead called the Mary Anne, has a tunnel run for some distance; also has a shaft down 40 feet, and at that depth shows a ledge 20 feet wide of decomposed quartz, and from assays made it runs from \$25 per ton upwards. It is located where it is easy of access, and will probably develop into a good property. It is owned by Mr. H. H. Dickinson and Dr. Chouquette and others, of Missoula. There are also some ledges located near the town, but as they are undeveloped, nothing much can be said of them. On Lo Lo fork of the Bitter Root, there have been some fine copper prospects found, showing from 35 to 60 per cent copper. They also carry some gold, but are comparatively undeveloped.

Bear Gulch.

The glory of Bear Gulch's placer mining days has departed, but there are yet quite a number of the old miners working over the old ground, and picking out spots that have been overlooked in the more prosperous days of the place. I spent one night there in company with an old mining acquaintance, R. B. Loomis, who in company with a gentleman named Stone is developing a location called the Haparanda, and has a ledge of fair looking rock which prospects some in free gold. They are running two tunnels on it and will certainly ascertain soon if it is valuable or not, as they have the nerve and energy to prosecute the work. Joaquin A. Biscal still presides over the postoffice and store—the only one general supply store in the camp; consequently he has a monopoly in that line, but he does not receive the condemnation of his patrons, as the railroad company does; and the right man in the right place is the man to use.

Drum Lummon Mine, Marysville.

Is in Lewis and Clarke county, 20 miles northwest from Helena, on the headwaters of Silver creek. It is reached by stage from Helena twice a day. The mine was discovered by Thos. Cruse in 1878, and was worked by him in a small way until 1883, when it was sold to an English company operating under the name of the Montana Company (limited), with a capital stock of \$3,000,000. With the ample means at their disposal they have placed on the property one of the finest plants that there is in the West. The ore being low-grade it was necessary to prepare to work it properly in order to make returns to the stockholders, and they have supplied themselves with all the modern appliances for collecting and saving all the precious metal their ore contains. The mill contains 60 stamps and they crush about 100 dry tons per diem. They have been experimenting with four Frue Vanners and are now preparing to put in 24 more of them.

That is evidence that the result with these concentrators was satisfactory to the company. They have their mill and works lighted with an electric plant using the Brush system. The mining is all done by the compressed air drill, the National being the pattern used. I must confess that it is an easier manner of polishing

the head of the drill than the old sledge-hammer process. They are using eleven of these air drills, and they have no difficulty in keeping the mill supplied with rock. They are now working a force of 135 men, 65 in the mine and 70 in and around the mill, and I think there is nearly as many more who gain their livelihood from this same source, but indirectly.

The prosperity of the mine dates from the time Mr. R. T. Byliss assumed the management, who is ably seconded by Henry Bratnoher as mine superintendent, who, by the way, was one of my old time friends of 20 years ago, and to whom I am indebted for many courtesies shown me during my stay in the town. He has made quartz mining a study for many years, and is now reaping the benefit of his application, and the compliment is mutual, for, without a doubt, the company could not find a man who would cater to their interest in the manner he does. The mine paid a short time ago a fifteen per cent dividend, and from the present outlook have enough of their mine drained to last their present milling capacity for nearly 10 years. The lower level of their mine is in much higher grade ore than near the surface. They just struck some rock in the north end of the lower level that will run up into several hundred dollars to the ton. That is base ore, and they will have to ship to a smelter to work. The gross income of the mine can be safely estimated at \$1,000,000, with an expense account of less than 40 per cent, so you can readily see that it will be a handsome paying property for years to come. Just at present R. M. Breierson is acting general manager, but Mr. Byliss is returning from England and will undoubtedly resume his old position.

Marysville is quite a thriving village. The wants of the public are duly taken care of by Mr. Lighthody, of the American house. The Drum Lummon hotel, kept by Annie Dillon, is also a homelike place, and the Marysville house, by Mrs. Schaffer and her daughter, is a popular hostelry for ye honest miner. General merchandise, J. D. Courade & Bros., Jurgens & Price and Smith & Co., and other branches of trade are well represented, as is the usual case in mining camps like this close to a large town.

The Boston and Montana Mining Co.

Are working the Gloster mine, some three miles from Marysville. The mill and mine lie about half a mile apart, and the ore is transported to the mill by a cable tramway: the loaded car going down bringing up the empty one, also carrying lazy newspaper men up and down who wish to secure subscribers to their periodicals.

They have just completed their engine house at the hoisting works, which is certainly a finely appointed works as are needed in any country. The engine is 500 horse-power, furnished with the O'Neill cut-off. It is furnished with the Behr indicator, these only being used in two other mines in the West, the Horn Silver in Utah, and the Basset mine in Colorado. They use a compound leverage brake operated by pedal pressure, and when the brake is set it is impossible for the ponderous engine to turn a wheel. The hoisting apparatus is thrown in and out of gear by hydraulic pressure, and, in fact, everything about the mine is first class. F. L. West is superintendent of the mine, and seems to be peculiarly fitted for his position, and, having had large experience heretofore, is fully capable of running it in shipshape. The mill of 60 stamps is equally well-appointed, and is capable of handling about 150 tons per day. The ore, like the Drum Lummon, is gold-bearing. The ledge matter is not so solid as the Drum Lummon, and consequently they have to work it by hand drill. It consequently takes more than the other mine to get out the same quantity of quartz. They are working some 200 men in and around the mine and mill, and must necessarily give employment to many more, as the item of wood alone must give employment to a larger number. Messrs. Muth & Co. attend the wants in general merchandise here, and the other Marysville dealers all run wagons in, and then there are the usual amount of saloons and boarding-houses that are found around a camp of this kind.

We learn from the *Independent* that the company up to January 1, 1885, disbursed to its stockholders \$300,000. The probable result since that time I could not arrive at, as the general manager, Mr. Childs, was not disposed to be communicative, and outside reports say that the output is from \$80,000 to \$90,000 per month.

The old Whippoorwill mine and mill is some little south of the Gloster mine. The mine is worked out, or supposed to be, but the mill is soon to be started up by Messrs. Cutter & Hickey, on rock from the Enterprise location, some of which prospects very rich. They are sanguine of making it pay. They have a tunnel in 300 feet and have five shafts down some 50 or 60 feet. In some of those shafts they have good ore and think that there is small pay in their tunnel.

Messrs. Cutter & Hickey are also running the Mount Pleasant mine and mill. It is free-milling gold ore; are running six men on mine and four in mill. The ledge runs from two feet in width to 10 feet; mill yield about \$35 per ton. They seem to be well satisfied and are running right along. Cold weather freezes up their water supply so they will soon have to suspend for the winter.

Two miles further up over the divide is the noted Penobscot mine, which Vestal made

\$500,000 out of so easily, and then lost again. The mine was run in a very extravagant manner, "gilt edge," you might call it, and when they got off the big pay they had to shut down. It remained shut down for five or six years, and then the whole plant, mine and all, sold to Mr. Longmaid for \$4000. He commenced in a modest way as his means would admit of, and his first clean up was \$8000, with but little expense, and now he is working 12 men in the mines, and seven around the mill, and things look fairly prosperous around the old works.

The Albion, or Bald Butte company is located on mills from the Penobscot, south. It is owned by Messrs. Tatem, Chumasero & Co.; is free milling gold ore with a small percentage of silver, but they are not prepared to work it for what silver it contains. It mills an average of \$18 per ton gold, and they are able to make it pay that way. The incline is down 180 feet. The lower levels are run 120 feet each way, and at the 100-foot level is run 150 feet each way. Veins run east and west, pitching to the north: size of vein averages five feet all through. They have a 10 stamp mill on the property, and are doing well. The mine is managed by Pat Powers, an old pioneer in quartz in this territory, having managed a mine on the old Whit-lack Union lead at Unionville.

Hints for Lubricating.

[Written for the Press.]

The days of lard, sperm, castor and whale oil as lubricants are fast passing away. With the discovery of the new processes for refining petroleum oils, the fact dawned that the prices at which "straight, pure animal and fish" oils are furnished cannot be paid. A moment's reflection will suggest that precisely where the world would be to-day without the privilege of burning kerosene, there it would be without the privilege of using petroleum lubricants. Petroleum gives to-day the only good and satisfactory light and lubricant. Where now are all the old tallow, mutton suet, "drippings of sweet oil," olive oil, etc., used by our fathers in our boyhood days? Why, the enormous increase of machinery since then would render us now without any oil with which to lubricate, if it had not been for the discovery of petroleum. There would have been an oil and fat famine. The great improvements made continually in the distillation of petroleum oils, and the progressive discoveries in regard to their possible combinations with vegetable and animal oils, give to the science of lubrication at present essentially a character of change.

This is why it is so customary to hear purchasers of lubricating oils state that they know nothing about lubricating oils and complain that the oil salesmen often deceive them. If the purchaser would make the experiment he would often discover that he knows quite as much as the salesman, and the salesman in turn quite as much as his principal. How much accurate testing and scientific preparation of oil, think you, there is in California and on the coast? Of the oils marketed here from abroad, how many are of constituents known to those who sell them?

The true remedy is for the purchaser to employ some simple tests like those referred to in this journal recently. The moment it is understood by him that an oil which is inflammable at a degree under 350° Fah. is unsafe to use around his works, he will spend \$4.50 for a pyrometer, which will quickly show him how safe an oil which tempts him by its cheapness really is. When he knows that an oil, no matter what its fire test, should have a specific gravity of 28° to be a good lubricator, he will invest, perhaps, \$1.50 for an oleometer, which in a moment makes any oil disclose its secret. Not every oil shown to a purchaser is worthy of being tried. But the moment that the purveyor of oil knows that his goods are not to be taken on his word, but scientifically proved, the quality of the oils offered will at once be improved.

CHARLES J. WOODBURY.

123 California St., S. F.

Why Inyo County is not Prosperous.

EDITORS PRESS:—I think the following will give the reasons why Inyo county is not the most prosperous mining county in the State of California:

The capitalists who invested thousands of dollars to develop claims, for which they paid large amounts of money, as a general rule send men to manage and develop their mines who had neither a theoretical nor practical knowledge of mining. But if a common miner were to apply for a position as clerk at one of their offices they would laugh at him, even if he could prove his ability. Bad management caused whole districts to be abandoned, but a lot of fossils, who call themselves prospectors, remained behind, and as soon as the law permitted and sometimes before, located whole districts, and relocated them from year to year. They act like the dog in the manger; they will neither work their mines themselves nor let any one else work them.

In every mining district in Inyo county there are mines which contain plenty of good ore. The law allows the fraction of a year to do \$100 worth of work, and if the locator fails to do the amount of work required he should be debarred by law from relocating that claim.

MINER.

Experiments in Roasting and Amalgamation.

Mr. C. A. Stetefeldt, the well known mining engineer, formerly of this city, has published a report on the metallurgical treatment of gold ores of Las Minas, Zemelehuacan, State of Vera Cruz, Mexico. The experiments on roasting and amalgamation made there are very important, and we make the following extracts from the report. An average of 10 assays from this San Anselmo mine, gave 0.567 ounces gold per ton; average samples from Muertos mine 0.450 ounces per ton; average sample from Marie Antoinette mine, 0.325 ounces per ton gold. The grade of ore from the mines can be kept up to \$10 or \$11 per ton or even more.

The Metallurgical Treatment of the Ore.

That the gold ores of Las Minas are not fit for raw amalgamation, can be seen "a priori," and the practical tests made at the mill have been an entire failure. Such ores can only be prepared for subsequent beneficiation by a complete roasting. Hence I directed my first efforts to roast the ore dead. By that I do not mean only a desulphurization of the pyrites, and a decomposition of the sulphates formed in roasting, but also a higher oxidation of the magnetite to ferric oxide.

Roasting Experiments.

The ore was crushed wet by stamps, with No. 40 screen on the mortar, and allowed to settle in a tank. In the sluice-boxes, between the battery and this settling-tank, the coarser particles of the native gold were caught. This arrangement was made in order to avoid errors of sampling, produced by coarse gold, in subsequent metallurgical experiments. It will be noticed that some of the ore charges I have worked are considerably lower in value than the average of the ores. The statement above explains this fact.

The roasting was done in a small reverberatory furnace, with a rather ill-shaped hearth, having dead corners between the working-doors that could not be well reached with tools. A charge of 500 pounds was all the furnace could conveniently take, but generally not more than 200 pounds were roasted, this quantity being more than sufficient for my metallurgical experiments. The moist ore was made completely dry, screened, and all lumps broken up, before it was charged into the furnace.

Charge No. 1.—San Anselmo ore, with 64 per cent magnetite. The charge contained, after 4½ hours' roasting, 44.8 per cent magnetite. The solution, from a sample leached with water, gave no copper reaction, the copper sulphate being already decomposed. Some aluminium sulphate was found. After 14½ hours, the magnetite was only reduced to 42.3 per cent. After 16½ hours, one-half of the ore was discharged. It still contained 39.6 per cent magnetite.

Charge No. 2.—To the ore remaining in the furnace, 2½ per cent of salt was added, and the charge stirred for 1 hour. It was now drawn into a pile and left in the furnace, firing being discontinued. After 4 hours the ore contained 20.7 per cent magnetite, and after 8 hours, 19.2 per cent. The ore was discharged after 22 hours. The magnetite had increased to 24.5 per cent. A sample, tested for copper, showed that in one ton of ore 0.44 pounds of copper were present as cupric chloride, and 1.32 pounds as cuprous chloride.

Charge No. 3.—Muertos ore, with 47 per cent magnetite. This charge contained, after 5 hours' roasting, 35.7 per cent magnetite, and considerable copper sulphate. After 7 hours, 30.5 per cent magnetite was found, and the copper sulphate had been entirely decomposed. After 17 hours, one-half of the ore was discharged. It now contained 20.0 per cent magnetite, no copper sulphate, but some aluminium sulphate.

Charge No. 4.—To the ore left in the furnace 3½ per cent salt was added, and treated like Charge No. 2, with this difference, that the furnace was kept hot by continued firing. After 3 hours the ore contained 6.2 per cent magnetite, and much copper chloride. After 5 hours the magnetite had increased to 10.7 per cent, remaining at the same figure after 8 hours. The fire in the furnace was now stopped, and the ore discharged after 15 hours. It contained 11.3 per cent magnetite. The cupric chloride had entirely disappeared, and only 0.6 pounds of copper were present as cuprous chloride in one ton of ore.

Charge No. 5.—San Anselmo ore, with 65.7 per cent magnetite. Mixed at once with 5 per cent salt. After 4 hours' roasting, a sample contained 1.6 per cent magnetite, and considerable cuprous chloride. After 7 hours the magnetite had increased to 2.6 per cent. Firing was now stopped, the charge drawn into a pile, and left for 13 hours in the furnace. After discharging, the magnetite had increased to 5.6 per cent. Very little cuprous chloride was present, hardly sufficient for determination. A soluble aluminium salt was still left in the ore.

Charge No. 6.—San Anselmo ore, with 67.2 per cent magnetite. Mixed at once with 5 per cent salt. After 1½ hours, the magnetite had decreased to 18.4 per cent; after 4½ hours, to 1 per cent. After 5½ hours the ore was discharged. It now contained 2.5 per cent magnetite. In one ton of ore there were present 0.2 pounds of copper as cupric chloride, and 0.6 pounds of copper as cuprous chloride.

(Continued Next Week.)

California Labor Statistics.

Returns have been received by the Labor Commissioner from Sonoma and Sierra counties. In Sonoma there are 2000 farm hands employed at the average wages of \$25 a month. There are 1525 Chinese, including 20 females, none of whom are married. They are paid \$20 a month. The amount annually paid to the Chinese in this county is \$450,000, 90 per cent of which is sent out of the country. Of these Chinese the Assessor says: "Their presence keeps thousands of white women out of the laundry business, hog and grape picking and numerous other industries." Their sanitary habits are "bad, filthy, the worst in the world."

The Assessor says that no mechanic desiring work need be idle. There are employed mechanics with average wages as follows: Bakers 30, at \$2.50 with board; brewers 10, at \$2.50 and board; blacksmiths 75, \$2.50; bookbinders 2, \$4; brickmakers 50, \$2; cannery employees 100, males \$1.50, females 75 cents; carpenters, 100, \$3; wagon-makers 10, \$3; cigar-makers 20, \$2.50; confectioners 15, \$2; coopers 50, \$3; distillery employees 100, \$2.50; dairy employees 200, \$1 and board, gunsmiths 5, \$3; marble-cutters 30, \$3; millers 50, \$2.50; saddlers 100, \$2.50; shingle-makers 100, \$2.50; shoemakers, 100, \$2.50; soda works employees 20, \$2.50; stone-cutters 400, \$2.50; tailors 100, \$3; tanners 20, \$3; tinsmiths 40, \$2.50; upholsterers 10, \$2.50; wine manufacturers 100, \$3; willow-ware workers 150, males \$3.50, females 75 cents; quicksilver miners 50, \$3; railroad employees 200, \$2.50; street road employees 2, \$2; stage drivers 20, \$2.50; teamsters 50, \$2.50; draymen 30, \$2.50; railroad and express agents, 50, \$3.50; auctioneers 3, \$5; harpers 100, \$2; bookkeepers 150, \$3; bricklayers 75, \$3; bank clerks 20, \$7.50; express company employees 5, \$3.50.

Insurance clerks 25, \$3; merchandise clerks 200, \$2.50; government clerks 8, \$7.50; cooks 100, \$1 and board; dentists 15, \$4; civil engineers 5, \$3; stationary engineers, 15, \$3; artists 10, \$2; glaziers 15, \$2; journalists 10, \$3; hostlers 100, \$1.50 and board; lumbermen 30, \$2.50; milliners 30, \$1.50; painters 60, \$2.50; plasterers 20, \$2.50; printers 100, \$3; photographers 15, \$3; schoolteachers 150, males, \$3, females \$2.25; servants \$2.00, \$1.50; telegraph operators 50, \$3; telegraph messengers 20, \$1.50; waiters 150, \$1.50; watchmakers 20, \$3; well-borers 2, \$3; woodcutters 150, \$2.50; artisans not mentioned above 300, \$2.50.

In Sierra county there are 510 Chinese, 50 of whom are females. Most of these are miners, about 50 being cooks at \$30 per month. Mechanics are employed with wages as follows: Brewers 5, \$2.50; blacksmiths 30, \$3.50; brickmakers 5, \$3; carpenters 20, \$5; dairy employees 50, \$1.50 and board; ironmolders 3, \$3 and board; machinists 2, \$5 and board; pattern maker 1, \$6 and board; shingle makers 5, \$3 and board; tinsmith 1, \$4. There are 1000 miners who get \$2 per day and board; 25 school-teachers at \$80 per month and 30 servants at \$16.

PATTERSON MINES.—The two latest and most important mining strikes or excitements in this section of country, and which are attracting the most attention, are those of the Patterson Consolidated and the New Patterson mines in the Patterson district, in this Mono county, and the Lapanta mine, near Hawthorne, in our sister State of Nevada. While all are rich and promising strikes, and the capital at once invested in the Lapanta, the Patterson district mines present a far better outlook for capital to take hold of them. The Hawthorne mines, although said to be rich, are in limestone, with no defined and permanent ledges, and no guarantee that they will continue to pay for any length of time; but our Patterson district mines are in a defined ledge, which has been traced for miles, and many locations made thereon, and the ore from the Patterson Consolidated is being worked at the Eclipse mill, belonging to the company, with gratifying results, and as the work progresses in the Patterson Consolidated and New Patterson, the greater is the guarantee of their permanency. Several experts who have examined the new mines in both districts, unhesitatingly pronounce the Patterson mines the most promising. The mines in the Patterson district offer superior inducements to capital to invest in them. In this district there is an abundance of wood and an unfailing supply of water for reduction works. Lumber and all other supplies can be delivered in the district at reasonable figures, which will enable mine owners to work their mines cheaply and realize a profit from the lowest grade ores. The ores of the Patterson mines now being worked average probably from \$75 to \$100 a ton, but the large bodies of ore in sight, coupled with the facilities for reducing them, will make them valuable mines worth \$25 ore. Capital will travel further and invest in mining property that cannot make near so good a showing as our Patterson mines, but "distance lends enchantment to the view," and as our mines are within thirty-six hours' run from San Francisco, they will not attract the attention they would, were they in Idaho, Montana or Alaska.

—Bridgeport Chronicle.

THE ARIZONA Territorial Insane Asylum is to be erected about two miles outside of the town limits of Phoenix.

Hawthorne District.

Too discovery of the Lapanta mine at Hawthorne, says the *Inyo Independent*, has given a great stimulus to prospecting for mines; the whole country around Hawthorne swarms with prospectors, and many discoveries have been made recently that give fair promise of turning out well. Just west from the Lapanta mine the hills are found to contain very many ledges of silver bearing ore. Some of these assays high. Samples sent from a claim about two miles west from the Lapanta were assayed at the office of the Manhattan mine at Austin; these samples assayed \$26.14 a ton. The claim belongs to the Mining Recorder of the district, George Box, and is called the Red Bank. In the same locality are at least half a dozen other claims, all of which contain good ore; but on none of these has work enough been done to show the extent of the ore bodies.

About six miles farther south some fine ore has been found within the last 10 days, and the general appearance of the country is indicative of the presence of good ore bodies. Mining speculators in San Francisco and big mining companies at Austin and Eureka, Nevada, have experts in the district, looking out for chances to get hold of promising mining claims. A hindrance to prospecting is scarcity of water, little or none being found in the district. With the first rain or snow that falls the number of prospectors will be greatly increased. All the while men being busy with other work, Plutes are hauling water from Hawthorne to the mines, and with their miserable crow-bait skeletons of horses make big money selling the water at \$3.50 a barrel.

The town of Hawthorne is now the center of greater mining activity than exists anywhere else on the Pacific Coast. On all sides the work of prospecting is pushed vigorously, and discoveries that promise well are frequent. In the town there is at least four times the volume of business done now that was done three months ago. Merchants, hutchers, hotels, saloons and restaurants all are doing a good business. If the people of Hawthorne are wide awake, there is a bright future before them. Beyond all doubt they are surrounded by a rich mining region, all the ores from which must be brought to one common center to be worked. The water supply will determine where this center shall be. In the mountains west from the town plenty of water can be found within reasonable distance, if a sufficient supply is provided and supplied at reasonable rates. Mills and reduction works will be built, and Hawthorne will have such prosperity as was never dreamed of when the town was founded.

IDAHO.—Edward Stevenson, Governor of Idaho, has made his annual report to the Secretary of the Interior upon the condition of affairs in that Territory during the past year. He says that the crops of this year will be placed at half crop as compared with that of 1884. Notwithstanding the rapidly increasing population, products of the soil are amply sufficient to meet the wants of the people and leave a small surplus for export. The Governor points to this necessity for extending the United States survey lines in the northwest portion of the Territory so that settlers may locate thereon. The mining in ores is said to be in a very prosperous condition now, and rich mineral districts are being discovered and explored, prospected and worked with great success. The Wood River mineral belt is yielding ore assaying from 100 ounces to 350 ounces. The great Salmon river basin continues its outpouring of gold and silver, as in former years. The new lava district is fast coming to the front. The shortness of the working season has retarded the development of rich and extensive mines in the Sawtooth district, but when systematically opened and worked these mines are expected to take a place among the best paying camps on the Pacific Coast. The Governor says that not half the truth has been told of the richness and extent of this placer mines on Snake river. The Coeur d'Alene section receives most favorable mention. The Lost River copper mines, according to expert testimony, are remarkably rich. The financial condition of the Territory is said to be satisfactory. The cash on hand exceeds by \$5500 the Territorial debt. The total assessed valuation of property for 1884 was \$15,497,578, an increase of \$1,509,000 over the preceding year. A strong plea is made for the liberal construction of the Desert Land Act. The population of the Territory is set down at \$75,000, and the value of the gold and silver product during the past year is estimated at \$5,486,000.

THE Sacramento Bee says: Felipe Parkeman and Franco Parkeman, of Guanajuato, Mexico, arrived here Tuesday, accompanied by Louis Palmer, of San Francisco, who acts as interpreter. They have been making a tour of the mines in Montana and Idaho, and have visited Grass Valley and Nevada City in order to inspect the machinery. They are very wealthy and own about twenty mines in Mexico, which are worked in a primitive manner, 300 mules at one mine doing the work that a steam engine might do, and 100 men attending to the mules. The Mexican miners were very much astonished by the wonderful machinery they saw upon this trip and will order much like it for use in their mines in the tropics.

SNAKE RIVER GOLD.—Some more of the Plowman prospecting party returned a few days ago. Wm. Hooten, one of the number, exhibited a sample of this cement that contains the gold which led them to take the trip. It was about as large as your double fist, almost as heavy as galena, and full of many-colored and beautiful pebbles ranging in size from a homeopathic pill to an English walnut. The cement is bluish in color, fine grained, and so hard as to require blasting to break loose for quartz mill work. It is impossible to knock one of the pebbles from the mass only by piece-meal. The flour gold is diffused all through the cement, of which there is a mountain as colossal as the high peak north of town. The pebbles are as evenly distributed through the great mass as the gold, and it gives the same prospect on the apex as at the base, and the same as far in as they went as at the surface. The same character of pebbles and cement is found nowhere else. In short a like formation has never been discovered. It is literally a mountainous curiosity and how it was formed and whence it came are puzzling the minds of the intelligent and experienced prospectors who will return to work it next season. It is located in Wyoming, on the headwaters of Snake river. Mr. Plowman discovered it on his prospecting trips 20 years ago. — *Idaho Democrat*.

THE NEW NEVADA DISTRICT.—Hawthorne District, where the Lapanta ledge is located, is a vast pile of limestone, containing a network of ledges of decomposed quartz, and there seems to be no boundary to the golden area. In all directions, and in the most unpromising places, prospectors are finding deposits of the precious metal, and all orthodox rules of search have been abandoned. The theory which is now popular is that the gold is where it is found, and how and why it came there is left for future consideration. A toll road is already being projected, two town sites are beginning to show their pin feathers, and a stage line will soon be in operation. Already town lots have been sold on Water street and Fountain avenue in Lake City, and the real estate fever has taken a good start. Hawthorne has abandoned all interest in the silver question. The center of a triangle formed by three gold districts, its business men now only fear that gold values may depreciate. The Yellow Jacket mine to the southwest, the Gardener mines to the northwest, either sufficient to make things agreeable to people whose desires are within reasonable bounds, and the wonderful deposits in Lake district, directly east, make this a gold center of alarming activity.

INFORMATION FOR MINERS.—The weight of one cubic foot of solid quartz is 165 pounds; of broken quartz 94 pounds; of fine sand, dry, 100 to 115 pounds; of fine sand, wet, 82 to 90 pounds; of ordinary gravel, dry, 90 to 100 pounds; of ordinary gravel, wet, 80 to 90 pounds; of boulders not over six inches in diameter, 95 to 103 pounds; of gold, 1175 pounds; of water, 62.5 pounds; of ice, 37.3 pounds; of one gallon of water, 8.32 pounds. The estimated average quantity of ordinary ground worked per day of 10 hours, per man, by different methods is as follows: By pan, one cubic yard; by rocker, two cubic yards; by long tom, five cubic yards; by sluice, 15, and by hydraulic 100 to 1000 yards. The above statement of facts was furnished the Elk Mountain Pilot by Mr. M. A. Hawkes. It is valuable and should be preserved for reference.

THE RESERVATION.—The mining discoveries near Hawthorne are certain to bring about some change in the Indian reservation at Walker Lake. Large tracts of mountain containing minerals, and wood and water, are included in the reservation. These are utterly useless to the Indians, or, at any rate, not the least use is made of these resources by the Indians. Along Walker river, and included in the reservation, is rich, fertile land enough to support several times the number of Indians located there. Very little of this fine land is improved. The Indians wander up and down the railroad, lie around the towns and stations, beg or steal, but will not work. It is no kindness to these people to prevent the development of great mineral resources on ground utterly worthless to them. A change should be made in the Walker Lake reservation. — *Inyo Independent*.

PAPER PIANOS.—A German technical journal gives an account of an interesting experiment in piano making. The case is made entirely of paper instead of wood, so compressed that it can be highly polished. The color is a creamy white. The tone of this instrument is reported to be not loud, but very sweet. The sound is emitted, unlike the short broken note of the ordinary piano, is soft, full, and slightly continuous, resembling, somewhat that of the organ. This modification of tone is attributed to the evenness of texture of the compressed paper.

THE Butte papers are advising those seeking employment to stay away from Butte, as there is a vast surplus of unemployed men now there. Every mining superintendent has from 20 to 100 applications per day for work, which he cannot give. With all its immense industries, it is said "Butte cannot give employment to all the men in the Rocky mountains," and the presence of so many unemployed men during the winter is looked to with much concern.



T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES.	1 week.	1 month.	3 mos.	12 mos.
Per line (agate).....	.25	.80	\$2.20	\$5.00
Half inch (1 square)...	\$1.50	\$4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. O. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 21, 1885.

TABLE OF CONTENTS.

EDITORIALS.—"Economic" Portable Boilers; Distribution of Ore; Mineral and Agricultural Land, 337. Passing Events; Instruction in Metallurgy; Timber Land and Mines, 340. The Stanford, Jr., University; Mexican Silver Mining, 340.

ILLUSTRATIONS.—"Economic" Portable Boilers, 337. Cushman's Mining District, Chihuahua, Mexico, 341.

CORRESPONDENCE.—An Experiment; Montana Mines; Hints for Lubricating; Why Inyo County is not Prosperous, 338.

MECHANICAL PROGRESS.—Wrought Iron Castings; Asbestos for Piston and Valve Rod Packing; Wire and its Uses; The Best Weld; Testing Belting Leather, 342.

SCIENTIFIC PROGRESS.—The World in Which We Live; Beneficial Influence of Religion; The Higher Studies; Predicting Tornadoes; Man Formed of Condensed Air; The Moon and its Significance; Fossil Insects; Geological Survey of Mexico; The "Bogs" of Ireland, 342.

USEFUL INFORMATION.—The Detection of Fatty Oils in Mineral Oils; A New Use for Asbestos; The Work of Windmills; How Fire May be Carried in Cotton; Electroplating on Wood; To Prevent the Cracking of Wooden Faucets, etc.; Soldering Fluid; By the Road or in a Direct Line; Mechanical Aid to Rifle Practice; To Render Rancid Lard Sweet; Convenient Post-office Weights; Caves as Moth Extremities; To Clean Brass and Steel, 343.

GOOD HEALTH.—The Development of the Heart; Depth of Sleep; Why Drunken Men are not Injured by Falls; Baked Apples in Seasickness; Full Breathing; Unequal Hands; The Eucalyptus Overestimated; Cause of Red Noses; Longevity of the Sexes; Crime and Strong Drink; Bee Stings, 343.

MISCELLANEOUS.—Experiments in Roasting and Amalgamation; California Labor Statistics; Hawthorne District, 339. The Inventive Age, 343.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 344-45.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 348.

Business Announcements.

Engines and Boilers—Fulton Iron Works, S. F.
Quartz Pulverizers to Let—W. C. S., S. F.
Situation Wanted—A. L., S. F.
Situation Wanted—Engineer, S. F.
Mechanical Dictionary—W. S. Duncombe, S. F.
Real Estate—Lowe Bros., Anderson, Cal.

See Advertising Columns.

Passing Events.

The signing of a deed giving several millions of dollars to found a technical educational institution in California, as was done a few days since by Senator Leland Stanford, of this city, is an event of prime importance to the educational interests of this State. Judging from the tenor of the endowment documents, the University will be one of wide scope, and is destined to accomplish much good.

The heavy rains of the past week have filled the ditches, streams and rivers. Although hydraulic miners cannot use the water, there are many miners who can, and who rejoice at its abundance. Of course river mining is put a stop to for the season.

The prospectors' occupation is about done for this year, as the snow has driven most of them to the camps. There is nothing of special moment to record from the mining fields aside from what we have referred to in our mining summary, on other pages of the PRESS.

Of the alleged 50,000 circulars sent out by the Board of Trade of New York to business men to ascertain the feeling in reference to the silver dollar, not a copy was received anywhere in Montana.

Timber Land and Mines.

The recent order of the Commissioner of the General Land Office concerning timber on the public domain, which puts a different construction on the timber laws from that accepted and acted upon during the past few years, is of great interest to the mining community. In the mining regions where large amounts of timber are required, it has been the custom to cut the trees on the public lands for this purpose. It has been considered that if the timber was used near where cut, and not made into lumber for shipping, the cutting was not illegal. In California, Nevada, Oregon and Washington Territory, an act of Congress allows the location of land chiefly valuable for stone and timber, when unfit for cultivation or mining. And this may be done on land not yet proclaimed and offered for public auction. No more than 160 acres can be taken up, and it must be paid for at a price of \$2.50 per acre. This Act (June 3, 1878) expressly specifies that after its passage "it shall be unlawful to cut, or cause or procure to be cut, or wantonly destroy, any timber growing on any lands of the United States, in said States or Territories, or remove, or cause to be removed, any timber from said public lands, with intent to export or dispose of the same." It even forbids vessels or railroads transporting any lumber manufactured from said lands.

There is a provision, however, in the Act that nothing contained in it shall prevent any miner or agriculturist from clearing his land in the ordinary working of his mining claim, or preparing his farm for tillage, or from taking the timber necessary to support his improvements.

As stated, this Act only applies to California, Oregon, Nevada and Washington Territory. Just now they are in trouble in Montana over the recent circular of the Land Office on this timber question. A petition is being signed around Butte, addressed to the Secretary of the Interior, asking that the order of the Commissioner be suspended until the people of Montana could be heard from. The document protests against any rules that will prohibit the cutting of timber upon public lands in Montana, to be used for mining, milling, smelting or domestic purposes.

The protest states that there are now in Butte and its vicinity about 20,000 people who are dependent for support on the mines of Butte. There is paid out by the mines of the camp, monthly, nearly half a million of dollars for labor, supplies and improvements.

There are now in operation, in Butte, eight quartz mills having 250 stamps, and six smelters and concentrating works with a capacity of 1000 tons per day. In addition to this there is near by the Anaconda smelter, the largest in the United States, if not in the world.

The Butte ore generally is not high grade, and must be worked as cheaply as possible. Most of the milling ore has to be roasted and the copper ore has to be treated by smelting and concentration.

For this reason large amounts of timber are required, and unless it can be obtained at reasonable rates the mining industry must come to an end. Large amounts of timber are also necessary to supply the needs of the people for domestic and building purposes.

The timber used for the purposes is taken from the public timber lands, which in this section are, as a rule, mountainous and have no possible value, except for the timber or as mineral lands.

None of the timber cut is exported from the Territory, but is used exclusively to sustain its mining industry and develop its resources, and for this reason the rule requiring each man to cut his own timber is unjust and should not be enforced.

Under the old rules which the people believed would be continued, they have built up the most populous mining camp in the world, but if the Government takes such action, as it is reported it may do upon the timber question, the labor is in vain, the capital is valueless, the mines must be shut down, the mills and smelters closed, business suspended, and from the most prosperous community for its population in the United States they relapse into the uncivilized wilderness which was found there a few years ago.

The Pioneer mill at Globe, Arizona, was burned down on Monday; loss, \$8000.

Instruction in Metallurgy.

While there is more or less instruction given in mining matters in Europe and in this country it has not been until of comparatively recent date that metallurgy has received the attention due it. Even now there are very few places where metallurgical students are properly educated. In fact, our books on metallurgy are by no means abundant, though the subject is one on which much information is needed and asked for. When it is remembered that the work of the miner must be supplemented by that of the metallurgist it would seem that wherever mining is taught metallurgy would receive due prominence. The advantages of technical education are now being more generally recognized all over the world. Metallurgy requires scientific knowledge, and practical work as well, and there are few fields where young men would find such chance of profit and advancement as in this. It is one of the professions that will pay, and which is not now over crowded.

A new school of metallurgy has been opened at the Birmingham and Midland Institute, and it is an important step in the technical teaching of England. At the opening of the school recently, Professor W. Chandler Roberts, chemist of the Mint, and Professor of Metallurgy at the Royal School of Mines, delivered an address, in which he deplores the fact that we appear to have imitated the systems of early metallurgists and alchemists in handing traditions and discoveries down to one or two pupils only. The greatest advances in theoretical metallurgy, he considers, were due to recent times, the result of individual and not collective teaching. It was not until Dr. Percy was appointed to the chair of metallurgy at the Royal School of Mines that systematic teaching was commenced.

The Royal School of Mines has trusted to elaborate lectures, and has devoted special care to a complete system of laboratory work. The *Ecole des Mines*, in Paris, adopts a system which is in the main the same, but the students visit and report upon works during their vacation—a plan Professor Roberts has endeavored to imitate since his appointment to the chair at the School of Mines, in 1880. Second, there is what may be called the system of Freiberg, as it is so well represented at the great school in Saxony, where the men study metallurgy theoretically, in lectures to which a somewhat limited laboratory course is added, the great feature of the instruction being the facilities the men have for spending a portion of each day in the Halsbrückner Hütte or the Muldner Hütte, these being the great works of the district in which the school is situated. And, finally, there is the system adopted in America, especially at the School of Mines, Columbia College, New York, and at the Massachusetts Institute of Technology at Boston, where, in addition to laboratory work as ordinarily understood, students carry out metallurgical operations, more or less experimentally, it is true, but, as an engineer would say, on a scale of nearly "12 inches to a foot."

It is somewhat difficult to compare the relative merits of these apparently distinct systems, because the conditions of the countries in which they are in force are so different. In London, Paris, New York and Boston the mining schools are situated at some distance from metallurgical centers. From an American point of view the distance of London from South Wales, Lancashire and Yorkshire must seem insignificant; but distance is not the only difficulty to be met. In England the works are not under Government control, and students therefore owe their admission to works to the generosity of the owners, which has hitherto been so liberally exercised that the absence of State influence has not been felt. On the continent the control of work by the Government enables students to visit the various establishments as a matter of right, and this fact has doubtless determined the situation of certain mining schools.

Although no strict comparison can be made, Prof. Roberts brings forward the following prominent points connected with the three systems: The Royal School of Mines was established at a time when the systematic teaching of metallurgy had been neglected. It was only natural, therefore, that extreme importance should be attached to laboratory work, and especially to researches having for their object the investigation of obscure points in metallurgical practice. There is, in fact, far too great a

tendency at the present day to lose sight of the importance, from an educational point of view, of having the teaching of students on a thorough knowledge of the chemical reactions upon which metallurgical operations must depend, and on rigorous and minute chemical analysis.

With regard to the Freiberg system, its chief merit appears to consist in giving the students broad views as to practical details, if it does not familiarize them with the real difficulties of metallurgical work. Surely, it may be urged, the frequent opportunities for seeing metallurgical operations must be of great value to the student; but consider how short a time a student, who is preparing for the higher branches of his profession, can possibly give to the purely theoretical work which he must get through. No system by which a student accompanies a demonstrator, or even a local foreman, to works, and only sees the successes and not the failures of other people's labors, really affords him adequate instruction.

Prof. R. H. Richards, of Boston, observes "that large charges cannot afford to spoil a furnace charge to show a student what happens from a little carelessness."

In the American schools of mines plant of sufficient power is provided to render it possible to concentrate by the ordinary dressing appliances no less than four tons of any given ore, and to treat the enriched product by suitable metallurgical process, adopting either "dry" or "wet" methods, or both combined, as the necessities of the case demand; and it may be added that the "plant" provided is sufficiently comprehensive to permit the adoption of very varied methods of treatment.

Leland Stanford Jr. University.

The papers and popular conversation during the last half year have been largely occupied with rumors and surmises about a grand educational institution to be established by Governor and Mrs. Leland Stanford to perpetuate the memory of their young son who died while the family were visiting Europe. Not until Saturday of last week was the public given full information of the grand and useful undertaking to which the Stanfords will devote their great wealth. On that day there was a meeting at Governor Stanford's house in this city of the Board of Trustees into whose hands he commits the management of the University which he will establish and equip. The property which has been deeded to the State for the purpose, has a present value of three and one half millions, and it is the general understanding that Mr. and Mrs. Stanford will farther contribute to the University until it receives an endowment of thirty millions or upwards: making it in fact their sole legatee in the place of the heir whose death has led them to bestow their whole wealth for the advancement of the people rather than divide it for the personal benefit of relatives.

The best use which can be made of great aggregates of wealth is to devote them to the comfort or safety or intellectual advancement of the people. There is a bright list of philanthropists, who, having been more fortunate than their fellows in amassing this world's goods, have so placed the rewards of their successful stewardship, that they remain for all time a blessing to their fellowmen. Many do this at their death, being unable to summon courage to part with their fortunes while living. We have always admired those rather, who, while still in health and strength, planned and carried out the philanthropic enterprises which their wealth secured. How wise for Governor Stanford, not only to give his money, but also many years of his life to the building up of the beneficent institution which he has planned.

There are all shades of opinion as to what should be the aims and methods of educational work. We find our own ideas changing as we grow older, and the conditions of public affairs seem to be changing. We do not profess to be especially expert in the philosophy of education, but it seems to us that the University planned by Governor Stanford, and upon the development of which he now enters with so much zeal, will approach nearer to the real needs of the people than any institution now in existence. The object of the University is thus described in the deed executed by Mr. and Mrs. Stanford to the Board of Trustees:

The nature, object and purposes of the institution hereby founded to be: Its nature, that of a University, with such seminars of learning as shall make it of the highest grade, including

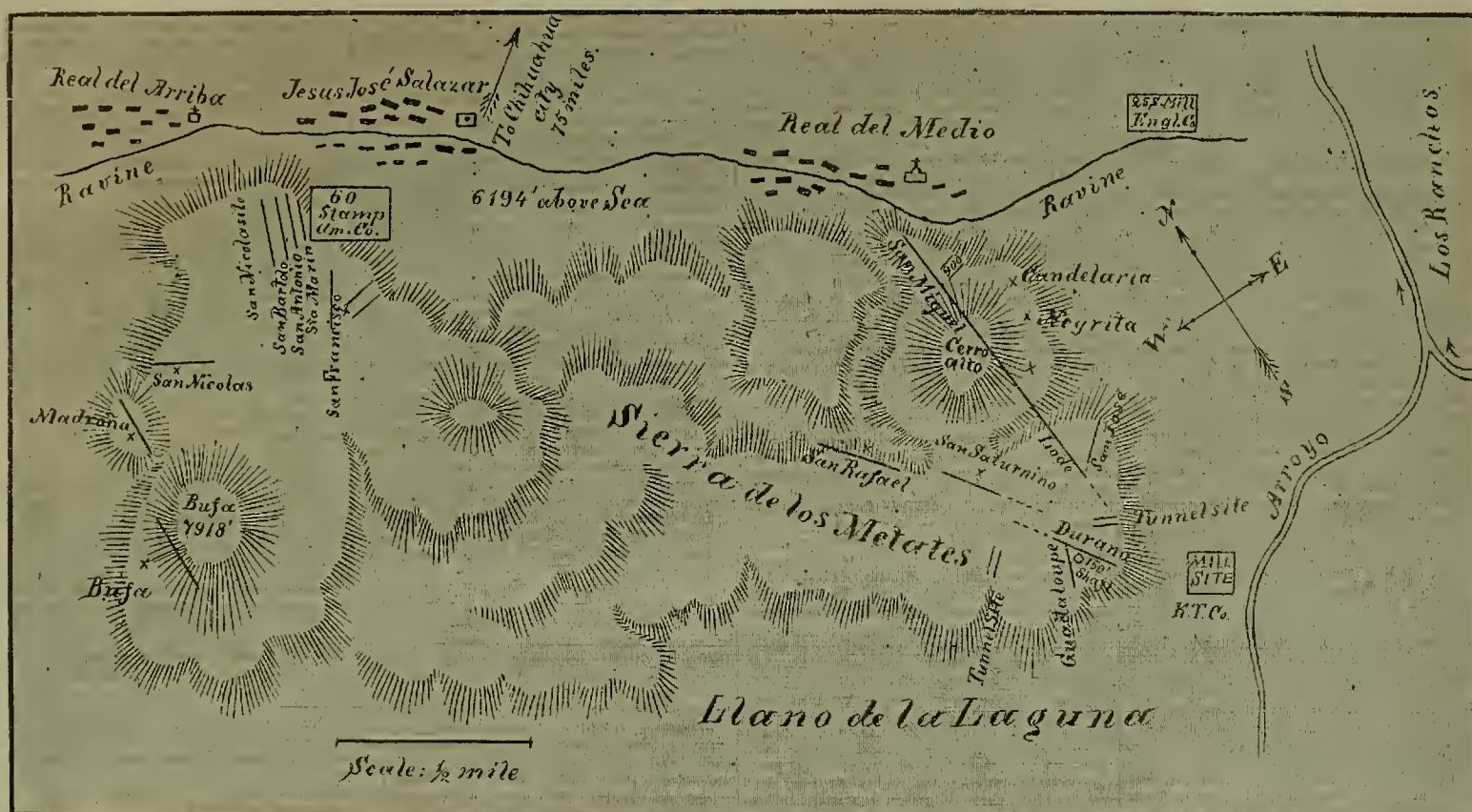
To establish and maintain at such University an educational system which will, if followed,

Out of these suggestions grows the consideration of the great advantage, especially to the laboring man, of co-operation, by which each individual has the benefit of the intellectual and physical forces of his associates. It is by the intelligent application of these principles that there will be found the greatest lever to elevate the mass of humanity, and laws should be formed to protect and develop co-operative associations. Laws with this object in view will furnish the poor man complete protection against the monopoly of the rich, and such laws properly administered and availed of, will insure to the workers of the country the full fruits of their industry and enterprise. They will accomplish all that is sought to be secured by the labor leagues, trades unions and other federations of workmen, and will be free from the objection of even impliedly attempting to take the unauthorized or wrongful control of the property, capital or time of others.

[Written for PRESS by W. H. PURDIE.]

A few items from this, one of the oldest and most noted of silver mining districts in the Republic of Mexico, if worthy of a space in the columns of your valuable journal, might not prove uninteresting to its readers of the mining community. Cuahuiraichic is located in Lat. 28° 61' N., Long. 6° 54' W. Mex., 75 to 81 miles south of west of the city of Chihuahua, in the loftiest part of the mountain chain of the Sierra de los Metates. This mountain chain is 100 miles east of the main range of the Cordilleras or the Sierra Madre, and 439 feet lower. The Sierra de los Metates is of similar formation to all of Northern Chihuahua. cretaceous fossiliferous.

Transportation facilities and all other resources conducive to the mining interests of this district, soon to rank with the best of Mexico, cannot be excelled in any country. We hail with pleasure the successful issue of these



CUSHUIRIACHIC MINING DISTRICT, CHIHUAHUA, MEXICO.

The merely physical wants of civilized man are not much greater than those of the savage, but his intellectual wants are bounded only by his capacity to conceive. His wants, therefore, will always depend upon his advancement in civilization, and the demand for labor will be measured accordingly. The rapidity of the communication of modern thought and the facilities for transportation make the civilized

Lorenzo Sawyer, Jamss McM. Shafter, Charles Goodall, Alfred L. Tuhhs, Francis A. Spencer, Henry Vrooman, Charles F. Crocker, Timothy Hopkins, Henry L. Dodge, Irving M. Scott, William Ashburner, H. W. Harkness,

Some two years ago the North Mexican Silver Mining Company, of London, entered the field and purchased the "Saturnino," "Durana"

THE inconvenient consequences of the withdrawal of Belgium from the Latin Monetary Union are beginning to be felt in France. In a few weeks the Belgian silver five-franc piece will cease to be a legal tender. The total loss on all the repudiated money circulating in France will exceed 30,000,000 francs.

MECHANICAL PROGRESS.

Wrought-Iron Castings.

Something New and Valuable in Metallurgy.

For the past year or two occasional allusions have been made in several technical journals, both in this country and Europe, in regard to a new process in metallurgy by which castings of wrought-iron could be produced as successfully as those of steel or cast-iron. Of late more authoritative and definite statements have appeared. In May last a paper was read at the meeting of the Iron and Steel Institute of London by Mr. Nordenfeldt, an eminent English machinist, in which the new process was described and fully endorsed by him. Such an authoritative declaration that wrought-iron, with all its desirable qualities, could be cast in a commercially practicable manner, elicited much attention from the members of the association and from all others engaged in iron manufactures. Sir Henry Bessemer, who was present and listened to the reading of the paper, is said to have expressed the opinion that the invention was of fully equal value to that of his own, known as the Bessemer process of converting cast iron into steel.

The manner in which the results were obtained at an experimental furnace built in Worcester, Massachusetts, are described in the *Boston Journal of Commerce* as follows: "The furnace is of peculiar construction, and, as the first successful attempt to use liquid fuel for this purpose, merits description. It is of iron, about five feet long, two high and three wide, and is divided into three compartments, each large enough to contain two crucibles, each holding the iron. At one end of the furnace there are three V-shaped troughs, about three inches deep. Into these troughs crude petroleum is fed from a tank some distance removed. Being ignited, the flame is turned into the furnace by the draft of this chimney. It then passes down a narrow chamber, constructed of fire-brick, and enters the first crucible compartment through an opening near its bottom, uniting at the same time with a stream of air from an atmospheric conduit in this bottom of the furnace. The flame is most intense, and completely envelops the crucibles. From the first compartment it emerges at the top on the further side, and enters the second compartment, surrounds the crucibles therein contained, and passes through an opening at the bottom of the third compartment. After surrounding the crucibles therein contained it passes out near the top and into the chimney. It is obvious that the degree of heat to which the successive crucibles are subjected is of varying intensity, the severest heat being in the first compartment. This, which was at first thought objectionable, is found to be an advantage, though it necessitates more labor. Each crucible in its turn occupies each compartment, and a more perfect combustion is obtained thereby. When crucibles No. 1, or those at the front, are taken out to be poured, No. 2 takes their places, No. 3 taking the place of No. 2, and newly charged crucibles being placed in the compartment vacated by crucible No. 3. The intensity of the flame is regulated by a very primitive but effective method, it being the moving of a fire-brick over an opening in the first air duct. The compartments are each covered by a slab of fire-clay, which contains a circular opening for viewing the progress of the combustion. The crucibles remain in the furnace from two to three hours. Then the two in the first compartment are taken from their fiery path and carried to the mold containing the pattern, into which the glowing mass is poured directly from the crucible. From this time it is treated like ordinary castings.

"The molten iron is much more liquid and fluent than ordinary cast-iron. It seems to run with the facility of water. On this account it is practicable to produce, by the new process, castings solid and fine beyond example. There are some features in the process not yet disclosed to the public, though there are several patents, each of which is considered essential to the success of the new method."

The castings can be hammered, welded, elongated, filed, etc., as easily as ordinary bar iron, and is said to be from 20 to 25 per cent stronger than good wrought-iron. The melting by the furnaces above described is very rapid and perfect, requiring less than half the time of ordinary melting of steel or cast iron.

To recount all the uses to which castings could be put would be simply a rehearsal of one-half or more of all iron articles now in use. It is said that Sir Henry Bessemer, on seeing the articles cast by this process on exhibition in London, remarked: "This is impossible, still it is a fact."

The Process in this Country.

The process has been essayed in Worcester, Mass., and, it is said, with complete success, under the direction of some Swiss engineers, who had learned the same from the inventor. The parties who have been experimenting there have secured the right for the United States.

Brief History of the Invention.

The journal from which we have quoted above gives the following brief history of the invention, as narrated by Mr. Ostberg, one of its chief promoters: For several years a Swedish engineer and mechanic, then in Russia, had been experimenting in this direction. Having succeeded to his satisfaction in the laboratory, he rather prematurely endeavored to get his invention adopted by the public.

When it became necessary to manufacture on a scale sufficiently large to meet the requirements of commerce, many defects and hindrances disclosed themselves. After it had passed through a varying fortune for some months, Messrs. Faustman & Ostberg, of Stockholm, became acquainted with the situation of affairs, and, realizing the great importance of the invention if it could be made practicable, they devoted much time to an effort to perfect it. About a year since they achieved a result which conformed to their desires. They immediately converted their malleable iron shops into works for manufacturing the new product, which is termed "Mitie," adopted from the Latin adjective, having the significance of ductility.

Mr. Nordenfeldt acquired the right to use the invention throughout the greater part of Europe, and Messrs. Faustman & Ostberg secured the right for Sweden, and also for the entire United States. It was under their direction that the experiments at Worcester were undertaken.

ASBESTOS FOR PISTON AND VALVE ROD PACKING.—Asbestos is a substance which can readily be manufactured into ropes, etc., which cannot be changed except by a high degree of heat, and is not effected by acids nor grease. These qualities, in addition to its cotton-like consistency, especially adapt it to the purposes of packing all kinds of rods and joints which are exposed to the action of steam of either a high or low temperature. As a piston or valve rod packing, for high pressure, there is nothing superior to it if well managed. It is found on sale at most all places where engineers' supplies are kept, in the form of rope, for piston and valve rod packing, and in sheets for steam chest and pipe flange joints. When used for piston and valve rod packing it should be well lubricated with a compound composed of equal parts of plumbago and tallow, and when placed in the gland around the rod great care should be used that it is not screwed up too tightly. This packing, if the rod is lubricated every two or three days with the plumbago and tallow compound, will outlast any known substance for this purpose. To prepare asbestos for joints, cut to the required size, and then paint one side with red lead, and the other cover with plumbago, so that if it becomes necessary to separate the joint after being made, it can be done without injuring the packing. Steam chest joints, which are so often separated for this purpose of valve inspection, when made of this material, and in this manner, will last for years without removal.

WIRE AND ITS USES.—This inelastic material that has been drawn out into a metallic thread has not only been woven, braided and twisted into almost every thing in the metallic line but has at last endured the tortures of the knitting machine and appeared in the form of a door mat, where the heavy stitches of wire make all the intersections and looped spacings desirable for a serviceable mat, where the hardest ice or snow-hall can be easily removed by them. In no part of our economy are we divorced from wire. It is our slave, and an ever-present master. Sleeping, we repose on wire mattresses. Eating, we see food which has passed through sieves, and which is sheltered from insect appetite by wire covers. Calling, we pull wires to ring curled wire bells. Traveling, we are conveyed by cable or electric railways, hoisted by elevators hung on wires and hurried over wire bridges. We announce our coming by telegraph or telephone wires, and we thread our way by night through streets lighted by means of electric cables. Across our fields are strung thousands of miles of barbed wire. Our clocks are set by wires, our watches run by wires, our hooks are etched by wires, our pictures hung by wires, and our politics managed by wires. Forty years ago there was not a telegraph office in existence. To-day they number over 60,000. Ten years ago the telephone was not in existence. To-day there are 330,000 in use in the United States alone.

THE BEST WELD.—Mr. Purvis, an English engineer, read a paper before the Institution of Naval Engineers on large forgings. Speaking of the different kinds of welds, he gave the preference, for heavy work, to the scarf weld, and considered the long V weld next best. He submitted some large specimens of welds, made by the use of sledge hammers, sows and the steam-hammer. Upon trial all of the welds broke at a red heat, by being bent, except the one made under the steam-hammer which was repeatedly bent forward and back till black hot, and then broke elsewhere than at the weld.

TESTING BELTING LEATHER.—M. Eitner proposes the following simple method of determining the value of leather employed on belting. A cutting of the material about .03 of an inch in thickness is placed in strong vinegar. If the leather has been thoroughly acted upon by the tannin, and is hence of good quality, it will remain, for months even, immersed without alteration, simply becoming a little darker in color. But, on the contrary, if not well impregnated by the tannin, the fibers will quickly swell, and, after a short period, become transformed into a gelatinous mass.

LOOK WELL TO THE BEARINGS of your shafting, engine and machine. Sometimes 25, 30, 40, and even 50 per cent of your power is consumed through lack of good oil.

SCIENTIFIC PROGRESS.

The World in Which We Live.

The above words are very significant; they are reminders to many of a varied experience, that is fraught alternately with joy and hope, and the woes and sorrows of life; such, in fact, as constitute the common realities of life.

Upon the world's grand stage the generations come and go, like a mighty army marching on to victory or death, with little apparent reason for their coming or departure. To-day, while we are so eager in our pursuits, we are walking swiftly in the tracks of hygone generations. All the chambers of life are hung with tapestry wrought by their fingers, while the cadences of their last farewell still faintly echo in every passing breeze, and linger on every distant hill and wave. The mighty stream of time is swiftly bearing us on to a common destination; we may be wrecked, but we cannot be delayed. At every pulsation of the heart a human being is called from the shores of time to the realm of evermore. Nor do they go alone; high hopes of human hearts have gone with them. Many a rapturous theme has perished with its author. The fresh dust is cold on many a breast that burned with fires that seemed immortal.

While I now write and turn to view our brief sojourn here, mighty movements are agitating the society of nations. The mechanism of human industries is no less active than it was when moved by the hands that lie nerveless in the shades of gone-by years. The movement of terrestrial affairs, gathering all the forces of life through natural agencies, and sending them through millions of living beings of every order, carries within itself the origin and destiny of nations as counterparts of a grand universal whole.

From the experience of mankind we are furnished with a record of failures and successes; from it we learn that all the doors of the world do not open into success and happiness, but many are the entrances into the avenues of crime and wretchedness, and the careless and unwary will naturally and unconsciously enter them. It takes no effort to enter the wrong road of life. All along are thousands of wrecks, that with precaution and timely effort might have been avoided, and the unfortunate thus wrecked might have been blessings to the world. All knowledge that would enrich the mind and make us useful, all those higher mental qualities that would refine our lives, and all those spiritual attainments that would give equilibrium to our powers—an equilibrium that constitutes happiness—are set forth as prizes to be obtained by earnest and unflinching effort. By all the motives that can be brought to bear our engagement in this effort is solicited. By the woes and wrecks of life we are warned of the many dangers that attend its pathway. Let us imitate the wise who have taken advantage of the favoring tide, and have been borne to success and happiness.—T. N. Curtis in *Phrenological Journal*.

BENEFICIAL INFLUENCE OF RELIGION.—The worst kind of religion is no religion at all; and those men, living in ease and luxury, indulging themselves in the amusements of going without religion, may be thankful that they live in lands where the gospel they neglect has tamed the heartlessness and ferocity of the men who, but for Christianity, might long ago have eaten their carcasses like the South Sea Islanders, or cut off their heads and tanned their hides like the monsters of the French Revolution. When the microscopic search of scepticism, which had hunted the heavens and sounded the seas to disprove the existence of a Creator, has turned its attention to human society, and has found a place on this planet 10 miles square where a decent man can live in decency, comfort, and security, supporting and educating his children unspoiled and unpolluted; a place where age is revered, infancy respected, manhood respected, womanhood honored, and human life held in due regard; when sceptics can find such a place ten miles square on this globe, where the gospel of Christ has not gone and cleared the way and laid the foundations and made decency and security possible, it will then be in order for the sceptical literati to move thither and there ventilate their views. But so long as these very men are dependent upon the religion which they discard for every privilege they enjoy, they may well hesitate a little, before they seek to rob the Christian of his hope and humanity, of its faith in that Savior who alone has given to man that hope of life eternal which makes life tolerable and society possible, and robs death of its terrors and the grave of its gloom.—*Science*.

THE HIGHER STUDIES.—Although there has been a great deal of discussion on the point, it has never been definitely settled whether the dead languages ought not to give place to the living languages in the educational course of our higher institutions of learning. There are good arguments from high authorities on both sides. The fact would appear to us that the studies should be adapted to the profession or occupation which the student intends to follow in after life. If he is to be a lawyer or physician, or historian, it would be well to have a knowledge of Latin. Greek seems not to be of so much importance. To an English-speaking scholar, however, whose life is marked out for business pursuits, a thorough knowledge of the English language will serve him well. To be

versed in any other language than his vernacular and deficient in that would expose him to merited ridicule. Sir Lyon Playfair has been giving this subject some study. At a recent British Association meeting he imparted this information: At the Oxford and Cambridge certificate examinations of last summer 703 boys passed in Latin and 673 in Greek, but only 131 in any and all the branches of science. There were only 263 proficient in French and 94 in German, while, most deplorable of all, the number of those who passed in English did not rise above 113. It may be inferred, then, that more than six times as much attention had been paid to Latin as to English; and that all the sciences had been esteemed of less than one-fifth the value of Greek!

PREDICTING TORNADOES.—Great progress has been made within a few years in the study of storms. William A. Eddy, the reporter of the Signal Service Department, has issued the following circular: The attention of Congress is called to the fact that some of the terrible loss of life and property due to tornadoes can be averted. In 1882, Prof. T. B. Maury asserted what was then the fact, that the prediction of a tornado was a triumph yet to be attained by the science of meteorology. In less than two years from that time some predictions of tornadoes were successfully made by Lieutenant John P. Finley, of the Signal Service. The percentages of verified predictions is steadily increased by knowledge of the average conditions preceding each series of tornadoes, thus making the predictions more definite and local with each succeeding year. Already the predictions of safety for the day are effective. Of 3228 predictions unfavorable to tornadoes, made in 1884, 3201 were verified, and of 38 predictions that tornadoes would occur, made in April and June, 1884, 18 were verified. Of 19 predictions that tornadoes would occur, made in June and July, 1885, 15 were generally verified. When tornadoes were predicted, in no instance did violent storms fail to occur, either hurricanes, tornadoes or hail.

MAN FORMED OF CONDENSED AIR.—Chemistry has demonstrated that man, this very highest specimen of the animal kingdom, is really formed of condensed air—or solidified and liquefied gases—that he lives on condensed air as well as uncondensed air, and by means of the same agent moves the heaviest weights with the velocity of the wind. The strangest part of this matter is, however, that thousands of these beings formed of condensed air, and going on two legs, occasionally, and on account of the production and supply of condensed air which they require for food and clothing, or on account of their honor and power, destroy each other by means of pitched battles in condensed air; and, further, that many peculiar powers of the bodiless, conscious, thinking and sensitive being, housed in this tabernacle of condensed air and moisture, to his result, simply, of its internal structure, and the arrangement of its particles or atoms; while the science of chemistry supplies the clearest proof that so far as concerns this, the ultimate and most minute composition as well as structure, which is beyond the reach of our senses and power of science to determine, man is, to all appearance, identical with the ox, sheep, bird or fish.

THE MOON AND ITS SIGNIFICANCE.—Prof. Richard A. Proctor, the English astronomer, says the moon is the most interesting of all the heavenly bodies. It has been particularly serviceable in the proof it affords of the law of gravitation. It proves, too, what the world has been in remote ages of the past, and what it will be in remote ages to come. Its most significant service to man has been as a measurement of time. The only perceptible effect which the earth has upon the moon's course is that of attraction, by which its route in space is slightly deviated. From the moon's present condition we may inform ourselves of the course of all planetary life. There is every reason to suppose that our present condition was at one time hers; that she possessed an atmosphere, water, animal and vegetable life. That has now passed away. Her surface is a sterile, rocky mass. The atmosphere has gone, or nearly so, and the seas are dried up. The same process is going on with our earth, and a similar result will eventually ensue, but by reason of the greater bulk of our planet effects produced in 10,000,000 years in the moon will require 60,000,000 with us.

FOSSIL INSECTS.—In 1879 only 103 fossil insects from the carboniferous rocks of the whole world were known, but during the last five years a great number have been discovered, including 1400 from Commeny, France, a few from Saarbrück, Kleinopitz, Lugau and other continental European mines, and a very considerable number from the mines in this country.

GEOLOGICAL SURVEY OF MEXICO.—The Mexican Government has resolved on undertaking a geological survey of the whole of Mexico, as far as practicable, and they have appropriated \$10,000 for the preliminary expenses. A survey on an extensive scale cannot fail to have an important influence in developing Mexican mineral resources.

THE "BOGS" OF IRELAND.—Surveys and careful measurements show that peat bogs cover about one-seventh of the surface of Ireland. Some of these bogs are supposed to represent fully 20,000 years' growth.

The Inventive Age.

People are quite too much inclined to look upon inventors as an impractical visionary class of persons. This is the tone of nearly every leading inventor for the last century and more. The history of Franklin, Fulton, Watt and many others of their contemporaries fully corroborates this assertion.

Coming down to a more recent period, he is not familiar with the discouragements and trials of Howe, ere he made the sewing machine a success? Singer also met with the same experience, and it is said that while he was himself personally and laboriously working upon his famous experimental machine, his fellow-workmen in the shops, turned away from him with disdain as a "crank" trying to work out an impossibility. Westinghouse, and even Thomas and Gilchrist, and Edison, whose names are now world famous, were each in their turn objects of ridicule and abuse.

The wonderful development of the use of steam could hardly have been foreseen by Watt when he patented his first steam engine in 1769, but it is a noteworthy fact that away back in 1750, when he was but 14 years of age, he constructed an electrical machine, thus utilizing a force that seems now likely to supersede steam to some extent. Watt was an inventive genius, and his early discouragements and trials were such as seem to fall to the lot of others of the inventive class. Unlike many of his predecessors and successors, however, he lived to gather and enjoy the fruits of his labors. As the inventor of the steam engine, his name stands enshrined among the noblest benefactors of the human race, and in no part of the world has his thought and the product of his hand been utilized to serve a greater variety of purposes than in progressive America.

We have before us a paragraph, the authorship of which is unknown to the writer, but which is so much in point that we transcribe as follows:

"The man who strives to perfect an invention, whether successful or not, is entitled to the commendation of his fellow men. We have never sympathized with those who speak sneeringly even of that much despised class of inventors, those who have striven to solve the problem of perpetual motion. Mistaken and erratic as they may be, they are engaged in a line of duty which is, to say the least, honorable and elevating. Thousands of inventions there are to day that the world calls valueless, which, were they placed in practical hands, would prove most useful and beneficial, and a source of wealth to the owners.

"Inventions, as a general thing, are an innovation on present customs or modes, and are therefore a step in advance of present thought. A century since, had any one suggested that one could stand in his own home and hold converse with a friend fifty miles away, he would be thought to be talking nonsense. Had any one at that time said that the mail would be carried from New York to Chicago in a day, he would have been considered equally as foolish. The prediction that messages could be sent on lightning's wing beneath the ocean from this continent to the Eastern continent would have been hailed with ridicule. These inventions were steps far in advance of the thought or knowledge of those days. It does not militate against the greatness of the discoveries that made all these things possible that the dull brain of the masses could not comprehend them until they were practically displayed to the world. The further he is in advance of the present thought or knowledge of the masses, the greater will be the opposition which the inventor will have to overcome before he will attain a just recognition of his labors.

"A great inventor must be a man of independent thought, a man of nerve and courage, a man of hopefulness and of determination. Many an inventor has been turned back, even when his feet were pressing the threshold of a great discovery, because he had not courage to stem the tide of opposition which he was encountering. Many a practical invention has been dropped before completion because of the inventor's discouragement and lack of push and determination.

"It is a surprising thought, when contemplating what invention has done for the progress and civilization of the age, that inventors meet with such a tardy recognition of their works. The wonder is that they are not held in higher esteem. The world could afford to pension its Stephensons, its Morses, its Bessemers, its Edisons, and its Bells. It has erected statues to some of these, and it can afford to erect statues to all its noted discoverers. In olden times men of scientific attainments were held in high esteem. Why ought they not to be held in a like high estimation to-day?

"We grant that the names we have given above are so held, but there are untold thousands of names of inventors of useful things, valuable and indispensable to the world, that should be placed in glowing letters on the scroll of fame. Our inventors need encouragement when they are alive, not after they are dead. Men do not work simply to gain a fitting epitaph. Their needs are in the present, and the earlier the world recognizes and applauds their work, the better will it be for them and the inventive art."

In San Luis Obispo county \$2,000,000 has been loaned by San Francisco capitalists on real estate.

USEFUL INFORMATION.

THE DETECTION OF FATTY OILS IN MINERAL OILS.—Friedrich Lux founds his method upon the different behavior of the fatty and mineral oils, when heated with potash, potassium, soda or sodium. For instance, rape oil, when heated with potash or soda to a high temperature saponifies—stirring or shaking promoting the reaction. At a temperature of 250° C. rape oil gelatinizes with potash or soda in five minutes; after 15 minutes the oil turns brown and solidifies to a buttery mass. On the other hand, mineral oils treated in the same way, become darker, but do not alter their state of aggregation. **A. Preliminary Test:** Detection of larger quantities of fatty oils (about 10 per cent or more). To about 5 c. c. of the oil under examination in a test tube, is added a small piece of sodium hydrate, the liquid heated directly over the flame to boiling, and kept boiling for about one or two minutes. Larger quantities of fatty oil are detected by the peculiar empyreumatic smell given off, and by the solidification of the liquid on slightly cooling. If a negative result is obtained, one proceeds as follows: B. The detection of smaller quantities of fatty oils (two per cent or less). Two middle sized beakers are taken, of which the one can be so far pushed into the other as to leave a space about 1-2 cm. between the two. Into this larger beaker is brought enough paraffine to bring its surface half way up between the sides of the two beakers. The inside beaker is also filled with paraffine to the same height. A paraffine bath, constructed in this way, cannot be overheated. The thermometer, hung in the inner beaker should be kept at about 200-210° C. Two test-tubes are now filled with a c. c. of the oil; to the one is added a few shavings of potassium, to the other a stick of potassium hydrate, so that the latter stands about one cm. above the surface of the oil. The two test tubes are placed in the bath and the time noted; after 15 minutes they are taken out and allowed to cool. If the mineral oil contains as much as two per cent fatty oil, it solidifies in one of the two test-tubes, generally in both, to a tough jelly.

A NEW USE FOR ASBESTOS.—In the processes connected with the dyeing and printing of cotton cloth, it is frequently necessary to hang the fabric in loops from parallel rods for the purpose of exposure to steam, air or ammonia. In order that the cloth should hold upon these rods without slipping or being strained, it is necessary to wind rope or strips of cloth around the rods; but this only mitigates the difficulty without accomplishing its removal; for the heat and corrosive action of the vapors rot any covering in a few weeks, and the first notice of any deterioration is generally the appearance of small pieces of roll covering among the cloth in process of finishing. Recently, asbestos rope and asbestos cloth have been used for this purpose, and prove to be very durable. Larger ropes of this refractory material have been used for the transmission of power over places exposed to heat.

THE WORK OF WINDMILLS.—In an article on windmills the *Scientific American* says: "An 8½ foot wheel will raise 3000 gallons of water daily a distance of 25 feet. Its first cost, including the pump and a plain tower, is about \$150. A 10-foot wheel will raise about 9000 gallons of water a day a like distance and cost about \$180, including the appurtenances above mentioned. A 12-foot wheel will raise 16,000 gallons of water a day, the above distance and cost, with the same appurtenances, \$210. So up, from 14 to 16, 18 to 20 feet diameter of wheel, until we reach a 25-foot wheel, which costs about \$1200 and will raise 100,000 gallons of water daily the specified distance.

HOW FIRE MAY BE CARRIED IN COTTON.—Edward Atkinson, of Boston, says: "Fire lurks in a cotton bale for weeks. The cotton which was injured somewhat over a year ago in Bedford, Me., was moved to South Boston for sale. The fire broke out again more than once while it was at South Boston being made ready for sale. It was then sold at auction. The fire broke out again in one parcel while it was on the cars being carried away, and in another parcel after it had been received at a factory where it was to be used. The latest outbreak was, I think, 30 days after the original fire."

ELECTROPLATING ON WOOD.—A novelty in silver is the discovery of a process of electroplating with silver upon wood, and its adaptation to handles of all kinds, including umbrellas, canes, carving-knives, etc. The silver is thrown upon the wood by a process which has proved extremely difficult in practice. The deposit of silver, of course, follows all the peculiarities of the wood, and the ordinary handle is simply garished in almost ineradicable silver. The special advantage is in the variety of designs that may be produced.

TO PREVENT THE CRACKING OF WOODEN FAUCETS, ETC.—Put the articles in melting paraffine and heat them there at a temperature of 212° F., until bubbles of air cease to escape from the wood. The whole is then allowed to cool to about 120° F., when the wood is taken from the bath and cleaned from the adhering paraffine by rubbing with a dry piece of cloth.

SOLDERING FLUID.—Some of the soldering fluids are injurious to tools and also to parts

that have been laid on the bench where such fluids have been used. The following recipe will do the work as well and will not rust and tarnish any more than water would. Take two ounces alcohol and put it into a bottle, and add about a teaspoonful of chloride of zinc and shake until dissolved. Use it in the same manner as the muriate of zinc, or muriatic acid and zinc. It has no bad smell.

BY THE ROAD OR IN A DIRECT LINE.—Alexander Cook, blacksmith, of Queens, L. I., covenanted when he sold his smithy to John W. Booth not to work within three miles of the shop. Cook went to work at a place which was more than three miles by the road, but less than three miles in a direct line. A lawsuit resulted and Judge Barnard decided constituted a breach of the covenant, as the words "within three miles," mean with that distance as the hec lios, and not as the road hands. Cook will now be liable to arrest for contempt.

MECHANICAL AID TO RIFLE PRACTICE.—Four hundred steel targets are being made at the Rock Island Armory. They are made to represent a soldier in three positions, and are covered with cloth (uniformed). In practice they will be placed in squads, platoons, companies, and various other forms in which soldiers move in an engagement. The practice will commence at a range of 250 to 300 yards, and be gradually increased to long distances.

TO RENDER RANCID LARD SWEET.—Chloride of soda will render rancid lard perfectly sweet. Put three ounces of chloride of soda into a pail full of hot water, and then put in the lard and boil the two together for an hour or two. When nearly cold, the lard is taken off and afterward boiled up. "The color is restored to an alabaster white, and the lard will be as sweet as a rose in June."

CONVENIENT POSTOFFICE WEIGHTS.—A silver dollar weighs nearly an ounce. Hence any letter not heavier than a dollar can go for a single two-cent stamp. A five-cent piece added will give the ounce. If you have not the silver dollar, five nickels and a small copper cent will give an ounce.

CLOVES AS MOTH EXTERMINATORS.—Whole cloves are now used to exterminate the meretricious and industrious moth. It is said they are more effectual as a destroying agent than either tobacco, camphor or cedar shavings.

TO CLEAN BRASS AND STEEL.—For brass: powder rottenstone, put it into a pint of water, add a teaspoonful of sulphuric acid, apply, then rub off and polish with whiting. For steel: emery powder mixed with turpentine.

GOOD HEALTH.

The Development of the Heart.

The *Hamburger Nachrichten* has recorded the observations made on the above subject by the late Dr. Benecke, of Marburg. According to these investigations, the greatest and most rapid growth of the heart takes place during the first and second years of human life. By the end of the second year its bulk is said to be exactly double what it originally was. Between the second and seventh years it is again almost doubled. A slower rate of growth now sets in until about the 15th year, the augmentation of volume during the intervening seven or eight years being only about two-thirds. In the period of maturity which now approaches, the growth of the heart again makes progress, the increase keeping pace with the advance toward maturity of the other portions of the system. Thus, as compared with its size at the age of 15, two thirds have been added by the age of 20. After the twentieth year the rate of development again becomes slower, but an increase in volume is perceptible up to the fiftieth year. The annual gain in bulk during that period is supposed to be about .061 of a cubic inch, and the maximum volume thus attained is estimated at from 16 to 17 cubic inches. Growth ceases after the fiftieth year is passed, and a slight diminution in the size of the heart ensues. This is regarded as a part of the general effects of approaching old age. As to the comparative size of the heart in males and females, it is stated that in childhood there is no difference of any note. When maturity sets in the male heart develops more than that of the female, and the difference of from one and a half to two cubic inches thus established is said to be maintained throughout the remainder of life.

DEPTH OF SLEEP.—Two of Vierordt's pupils, Moninghoff and Piesbergen, have made the depth of sleep the subject of an investigation. They worked upon the principle that the depth of sleep is proportional to the strength of the sensory stimulus necessary to awaken the sleeper—that is, to call forth some decisive sign awakened consciousness. As a sensory stimulus they made use of the auditory sensation produced by dropping a lead ball from a given height. The strength of the stimulus was reckoned, in accordance with some recent investigations of Vierordt, as increasing, not directly as the height, but as the 0.50 power of the height. For a perfectly healthy man, the curve which they give shows that for the first hour the slumber is very light; after one hour and 15 minutes the depth of sleep increases rapidly and

reaches its maximum point at one hour and 45 minutes; the curve then falls quickly to about two hours and 15 minutes and afterwards more gradually. At about four hours and 30 minutes there is a second small rise, which reaches its maximum at five hours and 30 minutes, after which the curve again gradually approaches the base line until the time of awakening. Experiments made upon persons not perfectly healthy, or after having made some exertion, give curves of a different form.

WHY DRUNKEN MEN ARE NOT INJURED BY FALLS.—One sometimes sees a drunken man pitched violently from a horse, and when the bystanders rush to the spot expecting to find him dead, they are astonished to find that he has been little injured. In his "Scrambles Among the High Alps," Leslie Stephen tells the story of a guide who, while drunk, fell over a precipice so deep that a fall over it seemed almost certain death, and who yet sustained little injury. Stephen accordingly gives his readers the advice either not to fall over a precipice, or to get thoroughly drunk before doing so. The reason of this immunity is that the nerve centers are so paralyzed in the drunken man as not to be affected by the shock of the fall, which, in a sober man, would have acted upon them so violently as to stop the heart, arrest the circulation and cause instant death.

BAKED APPLES IN SEASICKNESS.—If ever you should be in a position to advise a traveler going on a sea voyage, remember that there is some mysterious service done to the hitherto system, when it is shaken, by baked apples. Noticing that they were produced on board the Cuba every day at lunch and dinner, I thought I would make the experiment of always eating them freely. I am confident that they did wonders, not only at the time, but stopping the imaginary pitching and rolling after the voyage is over, from which many good amateur sailors suffer. I have hardly had the sensation at all, except in washing of a morning; and at that time I still hold on with one knee to the washing stand and could swear that it rolls from left to right.—*Letters of Charles Dickens.*

FULL BREATHING.—We have always maintained that the most important agent for the preservation of health and the cure of disease is a full and constant supply of pure air for the lungs. All the plans for systematizing exercise by combining it with proper pleasures should be encouraged. Horseback riding, walking, bicycling, foot-racing, and athletic sports are hardly less valuable for the increased quantity of air that they compel us to consume than for the exhilarating and healthful effects produced in our minds. In order to be of real value, exercise should be regular and, if possible, in the open air, and sufficient each day for the wants of the system; but never excessive. Extremes are always dangerous.

UNCLEAN HANDS.—Everybody's hands, it appears, are always more or less dirty. In the *Gazetta Medica Italiana* Dr. Forster says that after the most diligent washings and brushings with soap and water and rinsings with carbolie acids and other disinfectants, the hands remain so impure that, upon touching them to sterilized gelatine, micro-organisms were speedily developed. The doctor found, indeed, that on rinsing the hands with a solution of 1 to 1000 of corrosive sublimate they became "scientifically cleansed" for the time, but that in wiping them upon a towel not previously disinfected they returned to their sad condition of uncleanness.

THE EUCALYPTUS OVERESTIMATED(?).—Dr. Bonavia, of the Lucknow Horticultural Gardens, has but little faith in the statements as to the suitability and value of the eucalyptus globulus in swampy and marshy districts. The results of his experiments with the tree confirm the unfavorable results that have also been obtained with it in Italy, and he is surprised that it should ever have been deemed fitted to discharge the efficacious and salutary functions that have been so universally claimed on its behalf.

CAUSE OF RED NOSES.—Why is a drinker's nose red? is answered by Dr. Johnson, of Washington, D. C., who says that the drinker's heart beats about 13 times oftener than the heart of one who does not use liquor. The arteries, in consequence of this increased heart action, carry the blood to the nose quicker than the veins carry it back. The blood, therefore, remains congested in the overfilled vessels of the nose and face.

LONGEVITY OF THE SEXES.—Recent statistics on the comparative longevity of the sexes show that under 15 years there are more boys than girls, but over 75 years there are more women than men, and from the ages of 90 to 100, the proportion is about three to two in favor of women.

CRIME AND STRONG DRINK.—Lord Napier, in a recent address before the Church of England Temperance Society, said that while commanding the armies of India a return made to him, relating to 18,000 men, showed that among the total abstainers there were no crimes, but the whole body of crime was among non abstainers.

BEE STINGS.—Bee-keeper: The pain and injury from bee stings is quickly cured by onion juice. Cut an onion in two and apply one-half over the part as soon as you can after being stung.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RUNNING.—Amador *Sentinel*, Nov. 11: The Shugart mill is now running its full twenty stamps. The appraisers of the Zeile estate have appraised the Zeile mine at \$20,000. Crushing will be commenced at the Reed mine, Irishtown, the latter part of the week. J. C. McNamara had a crushing at the Kelly mill last week, but we did not learn the amount of the clean up. A strike of proportions represented to be large and rich has been made at the Anderson mine.

RAINBOW.—*Ledger*, Nov. 14: This quartz claim is situated in John Belluomini's ranch, about a mile and a half south of Jackson. Louis Isola, a miner from Calaveras county, has been working there for the past eight or ten months, in company with another party, on shares with Belluomini. At the depth of 43 feet they have drifted a considerable distance on the foot wall, and have discovered a ledge from 6 to 10 feet wide of live looking quartz, all of which is said to prospect well, and is calculated to yield by mill process from \$7 to \$10 per ton. It carries none of that heavy black mat with iron in the Nevills, and other mines south of the Zeile, but the general appearance of the ore gives promise that the discovery may lead to the development of a substantial mine. They have out about 200 tons of rock, all of which is believed to be of good paying grade. This mine adjoins the Red Cloud, near Murphy's gulch, owned by the Moon Bros.

MISCELLANEOUS.—T. E. Flagg is making considerable improvements around the Lighthouse mine, at Butte City, lately purchased by him from W. E. Stewart. He has built a fine chute to run the ore to the mill, and has quite a body of ore, but whether of paying quality remains to be seen. He has not milled any since becoming the owner. He has brought up his family from below, evidently intending to stay with the mining business. The five-stamp mill of the St. Louis mine near Pine Grove is expected to be started to-day, Saturday. As the ore paid expenses when worked by the slow process of an arastra, it ought to pay handsomely with a mill. There is considerable ore ready for crushing. It is reported that the sulphuret works are to be put up at the San Joaquin mine, near Pine Grove, to work the sulphurets of that claim. The ore contains a large percentage of sulphurets.

Calaveras.

WHAT CHEER MINE.—Calaveras *Chronicle*, Nov. 13: Work on the What Cheer mine is steadily progressing in spite of the difficulty caused by the influx of water which the company has had of late to contend with. The machinery throughout is in fine running order, and is propelled exclusively by water power. The company have lately erected a fine five-stamp mill, also boarding and lodging houses. The mill is kept running day and night, crushing on an average of 75 carloads in 24 hours. Hoisting is done by means of a hurdy-gurdy with excellent water power. The pump, which was heretofore used to drain the shaft, has been replaced by a larger one, the old one having been found insufficient to keep the water under control. The pump is connected with an air-compressor which keeps the shaft continually supplied with fresh air. The shaft is now down 600 feet. Sinking and breasting was resumed 1st Wednesday, it having been suspended for some time past on account of the trouble with the water, but there was already sufficient gravel on the dump to keep the mill running. Sixteen men are employed in the mine, besides a number engaged in cutting timbers in the neighborhood. There is no doubt but that this mine, under the present good management, will prove a valuable property, and we expect to hear of substantial returns in the near future.

WEST POINT.—The revival of the mining industry is steadily improving. In spite of the inclemency of the weather the work will go on, and if the worst comes, it will be prosecuted between showers. The abundance of water in the streams, caused by the late rain, has supplied the ditches with a sufficient quantity of the aqueous element to start the quartz mills and reduction works in full blast, giving the proper impetus to the mining business and bullion yield of this district. The Russell Reduction Works, together with their mines, will, in all probability, be sold during the present month. The price to be paid is \$75,000. The sale of the Lone Star, Reed & Hillary and Riverside mines will be consummated within the next 10 days without a doubt. The price to be paid is \$30,000. The Fine Gold mine near this place, which was recently sold for \$25,000, cash down, is being placed in condition to be prospected and developed on a reasonable scale during the coming winter. Water power will be used to propel all machinery erected, which will be hoisting works and a 10-stamp mill. Roads have been finished and excavating completed, and a large force of mechanics are busily engaged in building and placing the machinery in position. The body of ore to be worked in this mine, as it shows at present, is 100 feet in length by three to five feet in width. Average value of ore is about \$20 per ton. The Keltz mine is steadily undergoing development. Depth of main shaft is 60 feet. The south level is six feet in length; width of ledge in face of said level is three feet; the ore body extends 96 feet in length in north level, making, as far as explored, a body of ore 50 feet in length and 2½ feet in average width. The last crushing taken out of the mine, which was extracted from the bottom levels, amounted to 28 tons and yielded 166 ounces of gold. The Soap Root mine, owned by John Henry, is looking well. The flow of water has increased so, and pumping facilities being limited, sinking has had to be suspended for the present. Powerful machinery is soon to be placed on the mine, when operations will be resumed and the shaft sunk 200 feet deeper. Eight tons of solid sulphuret ore, which is now on the dump, will be reduced at the Russell furnace. Heavy machinery is now on the way from the city to be placed on the Scorpion mine, which is in close proximity to the Soap Root. The Oro Fino mine, owned by the Cook Bros., has changed hands. The price, I believe, is \$20,000 to be paid in installments.

Inyo.

POLETA.—Inyo *Register*, Nov. 13: They are stopping from the old main tunnel in the Poleta, to connect with the new incline, something near 200 feet above. The ore yield is fair, but not so rich as that recently worked from the incline mentioned. As wagons can load almost at the mouth of the tunnel, the expense of sacking will be saved, and nearly all the ore may be worked to a small profit with little or no sorting. Mr. Story thinks they will have a hundred tons or so ready for milling by the first of January.

REPAIRING.—The Bishop Creek Ditch Company have a force of about a dozen men at work near town, cutting their canal out to its proper size and grade, as originally designed, and putting it into complete order generally. It is said to be badly filled up for a mile or two below the head gate.

Mono.

PATTERSON CON. ORE.—Bodie *Free Press*, Nov. 11: Reports conflict as to the actual status of matters in the Patterson Con. property at Sweetwater. One statement has it that the mine has been bonded to the Irwin party in the sum of \$65,000; another fact appears to be that the owners refused to sell to another party of capitalists for the same amount. However, work is going on and the late point is that the ledge has been struck in a new adit at the depth of 75 feet. This is in what is called the new or "Rich Strike," and it is not now known here whether the ledge has been crosscut or not. Where opened above the ledge is eight feet in width, composed of quartz boulders and fine ore in clay. From the samples brought in by a friend of the *Free Press* we have Mr. Soderling's certificates of a couple of assays as follows: No. 9003—Blue, \$225.10 gold; \$59.20 silver—a total per ton of \$314.30. No. 9004—Red, \$79.72 in gold and \$4.80 in silver; total, \$84.52.

FROM MAMMOTH.—Yesterday Frank Leonard and A. W. Curtis returned from a short trip to Mammoth district. Charley Radcliffe, foreman of the Lisbon mine, sends in some very handsome specimens of fine, free gold ore. The mine and mill are in steady and very successful operation. Mr. Leonard also presents the *Free Press* with some quartz from the old Mammoth mine, which shows solid gold "big as a piece of chalk."

Nevada.

ANOTHER DEERIS DAM.—*Transcript*, Nov. 11: The Liberty Hill Mining Company have erected a debris dam a short distance above the mouth of Little Bear river. Those who have seen it say it will successfully restrain the slickens. The parties who recently leased the Rising Sun mine at Willow Valley and are now working it, have an excellent prospect. The ledge has recently improved in size and quality.

SPLENDID PROSPECTS.—This week's developments at the Fleming mine, just above Suspension bridge, have been of a satisfactory enough character to satisfy the most sanguine stockholder. In the north drift of the 130-foot level 100 feet from the shaft, and directly under Deer creek, the ledge has widened to 2½ feet of solid ore, and is extremely rich in sulphurets and free gold. In the south drift, which has been run a distance of 110 feet, the ledge varies from six inches to two feet and is also of high grade. Some beautiful specimens from the north drift were to be seen yesterday at Cross & Simond's law office.

MINING NOTES.—Grass Valley *Union*, Nov. 13: Work on the Central mine, on Greenhorn creek, is being steadily prosecuted. The ledge in the tunnel is of good size and fair quality. The distance yet to be run to strike the rich chute from the old Greenhorn is about 100 feet. The new water wheel on the Horseshoe mine is working satisfactorily, and the water from the shafts and drifts will be pumped out by Monday. The company will then call for bids for sinking the shaft 100 feet deeper.

A PAYING PROPERTY.—*Transcript*, Nov. 12: Although the Delhi quartz mine on the South Yuba river above Columbia Hill has been worked but little over a year, it has paid, not merely all expenses, but \$15,000 in dividends. An 8-stamp mill and four Triumph concentrators comprise the plant. Large quantities of sulphurets have been stacked at the mine, the cost of hauling not warranting their being brought to Nevada City for reduction. If further developments are satisfactory, chlorination works will be erected on the premises. A well-seamed ledge, averaging eight feet in width, is worked through a 900-foot tunnel that starts into the hill about 100 feet above the bed of the river. Another tunnel has just been run to the ledge 200 feet below the present workings. The ore is of medium to low grade and the daily crushing is twenty-four tons. This is above the average amount of work for eight stamps, but here the stamps weigh 1,000 pounds, instead of 800-pound stamps as is customary.

Plumas.

STRIKE.—Greenville *Bulletin*, Nov. 14: A few days ago it was rumored on the street that important developments had been made in the Indian Valley mine. Investigation proves the rumor to be true. Since the resumption of work in this mine under Mr. Cornell's management, the shaft has been sunk 50 feet, making a total depth of 680 feet. About two weeks ago a drift to the east was begun. Although the ore in the bottom of the shaft was rich, that of the immense ledge reached is much richer, the gold being scattered all through the quartz, and much of it is visible without a glass. The ore is of very fine quality, as a sample in this office will show. The south wall of the ledge is smooth and well defined. The breast of the drift on the ledge is 22 feet wide, but the north wall has not been reached yet. This immense body of ore is under that which paid so well when Corbin & Manson had the mine leased. The property of the Cherokee Mining Co. is advertised for sale under foreclosure of mortgage. It should be owned by the Green Mountain Co. The lower tunnel in this mine would tap the Cherokee claims at a great depth, thus avoiding the great expense of hoisting ore, an item which has prevented the successful operation of the Cherokee in the past. If operated by the Green Mountain Co. it would without doubt pay well. John Ellis and Chas. Bressler came over from the Dutch Hill country on the North Fork of the Feather river last Saturday. In their claim below that of the Dutch Hill Co., they have reached very fine gravel. Mr. Ellis is very confident that they have broken into the ancient channel which furnished the rich deposits of gold found at points below in years gone by. They expect to return as soon as the weather will permit, and continue the development of their mine.

Sierra.

GRAVEL MINES.—Greenville *Bulletin*, Nov. 11: From Mr. J. P. Hall, who has just returned from Sierra county, we have the following: Some of the gravel mines near Gibsonville have been worked for 30 years, and are paying as well to-day as ever. From the North American to the Bootjack more or less work has been done along the lead for three miles. The latter named mine used an engine under ground to pump the water, and thereby worked down the grade or lead as long as the water could be controlled. At La Porte this same lead has been extensively worked. All who are acquainted with the mines at La Porte and Gibsonville know of their richness. The largest piece of solid gold taken out at Gibsonville, to Mr. Hall's knowledge, was obtained from underneath the place where the brewery now stands and it weighed 96½ ounces. The distance between Gibsonville and La Porte is about eight miles, along and over a high ridge. The ground has long been claimed. Shafts have been sunk at a great expense, but, finding so much water, failed to reach the bedrock. The ground has finally been bonded. Mr. John Thomas has been to Europe and, it is said, has raised money enough to purchase and develop the lead. Mr. Hall says that this is considered by mining men one of the surest and best investments in Northern California. The Lincoln, at Potosi, is working quite a force and it is said is paying \$20 a day to the man. The Belmont Consolidated, near Yoker Flat, has a small crushing arrangement, put up by Mr. Forbes, of Downieville, with which, in the last ten days' run, \$1600 was taken out. Mr. Southerland has put up a mill on the extension called the Sierra Phoenix, and it is said that he is doing well. The Young America, near the Sierra Buttes, is very rich. Shares (fourths) that sold a few months ago for \$1000 are now worth \$75,000. The ledge lately struck in Gold valley is causing quite an excitement. It was struck on each side of the valley by different parties the same day, and is said to be exceedingly rich. Gold valley lies near Gold Lake, between the Plumas Eureka and the Sierra Buttes. At Soda Bar, in a claim that had been worked and reworked, the owners struck gravel under what was supposed to be the bedrock, and are taking out an ounce and a half per day to the man.

NUGGET.—*Mt. Messenger*, Nov. 13: A nugget of gold weighing 34 ounces after it was cleaned, was sold at the bank, in this place, recently. The quartz mill of Mr. Van Slyke, at Butcher Ranch, has been shut down for the winter. The mill is about a mile from the ledge, the rock having to be hauled in wagons. So soon as snow fell this work had to be stopped. The work of laying the new track in the Extension tunnel was completed Thursday noon, and the work of taking out gravel was resumed Thursday night. Nearly 1200 feet of tunnel changed from strap rail to T rail in four days and a half, is pretty good work. The Young America Company have repaired their tramway in such a manner that it will not be likely to give way again. We understand the company has just declared a dividend of \$1000 to the interest, which, considering the expense they have been to and the short time they have been running, is very good indeed.

Shasta.

PLACER AND QUARTZ.—Shasta Co. *Democrat*, Nov. 11: A few days ago Tom Green purchased another mine, paying therefor \$1900. The Potts & Foster tollroad to Bullychoop is being extended two miles further into the mining country. Work on the Hardscrabble placer mine, near Igo, will be resumed immediately, as there is now sufficient water to start with. The Buckeye miners are putting their claims in shape for a good winter's run. Such a good fall of rain so early in the season was unexpected by all. Weil, Conroy & Murray have resumed development of their Flat creek gold quartz mine. Weil informs us that they will start their mill up next month. Jake Hudson and partner are sinking on a prospect on the other side of the river above Jake's farm, which is very promising. The ore frequently yields big assays in gold and silver. H. Croft, of Churntown, was in town yesterday, and reports that two new strikes were made in Old Digging's district on Churn creek gulch, and that the quartz is rich in free gold. Andy Fife and Andy Tilden have extracted between 70 and 80 tons of high grade ore from their claim on Salt creek, and will have it crushed soon in the Meribew & Co.'s mill at Lower Springs. Geo. McDaniels and his partners are getting very rich prospects out of their claim southwest of town. The rock is heavy with fine sulphurets, which carry most of the metals, and assays "way up." The vein is a large one, running nearly north and south. The rain affording plenty of water for the purpose, Reid & Co. started their quartz mill in full blast Monday, with the accomplished young engineer, Lou Gross, at the throttle. Sufficient water, and with plenty of good ore on the dump, a profitable run is anticipated. Development work is still being vigorously pushed ahead on the Morely mine on Cow creek, and the outlook is very encouraging, becoming brighter as the depth is attained. Mr. Morely is of the opinion that his is one of the richest small mines in the State. We hope so, and may it continually richer grow. Meribew & Co., of Lower Springs, have one of the finest quartz milling and concentrating outfits in the country, which is now running in tip-top shape, and commenced crushing the first of this week. The machinery is being driven by steam power, and with two Frue concentrators they will put through regularly ten tons of ore a day.

Siskiyou.

PICK AND PAN.—Yreka *Union*, Nov. 13: Mining operations will be commenced in a number of placer claims on the Salmon, the late storms having filled the gulch streams, and left several inches of snow on the high peaks. The Montezuma placer mine, at Callahan, is in ship shape, and will be operated as soon as sufficient water can be had. Many improvements have been made in the mine during the dry season, such as putting in new boxes at the head, repairing the flume and replacing worn blocks with new ones. A large force will be employed and the mine will be superintended by Mr. James B. Parker, who managed it with such excellent success last season. Mining on the Klamath has closed for the season, and many of the mine owners had the misfortune to have their wheels carried off by the sudden rising of the river. The Empire mine lost every wheel excepting the dip, and the miners were driven

from work just as bedrock was reached. The last three buckets of dirt washed yielded \$25. The windmills of the Phil Mott and Fort Jones were also washed out, and both companies sustained heavy losses. The Kanaka company and the three Chinese companies in the same district escaped loss this year. McConnell pulled out just in time, as he always does. The Black Bear has just cleaned up after a run of 26 days, and the result was much better than Lieutenant-Governor Daggett expected. The Bullion was brought out to Etna last Friday by Mr. O. L. Daggett. The mill has been running by steam, but the late rains will, no doubt supply water enough to run it until heavier storms come, which will reduce the cost of milling considerably. All the dumps are full of good paying rock, and a rich strike is reported to have been made in the mine during the past few days.

Trinity.

A BIG STRIKE.—Trinity *Journal*, Nov. 14: Wm. S. Lowden informs us that the Brown Bear Co. at Deadwood, struck their ledge in the lower tunnel last week. When he left they had run four feet into the lode without crossing it, and it showed free gold all the way. This confirms the depth, permanence and richness of Deadwood veins, which has always been claimed, but never before proved. We hope for more particulars. Trinity river raised several feet during the storm, but soon went down, although it will not be as low again as during the summer. It was about as low this season as ever before known by the whites. The North Star Co. on East Fork, have had made a quartz wagon to haul the ore to the mill with.

Tuolumne.

ACTIVITY IN QUARTZ MINES.—Tuolumne *Independent*, Nov. 14: The Belcher Consolidated, or Onesti mine at Deer Flat, has been sold to parties in San Francisco who intend soon to commence active operations. This mine was worked a long time ago and yielded a good deal of gold, but since the mill was burned there has been nothing done on the property, owing to a disagreement amongst the stockholders. The mine has a very good reputation here, and competent experts say the ore will pay about \$16 per ton, and the vein is a good-sized one. Some parties are negotiating for the claim of David and William James, on the Tuolumne river near the mouth of Humburg creek. The mine continues to improve and the ore shows lots of coarse gold, and some of it is mortar rock. The Blaine mine, at the mouth of Indian creek, has been sold and active operations were commenced on the property this week. The mine was formerly known as the Garner mine. Rumor had it this week that the Cook property at Courtville and the Golden Rock Co.'s water ditch were sold to a French company, but the report lacked confirmation. It is now reported that other parties are negotiating for the ditch, with a view of putting it in good order and selling water, and perhaps working some of the gravel range. The owners of the Wide West mine are at work on their mill, which will soon be ready to run. It is among the possible ties that there will be a mill on the celebrated Mississippi mine, in Big Oak Flat, this season. The Mississippi produces some very handsome "specimen rock," and we have seen some slate from this mine showing lots of coarse gold.

SOULSBYVILLE.—Men were sent up on the Soulsby branch ditch this week to clean it out and repair the flumes. It is said that the main ditch will be repaired this week and ready to have water turned in. This will give employment to men who are now idle at this place—when water comes. Having free water in the creek, the pump at the Black Oak mine was started last week. As soon as water is obtained from the main ditch a full crew of men will be put to work sinking the shaft, as they have not sufficient free water to keep the pump and hoisting works running at this mine. The Dead Horse mine was closed down last week. This has thrown several men out of work. It will, no doubt, go on again in a short time, as it is reported that it is a good mine.

BUCHANAN.—The Buchanan Mining Co. are making preparations to construct a wagon road to their mine, which is situated about seven miles south-east of Summerville. The Dead Horse mine shut down for a short time on Saturday last, in consequence of which our little town has assumed rather a gloomy appearance. Mr. Burnell is having a quantity of rock hauled from the Seminole mine to Easton's mill, at which place he intends to have it crushed in the near future. Clark & Brown will start the Louisiana mill in a short time.

MINE AND MILL.—Union *Democrat*, Nov. 14: Operations will be resumed in the Crystalline mine and mill next week. During the season of enforced idleness the mill has been put in complete repair. All the 25 stamps of the Heslep mill will be running and the mine started up with a full working force next week. The rains increased the water sufficiently to start everything up. On account of the rain, which delayed the transport of some needed supplies, there has been some delay in getting the Buchanan mill ready for operation. The mill is already completed and as soon as some necessary belting for the Frue concentrators arrives crushing will be commenced.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Nov. 14: The north lateral drift on the 3100 level is being steadily advanced, and is now 89 feet beyond the deep wine station. The whole face of the drift is in good ore, which is a very promising circumstance for that particular locality, as it corresponds with what is developed on the 3000 level at about the same distance north, both being within 100 feet of the Savage south line. Crosscut No. 2, on the 3100 level, 90 feet north of the Chollar line, has been turned more to the north, following a promising section of the vein. A large amount of strongly-mineralized quartz was passed through by this crosscut, which promises to concentrate into something good at some point.

CHOLLAR.—On the 3100 level the main lateral drift south has been pushed along very energetically during the week, about 75 feet being its advancement, making a total length of 345 feet. It is being run in wall rock on the west or "hanging" side of the vein. The material is dry and easy working, and Superintendent Hamilton says he is going to push it for all it is worth toward the Potosi line, not crosscutting at present, or until it shall be considered advisable. Everything is running splendidly at the Combination shaft, and as soon as the present 3100 level of the

middle mines shall be considered sufficiently prospecting, sinking for the 3200 level will be in order, and not before.

CROWN POINT.—Over 300 tons per day are now being shipped from this and the Belcher mine, principally from the old upper levels; quite a respectable contribution comes from the 1700 level, where some pretty good ore is being breasted out. This corresponds to the good streak of ore in Belcher on the same level, and forms a connection with the main drift being carried through Kentucky into Yellow Jacket. The 1700 level of these Gold Hill mines promises to cut quite a figure in future mining operations in that section of the Comstock.

YELLOW JACKET.—The usual amount of ore to supply the Brunswick mill, about 170 tons daily, is extracted and shipped, coming from the old stopes and breasts above the 1300 level, all being shipped without assorting, thus dispensing with the services of many men. But this is merely being tried by way of experiment. The mill is being run altogether by water power now, the Carson river having raised sufficiently to allow of it. Good progress is being made on the 1700 level drift, from Crown Point through Kentucky to prospect that level of this mine.

CON. CALIFORNIA AND VIRGINIA.—About 120 tons per day continues to be the yield from the 1750 level, assaying \$18 per ton. The northwest drift on the 1650 level is also being extended in order to get at some ore in that direction. From the Jones lease section, above the 1500 level, nearly 100 tons per day are being shipped to the Eureka mill, assaying about \$13 per ton.

KENTUCKY.—The old upper workings contribute their daily quota, as usual, toward the running of the Rock Point mill, on the Carson river, and also supplies the Longglass mill, of 10 stamps, in Gold Canyon, which is the property of Superintendent Stevenson.

ALTA.—On the 700 level the drift west has at last cut through into an ore body formation for which it has been running, but not far enough advanced to estimate or fairly understand the value of the low-grade bonanza met with.

OPHIR.—The lateral drift south on the 400 level is now in about 190 feet, following a very promising quartz formation, with occasional streaks and bunches of ore. No upraising is commenced yet above the main west drift.

SIERRA NEVADA.—On the 520 level the lateral drift north from the west crosscut is running in very favorable vein material, decomposed quartz, soft porphyry and clay, with some little water.

BEST & BELCHER.—The lateral drift south on the 1000 level continues following the strongly-mineralized quartz formation it was started to explore, but shows no particular improvement as yet.

MEXICAN.—On the 500 level the middle crosscut shows no particular change from last week. Material, decomposed quartz, vein porphyry and heavy clay.

UNION CONSOLIDATED.—The crosscut east on the 500 level, 100 feet south on the Sierra Nevada line, is progressing well in promising vein material.

GOULD & CURRY.—On the 100 level the crosscut west is now in about 70 feet. Material, vein porphyry, decomposed quartz and clay.

MONTE CRISTO.—Getting out ore enough to keep the mill running. Will resume sinking the new shaft shortly.

Dun Glen District.

NEW PLACER MINES.—*Silver State*, Nov. 13: There is some excitement at Dun Glen over the discovery of gold bearing gravel in Barber's canyon, on the western slope of the range. Quite a number of claims have been located, and Vance Nelson, who arrived from Dun Glen yesterday, says a shaft has been sunk 35 feet deep in the canyon without encountering bedrock, and five feet of the gravel in the shaft is said to be rich in gold. Two gold bearing quartz leads were discovered in the canyon years ago, but they were not prospected to any great extent.

Eureka District.

IMPROVEMENTS.—*Eureka Sentinel*, Nov. 11: Improvements about the Eureka Con.'s smelting plant appear to be the order of the day. The new water-jacket furnace in course of erection will be completed in two or three weeks, when the plant will be one of the most perfect in the West. Last May, when the furnace now in operation was completed and work resumed, Superintendent Robbins thought he had connected with the works all necessary improvements for the ready handling of ores, but from time to time he saw imperfections which he has done away with. Considerable custom ore is being hauled to the works from the mines of the district this week.

Hawthorne District.

THE LAPANTA MINE.—*Virginia Enterprise*, Nov. 15: A telegram from Hawthorne last evening says: Hawthorne District is looking most favorably. The main incline of the Lapanta mine is down sixty feet, showing a vein two feet in width, giving an average assay of \$135 per ton. Two hundred feet east, shaft No. 6 is down thirty feet; ledge looking well and averaging \$100 per ton. William M. Lent passed here en route for Bodie, this evening, in company with Captain John Kelly. Miners from Bodie report the 700 level of the Mono mine to be a failure.

Lone Mountain District.

SPLENDID PROSPECT.—*Elko Free Press*, Nov. 14: During the past two weeks there has been considerable stir over the discovery of a very rich and promising ledge in the King mine at Lone Mountain district, about 23 miles northwest of Elko. The claim in question is owned by Mr. S. G. Weston of this place, who has been mining in that district for the past five years. There are two shafts on the claim, one being 75 feet in depth, the other 65 feet. At a depth of 50 feet a crosscut was run, and an incline started down on the ledge, which pitches to the west. This incline is now down about 20 feet. When first struck the ledge showed about 10 feet of pay ore, which has now increased in the incline to 14 feet. The ledge is well defined, having a porphyry foot-wall backed by granite, and a hanging wall of lime and ironstone quartz. The ore is free milling, and can be mined and milled for less than \$6 on the ground. It assays in gold and silver from \$25 to \$300 per ton. There are now on the dump upwards of 300 tons of pay ore, worth about \$5000. The ore in sight in the mine is estimated at \$50,000. There is connected with the property a water-right sufficient to supply power to run 30 or 40 stamps. There is a

good road to within one-half a mile of the mine, which is situated on the west slope of Lone Mountain. Considerable surprise was manifested by a party of gentlemen, who visited the claim last week, over the fact that Lone Mountain contained such a fine property, and that so much work had been done. Aside from the King, there are several splendid copper claims, which will undoubtedly be heard from in the near future. It is quite likely that the King mine will be extensively worked next season and made to show its worth.

Lewis District.

GOLD.—*Central Newsman*, Nov. 11: J. E. Satter and R. A. Hazlett have struck a vein of ore in the Alleghany mine, at Lewis, that shows virgin gold all through the ledge. Both men are greatly elated over the find, and think that their fortunes are made. John Kae, J. N. Finley, J. H. Green and John Rhodes have struck some very rich ore in the Sunbeam mine, situated on Morning Star Mountain. The Morgan mine still continues to produce an abundance of good ore that turns out gold bullion to the satisfaction of its owner. Other mines in the district are looking well, and the prospects of the camp are brightening up. Everyone is encouraged by the new developments, and the old miners and prospectors go to work with renewed energy.

Pahrnatag District.

BULLION.—*Pioche Record*, Nov. 11: Eugene Howell shipped up another bar from Pahrnatag, value \$1241.41, 964 fine; result from 15 tons of ore, showing extraction of \$82 for every ton worked. He has thus made a thorough test on 34½ tons of ore from the new find, having made two shipments, in total \$2542, taking out in wet crushing in this heretofore considered base ore from 80 to 87 per cent of the assay value, or \$72.10 for every ton. This test fully demonstrates with systematical working and economical management that the mines in Pahrnatag still possess merit, and when handled on a proper basis can be made to pay.

Reese River District.

THE MANHATTAN MINES.—*Virginia Enterprise*, Nov. 12: The Manhattan mill, in Austin, has started up again, and is rolling out the silver bullion after its good old style, disposing of the rich ore which has been accumulating since July, when the mill took a rest. The richest and best of this ore is that taken out by tributaries. It is in small, separate lots of a few tons or so, yielding all the way from \$300 to \$5,000 per ton, and the boys have been waiting very anxiously for their little "crushings." The heavy lawsuit against the Manhattan Company by outside parties has operated as a sort of deadlock or embargo, but this being arranged, the mill is now turning loose these desirable resources. The mill was started up to crush up the ore on hand, and is doing excellent work. At the Lander shaft the several tribute stopes on the 700 and 740 levels continue to produce ore in limited quantities. Stopping is also being carried on in the 650 and 800 levels. The Paxton incline section continues to produce the usual amount of ore from the tribute stopes in 950, 1350, 1440 and 1500 levels. The 1440 west drift is being extended and carries very good ore in the face. At the Union shaft the south crosscut shows no change. The east drift on Union ledge is being continued, showing spots of good ore with a large ledge. Several parties of tributaries are taking out some ore on the several ledges already cut.

Rebel Creek District.

ORE FROM THE OHIO.—*Silver State*, Nov. 13: Last evening E. O. Connor's team arrived here with about 15,000 pounds of rich ore from the Ohio Company's mine at Rebel Creek.

San Bernardino.

ORO GRANDE.—*Calico Print*, Nov. 15: We were informed that the Oro Grande Mining Company's mill at Oro Grande has been leased to Denver capitalists for six months, with the privilege of purchasing same. The Denver capitalists are represented by Mr. Canfield, and should they find suitable mining property at Soda Lake, then a smelter will be erected at Oro Grande, where there is good water power and plenty of wood. The Calico Mill and Mining Co.'s mill at Daggett has been idle during the past week. Litigation is partly the cause of it, but it is expected soon that the mill will be running regularly.

CALICO.—The Jessie Tay and Rose Bud claims, owned by Anderson and Ackerman, have been bonded to Porter and Waterman, who are at the present time taking out some good ore. The Dora Belle mine is showing up some good mineral, a continuous vein 6 inches wide of 100 oz. ore is being worked on the claim. A streak of high grade ore has been struck on the Alhambra mine. This mine is owned by the Golconda and Alhambra Mining Co., Mr. Rodgers representing the company as superintendent. Work is being pushed ahead on the Young Waterman claim. It is the intention of the owners of this mine to develop it systematically, and not gouge out every little pocket of ore they happen to strike, although some very high grade ore has already been taken out of the shaft which is being sunk. The Sue mine is still looking very well, and is holding its own as regards shipments. The Humbug mine will shortly be worked again.

Willow Creek District.

PROGRESS.—*Co. Eureka Sentinel*, Nov. 14: The mining industry has made great progress in this district during the summer. Steady industry has taken the place of false representations, and solid developments have succeeded vain attempts at booming, which characterized the camp a few years ago. The Wild Deer claim, which, one year ago, was a mere prospect, has developed into a mine of no mean proportions. About 1200 feet of tunnels, drifts and inclines have been run upon the ledge. Several hundred tons of assorted ore have been mined and worked successfully at the mill—all taken from a small portion of the ledge above tunnel No. 1. The work done upon the ledge up to the present time shows a continuous ore body 250 feet long, 100 feet wide, and 3½ feet in thickness. We find occasionally barren streaks in it, but to make up for such spots, we have bunches of horn and native silver in other parts, which assay from \$300 to \$1000 in silver and gold, the latter metal holding over one-fourth the value all through the mine. Every foot of development shows richer and better prospects. The ledge below the 100 level has never, pinched or broken, and the mine can be worked for 1000 feet deep by tunnels run directly upon the ledge, which fact alone saves an immense amount of ex-

pense in working. The ore is growing richer in gold as depth is attained, the base bullion shipped to San Francisco running over two-fifths in gold in value. Bill Long still has charge of the mill and has made a record in handling the ores of the district, which is a credit to himself and the town he hails from. A new toll road is now nearly completed up Flat Creek a distance of four miles to a point just below the mine. Quite a large force of men and mules have been engaged on it for the past two months. It will be a great advantage to the Wild Deer as well as other claims on the creek, and is a pretty good evidence of the prosperity of the camp. Two hundred tons of the richest ore ever taken from the Wild Deer now await the completion of the road in order to be shipped to the mill by team, which will be a great improvement on the old way of packing by mule trains. The Ohio mine has been developing steadily under the management of Mr. William Caruthers. They have shipped enough ore to Salt Lake since buying the mine last November to pay all the expenses of development. A new tunnel 350 feet long has been run, which taps the mine at a much greater depth than heretofore. The ore is very high grade, and the mine is owned by a very strong company that talks of erecting a mill on Willow Creek next spring. During the summer the irrepressible prospector has not been idle. Several new finds have come under my notice, some of which, on the same ledge as the Wild Deer, promise finely for the amount of work done. All the camp needs is more muscle and less jawbone. We want men who practice less at the bar and more on the head of a drill.

ARIZONA.

CLIFTON CLARION.—Nov. 11: A ride of a half hour last Saturday morning on the Narrow Gauge Railroad brought a reporter of the *Clarion* to the Metcalf mine. Everything bore the look of prosperity. A strike of gray ore or sulphide of copper was struck recently, carrying about 35 per cent copper. The other parts of the mine are looking in splendid shape. A fine body of ore was struck in the 80 foot level of one of the Metcalf group a short time ago. Messrs. Dineen, Guthrie & McDermott have struck a new body of copper ore in their Lafayette mine, which adjoins the famous Alaska. The vein is 8 feet wide. Mr. John Hill has leased the ore dumps between the Metcalf and Queen mines and informs me that he is making it pay very well, assorting the dumps for shipment to the smelter. The news from the King mine is encouraging, too. In sinking another shaft from the 100 foot level, the ore is looking very much better than in the former shaft, and the prospects for this becoming a fine mine in the future are good. The White Hawk is looking better than ever, and Louis Jentzen still continues to ship very rich copper glance. The Detroit is looking as well as ever with ore still of a good quality. The drift run in bottom level to tap winze, was completed a few days ago, opening up a considerable body of fine ore. Mr. Barry, foreman for Captain Cutler, with three men, is kept busily employed taking out lime rock at the Longfellow to be used as flux by the Arizona Copper Company. The Longfellow mine is looking well and producing chiefly what is known as red ore. The incline shaft has been working now for over two months and the output consists principally of this kind of ore.

COLORADO.

SUMMIT COUNTY.—*Breckenridge Journal*, Nov. 11: The mills at Lincoln put in a full week at good pay. The placer workers have all closed down for the season. The Gold Dust lode will send 20 tons of ore to the Russell-Nashold mill next week. During the last week we are assured the Eureka has treated some very valuable ore said to run into the hundreds of dollars per ton. From now until next spring our gold reports will be confined to mines so far developed and equipped as to be able to work without inconvenience amid our Alpine snows and Arctic winters. The Brooks-Snyder mill is running steadily, the rail has been laid into the tunnel and an iron car now does the work of the wheelbarrow with twice the effect from half the labor.

CUSTER COUNTY.—*Rosita Journal*, Nov. 11: Judge Hoyt received about \$700 this week royalty money for Maverick ore. The ore body in the Maverick is increasing in richness and size and making a fine showing. James Kurtz has taken a lease on the Silver Cloud shaft of the Maverick mine and is driving a crosscut to the south at a depth of 60 feet. The shaft on the Dinero is now 160 feet deep and shows several small feeders from the vein. Drifting will be commenced at a depth of 175 feet, and it is confidently expected that the ore body will be tapped soon. Work was commenced on the Lizzie Mac lode Monday. The property is developed by a 90-foot shaft and a short drift at the bottom of the shaft. The Aspen, an extension of the Maverick, has been leased for six months from the time of striking pay ore, to James Kurtz and others. The shaft will be sunk to a depth of 60 feet and then a crosscut run to the south. James Hudson, a Pueblo machinist, came up last week to set up a new patent hand hoister for C. G. Mathews. The machine is an invention of Mr. Hudson's and is said to be a great improvement on the windlass. It is being used on the Lizzie Mac lode on Columbia Park. The Security Company purchased eight claims at Silver Cliff recently with the Silver Cliff mill which they are preparing to commence active operations on at an early day.

IDAHO.

THE NEW DIGGINGS.—*Coeur D'Alene Record*, Nov. 15: Last week Mike Rochford came to town directly from the St. Regis, and from him and others the reporter gathered the following particulars regarding the new placer field. On Deer creek, which empties into the St. Regis a Borgia river about four miles below Crow's Nest, 22 locations have been made and three water rights taken. A mining district, quartz and placer, has been established which embraces all of the country drained by the St. Regis, and is to be called the St. Regis. No bedrock has ever been found on Deer creek, although one shaft has been sunk to a depth of 25 feet, but from the surface to the lowest depth found the gravel prospects about the same. Mr. Rochford and partners whip-sawed lumber and made six sluice boxes. These had been run but a little while before he came away, but the little they shoveled in, by weight and meas-

urement, gave 15 cents in gold to the cubic yard of gravel. The creek has a good fall, and 600 inches of water and its bottom will average 600 feet in width for its entire length. Comment is unnecessary, but we must say that at these rates it will prove a paradise for hydraulic miners.

MONTANA.

STAR.—*Butte Miner*, Nov. 11: During the week just closed the only development worthy of special mention is the cutting of the vein in the south drift on the 500-foot level of the Rising Star, one of the Alice Company's properties. The drift in question has been run in 200 feet from the shaft, and on Thursday tapped the vein, which has been cut into five feet, with no indication of striking the opposite wall, and the ore is of a splendid grade. With such quartz in the crosscut and a continuation of the same grade of ore in the 800 drifts of the Alice proper, it would certainly hold that the deeper the mines go there is no diminution either in the quality or quantity of the products of the veins.

THE MOULTON.—During the week the mill was shut down two days for necessary repairs and putting in new driers, but is again in good trim and running to its full capacity. The stopes are producing as usual, both as to quality and quantity, and all the machinery is in first-class working order.

THE ALICE.—Everything about both the mine and mills of the company is running smoothly. During the week one shipment of 16 bars of bullion has been made and there are 20 bars more in the office, which will be shipped to-day. The vein in the 800-foot level is showing fully as well as at any time since it was but.

THE RISING STAR.—Work is being pushed with vigor, particularly the 500-foot level, in which the ledge has been tapped at a point 200 feet south of the shaft. The crosscut has not yet reached the south wall of the vein, but is now showing five feet of good ore. The body of ore thus opened is the best yet exposed in the mine, and from present indications is very extensive in quantity as well as of high-grade.

OREGON.

MINING SEASON.—*Jacksonville Times*, Nov. 13: A good mining season is predicted and hoped for. James Burns has returned from Portland and will resume mining operations on Applegate. The Wagner creek placer mines are in readiness and a good report is expected from them. Much more rain fell in Josephine county than in this and many of the miners there are at work. Bybee & Hall have done some piping on their mines on Canyon creek, Josephine county, and with a favorable season will take out considerable dust. J. N. Casteel was down from Big Applegate this week and reports his company and miners in that section generally as ready for an extended run. We are informed that the California capitalists who intend to run a ditch between Sucker creek and Illinois river, a distance of about 12 miles, have arrived at Kerbyville. They propose inaugurating a big mining enterprise and intend buying the claims of A. Brown and others. The Sterling Mining Company's huge, new reservoir is completed and being used with success. There is considerable water in the ditch and piping is going on, though more rain and snow is necessary to set everything going at full speed. Captain Ankeny is acting as superintendent, Frank Ennis still being unable to resume his duties. Piping was commenced last week at several of the mining claims in this country, but, as the weather has turned off pleasant, not much is being done in most cases. The same may be said of other placers that are worked in the old-fashioned way. It will not take a great deal more rain to set the miners busily at work; and all of them are anxiously awaiting it.

UTAH.

REVIEW.—*Salt Lake Tribune*, Nov. 13: The receipts in this city for the week ending Nov. 11, inclusive, were: Bullion, \$134,314.65; ore, \$27,647.80; a total of \$161,962.45. For the previous week the receipts were \$92,266.46 in the aggregate, of which \$77,441.46 was bullion and \$14,825 was ore. The Ontario product for the week was \$50,580 in bullion, bringing the total for the year up to \$1,410,019.21. The Stormont sent up on the 6th two bars of silver valued at \$3610. The product of the Hanauer smelter for the week was eleven cars of bullion, \$29,600; the Germania, four cars, \$9873.70. Ore receipts were \$7150 in the Lead mine, \$6850 from the Crescent, \$3100 from the Sampson, \$374 from the Lion, Utah; \$5670 from the Queen of the Hills, and \$3277.60 from the Bannock, Idaho; \$1150 miscellaneous, and \$136.20 from the Flagstaff, Nevada.

PARK.—The Ontario Company paid off on Wednesday and Thursday. A force of carpenters have been put to work making improvements on the Empire hoisting works, ostensibly for the purpose of protecting them against the heavy snows of this winter, and we understand that in early spring this company will resume work on the mine.

THE SANDSTONES.—*Salt Lake Tribune*, Nov. 14: Rich ore was struck in a new prospecting shaft on the Butte mine last week. A shipment of sulphides was made from the Leaching Works to Salt Lake last week. The Little Chief, Gisborn and Golden Gate mines have a big showing of low-grade ore that will pay a good profit to the reducer. The Leaching Company has a force of mechanics putting up the plant and sometime next week the ten leaching tanks and four precipitating pans will be in place. Wells, Fargo & Co. carried 31,704 ounces of refined silver out of camp last month. Of this amount the Stormont produced 20,920 ounces, and the Christy, in 15 days' run, 10,784.17 ounces. The old Bonanza, abandoned, then relocated last January, has enough ore exposed now to prove that it is a big mine; it has yielded within the last few weeks more than 100 tons of rich ore to the chloriders. There are many claims in town and on East and Central Reefs, that were abandoned until recently, when most of them were taken in hand by chloriders, many of whom were poor men; all are yielding good wages and several are proving bonanzas. The old Leeds mine, which has produced hundreds of thousands of dollars and was so badly gouged out by a grab-all-in-sight management such as the Horn Silver has been afflicted with for years, is still a profitable property.

MECHANICS' INSTITUTE INDUSTRIAL EXHIBITION

Of the City and County of San Francisco.



PREMIUMS AWARDED.



GOLD QUARTZ and PLACER MINERS' SILVER PLATED AMALGAMATING PLATES FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco, Cal. E. G. DENNISTON, Prop'r.



PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884. CLOT & MEESE, Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

GOLD MEDAL AWARDED

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine. SILVER MEDAL AWARDED For Best Slide Valve Engine and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street, SAN FRANCISCO.

AUTOMATIC

ENGINES

A Specialty.



HORSE POWERS, WINDMILLS, TANKS and all kinds of Pumping Machinery built to order. Awarded First Premium for Windmills at Mechanics' Fair, 1885.

F. W. KROGH & CO., 51 Beale St. San Francisco.

L. PETERSON, INVENTORS. MODEL MAKER,

253 Market St., N. E. cor Front, up-stairs, S. F. Experimental machinery and all kinds of models, tin, copper and brass

Send for Catalogue and Price List.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by DUNHAM, CARRIGAN & CO., San Francisco, Cal. | JENKINS BROS., 71 John St., New York.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS LOGGING, PORTABLE, STATIONARY, MARINE AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL 222 & 224 FREMONT STREET, SAN FRANCISCO.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned this title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO., 316 California St., San Francisco.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding homastic and pretensions claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street - - - San Francisco, Cal.

THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

118 California Street, San Francisco, Cal.



THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE, Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS. SAN FRANCISCO, CAL.

The most Complete Compound manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid and Alkali Proof.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees, No. 310 California Street, San Francisco.



Property Owners are interested personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.

American Exchange Hotel,

SANSOME STREET,

Opposite Wells, Fargo & Co's Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

T PACIFIC ELECTRIC PAD

THE GREATEST DISCOVERY OF THE AGE!

Patented Jan. 14, 1882.

Best Retainer in Existence!

Gives perfect ease and comfort in all positions. Does not interfere with work or business. We guarantee a perfect cure of Rupture in all cases which we accept and treat. Both of adults and children. Now, reader, if you are ruptured, this is worthy of your investigation. We especially desire all extreme cases, those considered incurable. If other treatment has failed you, come and see us. EVIDENCE UNLIMITED! OUR TERMS: NO CURE, NO PAY. Single Truss with solution, \$10. Double Truss with solution, \$15. Consultation and Advice Free. Write for full information and circulars. Office open even 25-26.

PACIFIC ELECTRIC CO.

SOLE PROPRIETORS,

No. 330 Sutter Street, San Francisco, Cal.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe,
Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope,
Allison Artesian Well Casing,
Eclipse Blowers,
Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

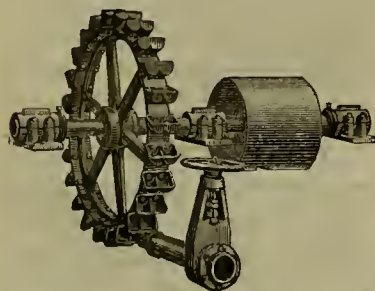
WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MECHANICS' MILLS.



Water Tanks.
Wine Tanks.

Our well-known TANKS are made by machinery,
from the best of materials, and shipped to all parts of
the country. Each piece numbered. No skill required
in setting up.

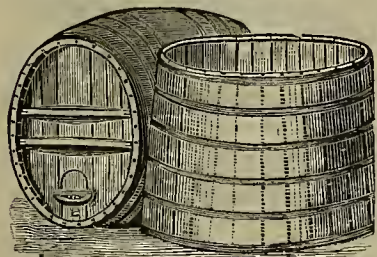
WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!

CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven M'fg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matcher Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

Lane and Bodley Saw mills.

H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES and LUBRICATING OILS.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and
Rice Mills, Grain and Malt Driers, Furnaces, Chess, Ce-
ment and Sinter Mills, Separators, Revolving and Shot
Screens, Stamp Batteries and all kinds of Mining and Mill-
ing Machinery. Inventor and manufacturer of the celebrated
Slot Cut and Slot Punched Screens. Mining Screens a
Specialty, from 1 to 15 (line).
Orders Promptly Executed.

DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.

Elevator, 12 Front St.

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.Highest Prices Paid for Gold, Silver and
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,

Under Chamberlin Patent.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO, - CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
OILS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we
confident from our experience we can well suit the de-
mand for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL.

H. KUSTEL.

★ METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.

Assaying and Analysis of Ores, Minerals and Waters.
Minerals Examined and Reported on.
Practical instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

113 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations

Mines; Plans and Reports furnished.

O. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.

Location of Works: Melrose, Alameda Co., Cal.

OFFICE: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 up-
ward per ton; Jewelers' sweepings and scrapings bought
or worked for the owners at a fixed rate per ton. Rebelli-
ous ores especially solicited. Ores worked and practical
working tests made by any process, to wit: Amalgama-
tion in battery and copprecipitates for free gold ore.
Amalgamation in pans for silver and gold ore, with or
without roasting. Leaching of silver ore. Chlorination
of gold sulphurets. Assaying, Chemical Analyses of Ores,
Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

The Rains.

The rains have fallen abundantly all over this coast this week, and gladdened the farmer's hearts. Up to 3 P. M., to-day (Wednesday), this present storm has given us in the city 4.23 inches, or 7.84 inches for the month of November to date. The season's rainfall so far is 8.73. On Tuesday morning this waters fall heavily. Between five and six A. M. we had .87—a good fall for one hour; and in the four hours between 4 A. M. and 8 A. M., the fall was 1.14. Some persons supposed that the rainfall then was phenomenal, and that we had never before had so much at one time. Mr. Thomas Tennent, who has kept rainfall records since 1849, has kept track of heavy falls of water and gives us some figures which show heaviest rainfalls in 24 hours in this city, whenever it exceeded three inches. This record is as follows:

Date.	Inches in 24 hours.
December 17, 1852.....	3.00
April 16, 1853.....	3.45
January 9, 1852.....	3.50
November 24, 1854.....	3.93
December 19, 1856.....	4.23
December 20, 1856.....	4.23
December 18, 1871.....	3.22
December 19, 1881.....	3.49
December 23, 1871.....	3.48
November 23, 1874.....	3.78
March 6, 1879.....	3.47
December 29, 1881.....	3.74

This month we have had several very rainy days. The heaviest this month in 24 hours according to this record was 1.72, which was on Nov. 6th.

The rainfall in this city so far this month beats this record for any previous year since 1850, this measurement for November in that year being 8.66 inches. The total rainfall this month will bring the record closely to that of November, 1850, if not exceed it. In the latter event, November, 1885, will go on record as the best month in rain statistics.

Mining Share Market.

There is very little change to note in the mining share market. On the Comstock the principal locality and centralization of interest so far as the deep levels are concerned lies in the middle mines, Hale and Norcross, Savage and Chollar. There is very little to say even of this important point or section of the Comstock. The managing powers are simply doing the best they can to develop a paying mine. Thus far in Hale and Norcross, the chief point at issue, the much-desired bonanza has not been uncovered, yet the prospects for a real, first-class one still hold good. Veins of rich ore are developed on the 3000 and 3100 levels, tending principally toward the Savage mine, and the explorations are conducted in that direction as well as westward. The face of the main north lateral drift on the 3100 level is all in good ore, also the face of crosscut No. 3 and farther south.

The north end of the Comstock is looking up, in Ophir, Consolidated Virginia and elsewhere, and the chances are that the tracings of the grand old lode for miles beyond the Utah will be practically followed up the next season as they never have before.

The recent stormy weather had the effect to raise the Carson river considerably, so that the mills have been able to run nearly all of their stamps. More water, however, is needed, induced by more storms of either snow or rain.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco.

AUTOMATIC DINING TABLE CO.—Nov. 16th. Manufacturing and selling an electric dining table, invented by Charles A. Grellwitzer. Capital stock, \$100,000, in 100,000 shares. Directors, Chas. A. Grellwitzer, Joseph T. Pohlman, Abrie O. Colton, William Wankowski, William T. Attinger, Daniel Reynolds and F. Schafer.

ELDRIDGE MINING CO.—Nov. 17th. Location, California. Capital stock, \$1,500,000. Directors, N. Eldridge, H. O. Stearns, J. L. Buckman, George N. Gray, H. D. Weld, Walter Rosie and G. N. Whittaker.

CALIFORNIA QUARTZ MINING CO.—Nov. 14th. Capital stock, \$500,000, in 20,000 shares. Directors, A. B. Paul, E. Hestres, A. B. Paul, Jr., J. Henricks and John Mullen.

Bullion Shipments.

Odessa Mill, Nov. 15; Barber's Mill, 15, \$500; Calico Mill, 15, \$3463; Lapanta, 15, \$15,000; Hanauer, 10, \$5300; Ontario, 10, \$30,580; Vienna, 10, \$2564; Hanauer, 11, \$7950; Lead, 11, \$2850; Queen of the Hills, 11, \$2810; Alice, 12, \$22,545; Hanauer, 12, \$2490; Crescent, 12, \$2510; Queen of the Hills, 12, \$1100; Nevada ore, 12, \$400; Germania, 13, \$4794; Hanauer, 13, \$5100; Queen of the Hills, 13, \$1200; Hanauer, 14, \$2490; Germania, 14, \$4690; Germania, 15, \$4861; Hanauer, 15, \$7800; Stormont, 15, \$2960; Lead, 15, \$2130; Mayflower, 15, \$1700. The banks of Salt Lake city report the receipt for the week ending November 19th, inclusive, of \$134,314.65 in bullion and \$27,647.80 in ore, a total of \$161,962.45.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ. SALE.	SECRETARY.	PLACE OF BUSINESS.
Baker Divide M Co.	California, 10.	25. Oct 29. Dec 1.	Dec 21. D M Kent.	330 Pine St.	
Buchanan M Co.	California, 14.	15. Oct 20. Dec 5.	Dec 21. J Sullivan.	121 Post St.	
Boulter Con M Co.	California, 3.	25. Oct 23. Nov 27.	Dec 17. G W Sessio.	309 Montgomery St.	
Bulwer Con M Co.	California, 3.	25. Oct 23. Nov 27.	Dec 17. W Willis.	309 Montgomery St.	
Chollar M Co.	California, 13.	50. Oct 21. Nov 24.	Dec 18. C E Elliott.	309 Montgomery St.	
Con Amador M Co.	California, 10.	50. Nov 2. Dec 2.	Dec 18. F Latham.	327 Pine St.	
Del Norte M Co.	California, 1.	20. Oct 8. Nov 14.	Dec 7. J B Cronan.	230 Montgomery St.	
Equitable Tunnel M Co.	Utah, 32.	10. Aug 8. Nov 15.	Dec 4. G J Collins.	512 Montgomery St.	
Guidelup M Co.	California, 1.	65. Oct 12. Dec 18.	Dec 14. R Eiler.	310 Pine St.	
Golden Jacket M Co.	Nevada, 1.	65. Oct 27. Dec 3.	Dec 26. R G McCallan.	331 Montgomery St.	
H & Norcross M Co.	Nevada, 27.	50. Oct 8. Nov 12.	Dec 3. J F Lightner.	309 Montgomery St.	
Holmes M Co.	Nevada, 10.	1.00. Sept 28. Nov 2.	Dec 2. C T Bridge.	224 California St.	
Julia Con M Co.	Nevada, 21.	10. Nov 4. Dec 9.	Dec 30. J Steadford.	419 California St.	
Mexican G & S M Co.	Nevada, 30.	25. Sept 21. Oct 26.	Dec 18. G B Elliott.	309 Montgomery St.	
North Peer M Co.	Arizona, 2.	02. Nov 7. Dec 10.	Jan 4. H Deas.	309 Montgomery St.	
New York Hill M Co.	California, 9.	15. Oct 30. Dec 5.	Dec 24. J B Leighton.	313 Montgomery St.	
Navajo M Co.	Nevada, 13.	10. Oct 29. Dec 4.	Dec 23. J W Pew.	310 Pine St.	
Potosi M Co.	Nevada, 20.	40. Sept 28. Nov 4.	Nov 25. G B Elliott.	309 Montgomery St.	
Summit M Co.	California, 1.	05. Oct 3. Nov 30.	Dec 21. G W Sessio.	309 Montgomery St.	
Savage M Co.	Nevada, 64.	50. Oct 5. Nov 30.	Nov 30. E B Holmes.	309 Montgomery St.	
Sierra Nevada S M Co.	Nevada, 83.	25. Sept 30. Nov 4.	Nov 24. E L Parker.	309 Montgomery St.	
Sulphur Bank Q M Co.	California, 4.	50. Aug 29. Oct 4.	Dec 3. J T Winttingham.	336 California St.	
Trinity M Co.	California, 1.	10. Nov 2. Dec 7.	Dec 24. G W Pearson.	417 Kearny St.	
Tulahoma M Co.	California, 1.	05. Sept 15. Nov 13.	Dec 15. H J Hyland.	309 Montgomery St.	
North Peer M Co.	Arizona, 2.	02. Nov 7. Dec 10.	Jan 4. H Deas.	309 Montgomery St.	
Willow Creek M Co.	Nevada, 2.	1.00. Oct 12. Nov 16.	Dec 14. R Eiler.	310 Pine St.	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Kentuck M Co.	Nevada.	J W Pew.	310 Pine St.	Annual.	Nov 25
Pioneer M Co.	California.	A Judson.	320 Sansome St.	Annual.	Nov 23
Silver Lick M Co.	Nevada.	L J O Farrell.	420 California St.	Annual.	Nov 25

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caledonia M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Nov 25
Jackson M Co.	California.	D C Bates.	328 Montgomery St.	10.	Oct 5
Kosuth M Co.	Nevada.	C K Stuartant.	328 Montgomery St.	25.	Mar 16
Richatatan S M Co.	Nevada.	John Crockett.	418 California St.	25.	Sept 1
Mt Diablo M Co.	Nevada.	R W Heath.	318 Pine St.	20.	July 30
Navajo M Co.	Nevada.	J W Pew.	310 Pine St.	25.	Feb 13
Plymouth Con G M Co.	California.	W Van Norden.	Pres. 23 Nassau st. N. Y.	50.	Apr 6
Silver King M Co.	California.	J Nash.	328 Montgomery St.	25.	Oct 15
Syndicate M Co.	Nevada.	J Stadfeld Jr.	419 California St.	10.	Sept 8

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.		
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.
Nov. 4-11																		
Thursday.....	.05	47 S Cy.	.00	53 N Fr.	.00	54 NW Cy.	.00	58 NW Cl.	.00	73 SE Cl.	.00	70 NW Cl.						
Friday.....	.00	59 S Cl.	.00	49 NW Fr.	.00	56 SE LR.	.00	59 NW Fr.	.00	70 S Fr.	.00	74 W Fr.						
Saturday.....	.00	53 SE Fr.	.00	50 N Cl.	.00	56 SE Cy.	.00	56 NW Cl.	.00	72 SW Cl.	.00	67 W Cl.						
Sunday.....	.00	60 NE Cy.	.00	45 N LR.	.05	50 S Cy.	.75	54 NE LR.	.00	66 S Fr.	.00	66 W Fr.						
Monday.....	.01	56 E Cl.	1.67	54 S LR.	.40	57 E Cy.	1.31	59 SE LR.	1.14	60 S Cy.	.34	64 S Cl.						
Tuesday.....	.00	54 NE Cy.	2.07	64 S Cy.	2.07	57 S Fr.	1.55	64 SE LR.	.31	60 E Cy.	.02	67 S Cl.						
Wednesday.....	.01	52 S Cy.	.03	51 N Cy.	3.36	52 NW Cl.	.33	55 N LR.	.25	69 S Cy.	.00	70 SW Fr.						
Totals.....	.07		3.77		5.88		8.94		1.70		.36							

EXPLANATION.—Cl for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING OCT. 31.	WEEK ENDING NOV. 5.	WEEK ENDING NOV. 12.	WEEK ENDING NOV. 19.				
Alpha.....	..	.65	.70	..	.65			
Alta.....	.20	.30	.25	.25	.30	.25		
Andes.....	.25	.30	.30	.60	.35	.40	.30	.35
Argenta.....	..	..	..	..	..	..	..	..
Belcher.....	1.25	1.70	1.65	1.90	1.30	1.75	..	..
Belling.....	..	..	..	..	..	..	..	..
Best & Belcher.....	1.25	1.35	1.35	1.70	1.45	1.50	1.25	1.50
Bullion.....	.50	..	..	..	..	..	..	..
Bonanza King.....	..	..	..	..	..	..	..	..
Belle Isle.....	.10	.15	..	..	..	..	..	..
Bodie Con.....	2.45	3.10	2.25	3.00	2.75	3.00	2.35	2.80
Benton.....	..	..	..	.10	..	..	..	..
Bodie Tunnel.....	.20	.25	..	..	..	.15	..	.10
Bulwer.....	.45	.50	.25	..	..	.40	..	.35
California.....	1.20	1.35	1.35	1.70	1.50	1.60	1.45	1.60
Challenge.....	..	..	..	..	..	..	..	..
Champion.....	.20	.15	..	..	..	..	..	..
Chollar.....	.80	.05	.75	1.00	.75	.85	.65	.75
Confidence.....	.90	1.00	.90	1.00	..	.90	..	..
Con. Imperial.....	1.20	1.35	1.35	1.70	1.50	1.65	1.45	1.60
Con. Pacific.....	1.15	1.35	1.15	1.25	1.30	1.25	..	1.20
Crown Point.....	..	..	..	..	..	..	..	..
Day.....	..	..	..	..	..	..	..	..
Eureka Con.....	2.25	2.50	..	2.50	3.00	3.10	..	..
Eureka Tunnel.....	..	..	..	..	..	..	..	..
Exchequer.....	.20	.25	..	..	..	.25	..	.25
Grand Prize.....	..	..	..	.20	..	..	..	..
Gould & Curry.....	.80	.95	.95	1.10	.95	1.05	.75	1.00
Goodshaw.....	..	..	..	..	..	..	..	..
Hale & Norcross.....	2.90	3.00	4.15	3.00	4.20	3.37	4.05	4.00
Holmes.....	.50	..	..	..	..	..	..	..
Independence.....	..	..	..	..	..	..	..	..
Julia.....	..	..	..	..	..	..	..	..
Justice.....	..	.15	..	..	..	..	..	.10
Martin White.....	..	..	..	..	..	..	..	..
Mono.....	.10	7.50	5.75	8.00	7.50	9.75	6.25	7.50
Mexican.....	.70	.80	.80	1.05	.35	1.05	.80	1.60
Mt. Diablo.....	..	2.50	..	..	..	..	..	..
Northern Belle.....	.40	.70	.40	.60	.30	.40	.30	.40
North Star.....	.15	.35	..	.20	..	..	..	..
Ocidental.....	.90	1.10	1.15	1.45	1.30	1.50	1.05	1.35
Ophir.....	.25	.35	.25	.30	..	.30	.25	.30
Overman.....	.15	.20	.55	.65	.55	.60	.45	.60
Pinal Con.....	..	..	..	..	..	..	..	..
Savage.....	1.25	1.50	1.20	1.55	1.50	1.80	1.75	1.85
Seg. Belcher.....	.60	.75	.70	1.95	1.05	1.20	.90	1.10
Sierra Nevada.....	..	..	..	..	..	..	..	..
Silver Hill.....	..	..	..	6.25	..	..	6.75	7.00
Silver King.....	..	..	..	..	..	..	..	..
Scorpion.....	..	..	..	..	..	..	..	..
Syndicate.....	..	.35	.25	.35	.20	..	..	.20
Tioga.....	.65	.70	.75	.90	.80	.85	.60	.80
Union Con.....	..	.50	.50	.75	.75	.75	..	.70
Utah.....	..	..	..	..	..	..	..	..
Yellow Jacket.....	1.75	2.00	1.80	1.95	1.45	1.80	..	1.50

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Nov. 19.	50 Mexican.....	80c
30 Alta.....	400 Mono.....	6.00
400 Andes.....	100 Nevada.....	1.00
100 B & Belcher.....	100 Overman.....	.20c
600 Bodie Con.....	470 Ophir.....	1.05
20 Bulwer.....	300 Potosi.....	.45c
200 Con Va & Cal.....	300 Syndicate.....	.20c
125 Chollar.....	100 Savage.....	1.75
100 Exchequer.....	115 Sierra Nevada.....	.85c
100 Eureka Con.....	200 Tioga.....	.10c
200 Gould & Curry.....	400 Union.....	.70c
160 Hale & Norcross.....	5 Union.....	.50c

I HAVE IT—Muller's stylish eye glasses; Xmas gift for sister or brother. 135 Montgomery street.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 10, 1885.

- 330,014.—WINDMILL.—Edward Gilman, S. F.
 330,020.—SAW-MILL SET WORKS.—D. L. Harbach, S. F.
 330,111.—BLACKING BRUSH AND SCRAPER.—C. E. Hatch, Vallejo, Cal.
 330,025.—SPRING VEHICLE.—M. P. Henderson, Stockton, Cal.
 330,156.—BOILER FURNACE.—John Mailer, S. F.
 330,151.—MOTOR FOR PROPELLING CARS, ETC.—L. C. Pressley, S. F.
 329,957.—INSECT DESTROYING DEVICE.—F. A. Ruhl, Stockton, Cal.
 329,958.—CORE FORMING APPARATUS.—Richard Savage, S. F.
 329,959.—CORE MAKING MACHINE.—Richard Savage, S. F.
 330,162.—VEST PATTERN.—Shively & Clark, Toana, Nev.
 330,071.—ELECTRICAL CONDUCTOR.—A. C. Tichenor, S. F.
 330,072.—ALLOY.—A. C. Tichenor, S. F.
 330,078.—SIPHON PUMP.—F. Whitman, S. F.
 330,080.—PIANO ACTION.—Fredk Zech, S. F.
 NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- JARRED C. HOAG—California.
 J. J. FARRIS—Amador and Calaveras Co's.
 F. H. HORN—Nevada (State).
 G. W. INGALLS—Arizona.
 E. L. RICHARDS—San Diego Co.
 R. C. HUSTON—Idaho and Montana.
 G. M. DOWELL—Santa Clara and Santa Cruz Co's.
 HUGH ELIAS—Nevada Co.
 J. DE PUR, Butte and Yuba Co's.
 J. WINKLER, Alameda Co.
 M. L. DENNIS, Plumas and Sierra Co's.
 J. B. PATCH, Nevada and Utah.

DELINQUENT NOTICE.

The Orleans Mining Company—Location of principal place of business, San Francisco, California. Location of works, Grass Valley township, Nevada

PACIFIC IRON WORKS

1850. 1885.
RANKIN, BRAYTON & CO.,
MINING MACHINERY.

San Francisco: 127 First Street.
Chicago: 100 N. Clinton.
New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

WATER JACKET SMELTING FURNACES

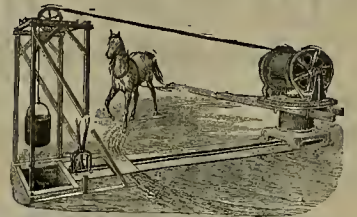
For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.

WATER JACKET SMELTING FURNACES

THE DUNCAN CONCENTRATOR

Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

HOISTING WORKS

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, 1 ts

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED. V. KINGWELL.

0414 T. HOMPSON. EDMONTON THOMPSON.
THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF—

Steam Engines, Flour Mill, Mining, Saw Mill and Dredging Machinee

Brodie Rock Crushers, Steam Power, Hydraulic, Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.



The California Perforating Screen Company.

All kinds of Quartz Screens, shot or round holes, zinc, copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

PACIFIC ROLLING MILL CO.,

..... MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

Geo. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Prest and Treas.

Geo. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BAFFY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

FRASER & CHALMERS.

CHICAGO, ILL. U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,
ROOM 43,
NO. 2 WALL ST.

PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,
JIGS & STAMP-BATTERIES.

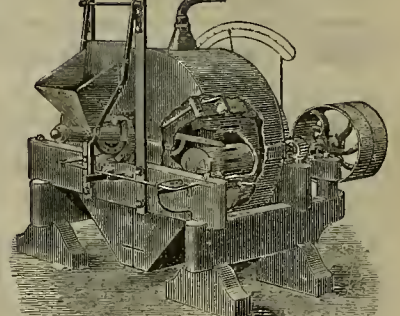
Denver Office:
No. 248
18th Street,
Denver,
Colo.

Mexico Office:
No. 11
Calle de San Mateo,
Mexico.

Tustin's Pulverizer

WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLY, SPIERS & HAYES,

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

.... MANUFACTURER OF....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

VALUABLE CHROMIC IRON MINE.

Within 2 miles of Railroad.

Thousands of Tons on Surface.

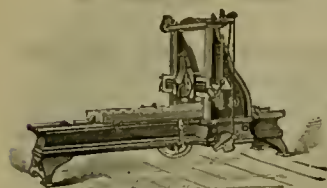
CAPITAL WANTED TO DEVELOP.

Half share as equivalent, or will sell outright. Address G. W. SPAWFORTH, Lang Station, Cal.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



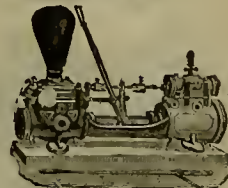
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

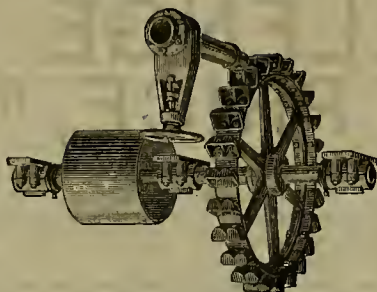
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.



SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.

SEND FOR CIRCULARS.



PELTON
HURDY-GURDY WATER WHEEL.

SOLE AGENTS FOR

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefell Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH. Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

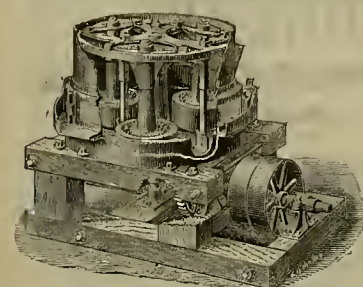
BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch
pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corless, Slide Valve, Poppet Valve, Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);
50,000 horse power now in use.
MACBETH PATENT STEEL-RIM PULLEY—Fifty per cent lighter and 25 per cent cheaper than cast-
iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.
WILSON'S PATENT GAS-PRODUCER.
STEAM BOILERS of all descriptions.
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship
Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain
Mining Company.

Send for Circular and Price Lists.

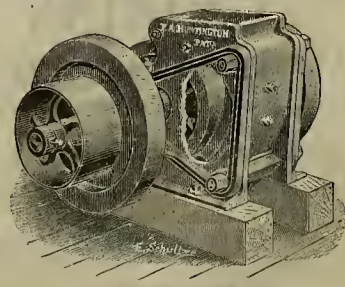


Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,
MANUFACTURER OF
Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,
Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

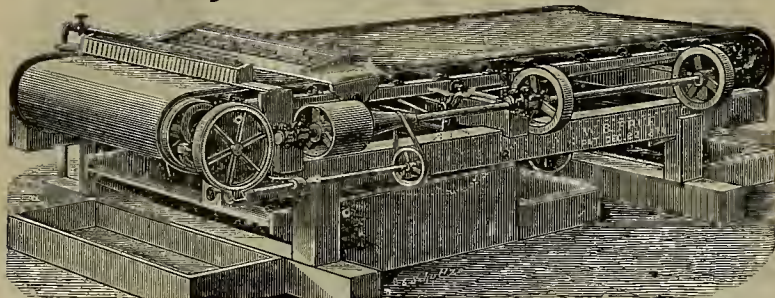
SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against this Triumph, or any other Concentrator for stakes of \$1,000.

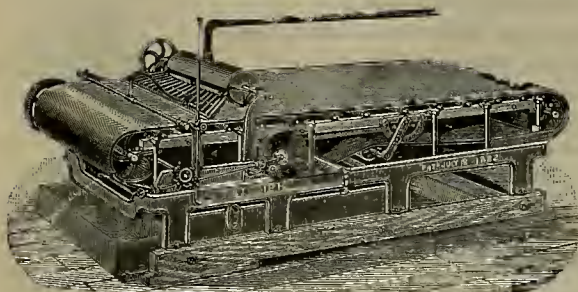
ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street.

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED.

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.



THE "TRIUMPH" TRIUMPHANT!

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and this same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$3.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induces us to and we hereby accept the Challenge of \$1,000, flouted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

JOSHUA HENDY MACHINE WORKS,

(INCORPORATED SEPTEMBER 29, 1882)

Nos. 39 to 51 Fremont Street,

San Francisco, Cal.

MANUFACTURERS OF

**NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY
OF EVERY VARIETY.**

Steam Pumps of all Makes,

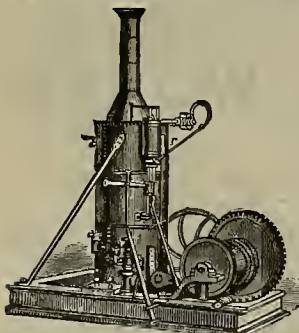
CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER AND RUBBER

BELTING.



STATIONARY, PORTABLE,

.....AND.....

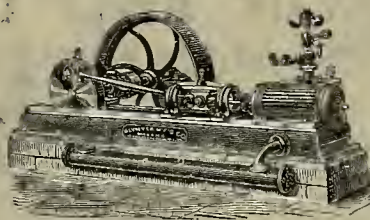
Hoisting Engines

.....AND.....

BOILERS.

IMPROVED SINGLE AND DOUBLE CIRCULAR SAW-MILLS.

SHINGLE MILLS.



WOODWORKING

MACHINERY,

.....COMPRISING.....

Band Saws,

Stickers,

Planers,

Shapers,

Etc., Etc.



MINING, QUARTZ, AND SAWMILL MACHINERY.

AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.

Agents for the Sale of BAKER ROTARY PRESSURE BLOWERS, AKRON (Ohio) HOT-POLISHED SHAFTING, WILBRAHAM ROTARY PISTON PUMPS, BLAISDELL & COMPANY'S MACHINISTS' TOOLS.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Lins, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 616 Front St., San Francisco.

A. T. DEWEY,
W. B. EWER,
GEO. H. STRONG.

Dewey & Co.'s Scientific Press Patent Agency (ESTABLISHED 1860.)

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not few. Circulars of advice sent free on receipt of postags. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

TO MINING MEN.

Competent man of practical knowledge desires position as Superintendent. Experience in Mexico and California. Speaks Spanish. Address

PACIFIC IRON WORKS.

127 First St., San Francisco.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 28, 1885.

VOLUME LI
Number 22.

Working Low Beds of Gravel.

We have had our attention directed to an article which appeared in the *Rocky Mountain News*, published in Denver, Colorado, under date of Nov. 11th, relating to the successful operation of a hydraulic mining plant, which has recently been placed in position on Clear creek, near Golden, distant about 13 miles by rail from Denver.

This plant was purchased by Messrs. J. B. Chaffee and George W. Cummings, of Colorado, from the Joshua Hendy Machine Works, of Nos. 39 to 51 Fremont street, this city, through Robert J. Cory, agent at Denver, and comprises two hydraulic giants, one 16-inch hydraulic gravel elevator and one water-lifter, the latter being an auxiliary for pumping purposes to the elevator. The general plan of position and method of operation are shown in the cut herein presented in a somewhat crude manner.

As will be observed by an examination of this sketch, the elevator consists of the lower or entrance sections of heavy, well-ribbed iron pipe, cast from the best iron. These sections are set down say, five or six feet below the surface of the bedrock, the necessary excavation having previously been made for its reception. A hydraulic nozzle of proper size is then inserted into the entrance section, fixed in position, and connected by a distributing pipe line with the main supply pipe, ditch or reservoir. From these entrance sections of the elevator a wrought-iron pipe extends upwards, at an angle of 45°, to such elevation as it is intended to raise the water, earth, sand and gravel, etc., where it is connected with an upper curved portion of well-ribbed, cast-iron pipe (flanged together in sections), which discharges into an outer flume or line of sluice boxes constructed in the manner usual in ordinary hydraulic mining.

In addition to the plant, as above described, purchased by Messrs. J. B. Chaffee and G. W. Cummings, their works embrace about 2100 feet of 18-inch hydraulic pipe forming the main supply pipe line, with necessary air-valves, water-gates and distributing pipe lines to the several appliances.

The appliances forming this plant are simple in their construction, yet strong and durable, and the principles involved are based upon the hydraulic proposition that a volume of water acting under a head or pressure has an almost inconceivable impinging power or force, and experiments have demonstrated that it is as easy to wash earth, sand, gravel or other material up an ascending plane as to carry the water itself,

for it requires as much power to raise a pound of water as it does a pound of the heaviest substance. The greater the pressure, the greater the impact force, and consequently the higher the elevation to which material can be raised, the one being proportionate to the other.

Having given this rationale of the principles involved in the construction and the method of operation of hydraulic gravel elevators, we deem it of interest to our mining friends to present some of the facts of the practical operation of the plant referred to.

The volume of water at command is unlimited, and, so far as the work has been con-

ducted, about 1000 miner's inches were used when the hydraulic giants and elevator were in full play. The vertical head or pressure of this volume of water is 190 feet from point of delivery at supplying ditch to the point of operation of the elevator on the bedrock, and Mr. George W. Cummings writes to the "Joshua Hendy Machine Works," on the 12th inst., following the article in the *Rocky Mountain News*, thus: "The elevator shaft (in sinking), before the water-lifter arrived, required a windlass at each end, a large pump in the center, all running night and day, with a force of 16 men, to raise the water and sink the shaft. The water-lifter drains the shaft in eight minutes, using the smallest (three-inch) ring in the nozzle. The gravel elevator is a perfect success. I am raising gravel 25 feet with a head of 190 feet, and I will guarantee it to raise 35 feet when I am ready to lower the receiving end."

The velocity of the water and gravel through the elevator is almost inconceivable, and a calculation made of the mass of earth, gravel and sand raised, gives as a result the vast quantity of 2000 cubic yards per day of 10 hours. The process of washing, which is almost automatic, requiring only the assistance of pipe-men

Should this experiment, although it cannot even now be called such, prove successful, it will be followed by others of a like character in that and other districts of Colorado, and the result will be a large addition to the output of gold in that State.

When it is considered that the yield of the placers above spoken of is stated to be one dollar per cubic yard, the introduction of several similar hydraulic plants into the well-known rich mining districts of that State, would open up vast fields of enterprise and pour into the channels of commerce streams of golden wealth. Let, therefore, California look to her laurels and it will be found that the use of these simple and effective machines may destroy the bugbear of the vexing debris problem.

For it will be observed that the plan of operations by the arrangement of the outer flume provides its own dumping ground in the successive stages of working and that vast shallow deposits of rich auriferous gravel with low, outlying ground can be opened, new industries fostered and our State of California made richer within herself.

The citizens of Carson, Nev., are going to try to persuade the authorities to re-open the mint.

Must Stop Mining.

It will be remembered that in the famous "debris" case of Woodruff vs. North Bloomfield and other companies, the Judge decided that all the defendants should be "perpetually enjoined and restrained from discharging or dumping into the Yuba river, or into any of its forks or branches, or in any stream or tributary to said river, or any of its forks or branches, and especially into Deer creek, Sucker Flat ravine, Humbag creek or Scotchman's creek, any of the tailings, boulders, cobblestones, gravel, sand, clay, debris or refuse matter from any of the tracts of mineral land or mines described in the complaint."

It having been alleged that the miners were disobeying the judgment of the court, they were summoned to show cause why they should not be punished for contempt. They denied having violated the order, and the matter was referred to Master in Chancery, S. C. Houghton, to take testimony and find out the facts. In his report, just filed, he says:

"The evidence clearly shows that since the date of the filing of the decree herein, mining tailings have been discharged into Humbag creek by the respondent, the North Bloomfield Gravel Mining Company, from its mines, described in the bill."

He then recites the facts proved by the testimony, showing that what he calls "drift mining" is constantly carried on with large quantities of water; that in one place a 15 inch monitor is in operation, and that the company uses on an average 1000 miner's inches of water per day, and concludes by saying:

"I therefore find, and do report that since June, 1884, the North Bloomfield Gravel Mining Company, respondent, has been continuously engaged in practical drift mining in its mine described in the bill herein; that in procuring, facilitating and protecting such drift mining operations, said respondent has removed from its said mine and discharged into Humbag creek, a tributary of the Yuba river named in the decree herein, a considerable quantity of mining tailings; that mining tailings, in much less quantity, have also been by said respondent discharging from its said mine into said creek by means of water run from ditches over the banks of said mine; and thereby said respondent has violated the decretal order of this court, and is in contempt."

A scheme is on foot at Portland to raise a fund for the purpose of encouraging the location of manufacturing enterprises there.



METHOD OF WORKING LOW BEDS OF AURIFEROUS GRAVEL.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Mining Debris.

The Legal Strife Between the Farmers and the Miners—Mistakes Made and Need for Better Methods on Both Sides.

DUTCH FLAT, PLACER CO., NOV. 19, 1885.

EDITORS PRESS:—Sojourning in this place, formerly one of the great hydraulic mining centers of the State, I have had opportunity to notice the effect produced by the closing down of that class of mines, which has been more disastrous here than in most other localities, for the reason that there are not in this vicinity any drift or quartz mines that amount to much. Since coming here I have become more convinced than ever that the farmers and miners made a great mistake in that they did not, at the commencement of their troubles, come together on some common ground and adjust their differences in an amicable way.

While the parties to this contest might naturally be expected to differ in opinions touching its merits, it is, nevertheless, true that this question has been discussed with too much rancor on both sides, and very often with too little regard to exactness in their statements of facts. To illustrate: The farmers and their friends, in estimating the amount of damage caused by the mining detritus, manifest a constant tendency to exaggerate the same, evincing, meantime, an equal willingness to depreciate the benefits resulting from hydraulic mining. So, on the other hand, do the miners and their adherents show a like disposition to underrate the amount of this injury, and unduly magnify the importance of the business in which they are engaged. Not only so, but aside from this disingenuousness, there has appeared so much of misstatement on both sides as amounts seemingly to a willful perversion of facts. There has, to say the least, been a good deal of loose talk indulged in pro and con in the conduct of this controversy.

Many of the miners, for instance, keep on asserting that their opponents intend, after they have prohibited hydraulic operations, to put a stop to all kinds of mining, a statement contradicted by reason as well as by the farmers themselves. The only warrant the miners have for holding and reiterating this opinion is the declaration made by certain extremists among their opponents, to the effect that the anti-debris people will never rest satisfied till the water comes down from the mountains in its original purity; which declaration, were it true, would, to be sure, imply a purpose on their part to put a stop to every form of mining. But as the Anti-Debris Association repudiates this ultra view, it is just as unfair to charge them with entertaining such purpose as it would be to charge the Miners' Association with the design of enjoining the farmers from plowing their land, as has been suggested by some of the miners, on the ground that stirring up the soil over areas so vast sends down more sediment into the rivers than comes from the hydraulic washings; and yet no sane person can for a moment suppose that the association or the great body of miners favor any such movement, or ever harbored a thought of the kind.

A Strange Misapprehension of Facts.

Misled by this language of hyperbole and so much reckless asseveration, many persons, not the special adherents of either of these parties, have come to entertain rather vague and sometimes very erroneous ideas about this whole business. You will, for example, meet with otherwise well informed people who are impressed with the idea that a large proportion of the farming lands in the State has been destroyed by the mining detritus, and that much of the balance is threatened with a like fate unless hydraulic operations are wholly arrested, to say nothing about rivers turned from their beds, towns buried up and harbors already shoaled to a dangerous extent. So, too, you will meet with others who speak of gold mining in California as being a thing of the past, they being under the impression that the check put upon hydraulic operations in the central counties of the State has about depopulated the mines and extinguished the whole business, these people not being aware that hydraulic washing is still permitted to go on and is never likely to be interfered with in the northwestern counties, and that never so much as one-half the gold product of the State was obtained from the hydraulic mines. Since the closing of so many of these mines, including all the larger ones, the contributions from this source are, of course, much less than before, amounting now to not more than a million dollars against six or seven millions formerly. As regards the quantity of land destroyed or ever likely to be destroyed, by the mining debris, its disproportion to the entire tillable land of the State is as one to one thousand.

And so, through such wide misconception of the real facts, the public mind has been abused, many persons having been led to prejudice the case accordingly as it happened to be first presented to them by one side or other, while the parties to the controversy influenced by these

extreme views have been all the while drifting further and further away from each other.

A Case to be Settled by Concessions and Compromises.

If there ever was a case that required to be treated in a spirit of conciliation and fairness—in which the rights and grievances of both sides should be considered and duly weighed, this is one. To such extent is it burdened with hardships and balanced with equities that, if ignoring the complaints of one party we listen only to those of the other, our feelings are strongly enlisted in behalf of the latter, whereas a dispassionate hearing of both sides leaves our sympathies divided and our judgment in doubt. Even the judicial mind, perplexed and confounded, has felt constrained, to qualify as much as possible its findings in view of the much conflicting evidence before it, and the absence of statutory provisions and decisions precedent to guide it.

Evidently, then, if the questions involved in this contest are ever to reach such settlement as will stop further litigation and strife, it will have to be done by compromise, even though such disposition of them fail to fully satisfy either party. There will have to be concessions made—something yielded and something tolerated on both sides. The valley towns and the land owners will have to bear with a little inconvenience and even suffer a little injury; the miners will have to go to the heavy expense of impounding or otherwise taking care of the more damaging portions of the debris, while the State and the General Governments will each have to contribute something towards protecting the water ways and incidentally the towns and farming lands along them. The above outlines the policy that it seems to me ought to be pursued, this being the idea I have entertained from the beginning of this trouble.

What Should Have Been Done at the Start.

After having visited and examined the Bear and the Yuba river bottoms, while acting as Secretary of the Hydraulic Miners' Association for the first few months after it was organized, I suggested to the members of that body that it might be a good plan for them to buy up the damaged lands along these streams and convert them into a grand dumping ground, leveeing the river banks at the same time and building retaining dams at all eligible sites below the mines. Up till that time there had existed mutual good feeling between the farmers and the miners, each showing a disposition to co-operate in the adoption of preventive measures, in the furtherance of which Yuba county had already contributed over \$30,000 towards the construction of levees along the Yuba. Had some such policy as this been pursued at the start, the costly litigation that has since followed might, and very likely would have been avoided, while the farming lands and the navigable streams would have been fairly protected and the miners allowed to continue their operations with little or no interruption. It is much to be regretted that some such amicable arrangement was not then reached, nor is it easy to see how there is to be opened, even at this late day, any very different way out of these difficulties.

How It Works in the Mines.

Without going over the grounds so often traversed in the discussion of this subject, let us examine for a moment and see how the stopping of hydraulic washing is affecting individual interests and the general welfare here in the mines. Confining our observations, for the nonce, to a few cases, two of them consisting of hydraulic mining, and two of other branches of business not conducted by the hydraulic process but dependent upon it, the one for its existence and the other largely for its support. And that I may not seem partial I will pick up these examples in different places in the neighborhood and quite at random.

James L. Gould,

A resident of this place, has been engaged in hydraulic mining in Gold Run, three miles below here, for more than 25 years, having commenced when quite a young man and grown up with the business. Mr. Gould has always been noted for his energy, enterprise and business capacity, qualities that enabled him to buy out his partners one after another, until he became the principal owner of the Gold Run Company's extensive properties, consisting of ditches, reservoirs, water franchises, and a large area of valuable mining ground. Much of the top dirt having been run off from this ground many years ago, it became necessary to drive a system of bed rock tunnels in order to reach and effectually handle the remaining stratum of rich, cemented gravel: a work which Mr. Gould, having commenced some 10 or 12 years ago, only completed after a series of years spent in unintermitting effort, and at an expenditure of nearly \$100,000. In driving this system of tunnels, which comprised a main trunk and several branches, Mr. Gould was the first to introduce the power drill on this coast, demonstrating its utility in the prosecution of this kind of work. Having incurred such heavy expenses, besides large sums laid out in otherwise improving his plant, Mr. Gould had been running only a few years when he was enjoined from further operations, he having been the first party proceeded against by the Anti-Debris Association. This action against the Gold Run Company was, in fact, brought by the association with a view to making it a test case. That the debris then being run off by this company could little harm any property or interest below may be inferred

from the fact that they were working the hard bottom gravel, every pound of which had to be blasted out with powder and the fragments further pulverized before it could be washed at all. These tailings, were, therefore, not only limited in quantity, but were so heavy that they could not travel far after their escape from the sluices. Although comparatively little of this hard gravel could be handled, it paid well, being very rich in gold; and Mr. Gould was beginning to realize some return from his heavy outlay with a prospect of ultimate large profits, when the hand of the law coming down heavily upon him closed his works, and, cutting off his revenues, left him encumbered with a considerable debt besides.

Thomas Wheeler,

Having amassed a handsome fortune mining for nearly thirty years in Sierra county, came some seven or eight years ago to Little York, two miles from this town, and there with his family, invested all his means in the hydraulic mines at and near that place. For constructing headrock tunnels and making other needed improvements, Mr. Wheeler had to encumber his property somewhat; but for all this, having gotten his claims into good shape and being himself an experienced and thorough-going miner, he was in a fair way not only to make money but achieve a large success, when the courts interposing, put an end to his operations; which interposition leaves Mr. Wheeler in his old age with a family on his hands and about penniless.

William H. Kinder,

Living at Gold Run, three miles southwest of this place, is another old-time hydraulic miner, having been among the very first to engage in this style of gravel washing. Mr. Kinder has, moreover, distinguished himself for the many valuable improvements he has introduced into the business, he being the inventor of the very effective gold-saving appliances known as the "Undercurrent" and the "Secondary." He was also the first man in California to rig up and work on a large scale what are known as tailing or canyon claims; one of which, outlitted by him on Canyon creek, was not only the best appointed, but by far the most extensive claim of the kind in the State. This claim being dependent on the hydraulic mines at Gold Run for its supply of material, was rendered worthless by the closing down of those mines. Prior to, and perhaps anticipating that event, Kinder had inaugurated a similar enterprise on Bear river, where, diverting the tailings as they gradually worked down stream, he passed them over a series of undercurrents, by which they were made to yield up very nearly all the gold they contained. But here again this most useful and persevering man was doomed to meet with a further, and what proved to be a final and crushing disappointment, the stopping of hydraulic washing above on Bear river, having here, as over at Gold Run, cut off the supply of tailing, leaving the costly, but now unproductive plant on his hands and his means exhausted.

Turning now to the east, two miles off that way stands

The Great Lumber Enterprise of the Towle Brothers.

In which something like half a million dollars must have been invested: the plant comprising several large saw mills and nearly 20 miles of railroad, besides vast tracts of magnificent timber land, patented and paid for. Now, this firm, while they have marketed much of their lumber at more distant points, have always depended largely on the hydraulic mines, of which there are a great many within easy reach of their mills, these mines having in times past taken fully one-third of their entire product. With the cessation of hydraulic operations, so much reducing the consumption of lumber, this firm have curtailed their labor force to a corresponding extent, thereby throwing a good many men out of employment and causing much distress in the lumber regions. While the Towle Brothers are not the men to succumb to any slight reverse of fortune, they nevertheless feel this loss of patronage severely, inasmuch as it renders a good deal of their heavy investment here nonproductive.

And so, everywhere throughout the enjoined districts, the shutting down of the hydraulic mines has affected a wide range of other interests and industries besides those directly concerned. The several foregoing cases are merely typical, each of a class, and do not include all or even a quarter of those that might be cited in this immediate neighborhood. Within a mile of the town not less than five or six large hydraulic mines have been closed by injunction, two of them belonging to Eastern parties, who purchased them not long since from Alvinza Hayward, who is himself still a loser to some extent by the closing down of the hydraulic mines elsewhere in the State. It is true he can stand it, but should there be forced upon one who has done so much to promote legitimate mining any more losses than are absolutely necessary? To gratuitously jeopardize the investments of a man like that is highly impolitic, as tending to discourage him from aiding mining enterprises hereafter. The losses sustained by Egbert Judson from the same cause amount to between thirty and forty thousand dollars per year, his investments being mostly over on the San Juan divide; and Judson is another man who has done something towards promoting the industries of California: as much, perhaps, as any man who ever lived in the State. His pecuniary interests should not, therefore, be needlessly sacrificed.

And what is to be seen here at and about Dutch Flat must be multiplied many times to measure the sum total of injury that has resulted from the shutting down of the hydraulic mines; all which takes us back to the starting point, to wit: the much hardship involved on both sides of this question, rendering it one eminently fit to be settled by a yielding and conciliatory policy, both parties conceding and suffering something, the farmers a little and the miners a good deal.

HENRY DEGROOT.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRAIN SEPARATOR.—James M. Smith, Etua, Siskiyou county. No. 329,602. Dated Nov. 3, 1885. This improved grain-cleaner consists in a combination of devices. There are two grain-carriers or belts having tight or closed surfaces for carrying all the grain or straw and arranged one below the other in different inclined planes, so that a drop is obtained from the discharge end of one to its receiving end of the other. The invention also combines in a threshing machine, with the riddle through which the grain is sifted or falls, a shoe bottom having an inclined flow adapted to receive this clean grain and discharges it into a conveyor; and with this an oppositely inclined flow adapted to receive the dirt and trash and discharge them into a separate conveyor.

EXTENSION BABY CARRIAGE.—Anthony McLean, S. F., No. 329,579. Dated, Nov. 3, 1885. The invention relates to that class of children's carriages that are adapted to be readily converted into other forms of receptacles or devices, according to the necessities of particular times; and the invention consists in the arrangement and construction of the running gear, carriage body and various attachments. The whole body of the buggy is adapted to be extended or contracted, and the carriage-body may be adjusted to different angles to the front of the carriage on account of wind or sunshine, as the case may be.

LAMP CHIMNEY CLEANER.—Mortimer D. Lamb, Butte City, Montana. No. 329,571. Dated Nov. 3, 1885. This invention relates to a new and useful lamp-chimney cleaner of that class in which hinged sections are provided with suitable rubbing surface or material curved to conform to the interior of the surface of the chimney, and adapted to be inserted and rotated or turned in the chimney, or the latter turned on the cleaner. The invention consists in a peculiar folding double cleaner, which folds up, which is adapted to open out to form a continuous plane, with springs to facilitate the folding.

WASH-BOILER.—Martin F. C. D. Dannmeyer, S. F. No. 329,628. Dated Nov. 3, 1885. This is a wash-boiler in which clothes are cleaned by the operation of a continuous stream of hot water. It consists of an outer inclosing case or boiler, and an interior diaphragm formed with double walls and top, with a filling of non-conducting material, the diaphragm resting upon the bottom of the outside boiler, and having a space beneath it and passage by which the water may pass from above into this space, with directing plates and upwardly extending pipes whereby the circulation is maintained.

WINDMILL.—Edward Gilman, Oakland. No. 330,014. Dated Nov. 10, 1884. This improved windmill consists of a vertical shaft, having arms projecting horizontally from its upper end with wings supported upon vertical shafts journaled in the ends of the upper and lower arms, and connected with a central tail-supporting shaft by gearing, so that the position of the wings or sails will be regulated by the direction from which the wind blows. These sails are arranged so as to automatically adjust themselves to the intensity of the wind.

MOTOR FOR CARS AND VEHICLES.—Leonard C. Pressley, San Francisco, No. 330,151. Dated Nov. 10th, 1885. This motor for cars or vehicles consists of a frame-work supporting a series of guides which may be so tilted as to stand in a vertical position, with their ends downward, and a series of weights which slide upon these guides, and are connected with a central shaft by cords or gearing, so that as they movedown these guides their power will be applied to this shaft, and by an intermediate mechanism this power is communicated to the traction-wheels of the vehicle. Various mechanisms may be used for reversing the frame-work and guides carrying the weights, such as worm gear, etc.

FORMING CORES, MODELS AND CASTINGS.—Richard Savage, S. F. No. 329,958. Dated Nov. 10, 1885. This invention relates to machines for forming cores of sand by impacting the sand around a bar or mandrel. The inventor has a rotary core, bar or mandrel, with a hopper and a telescoping spout, having its discharge openings equal in length to the mandrel, and on the same vertical plane therewith. One claim of the patent covers "a means for forming cores or molds for castings consisting of a receiver or hopper, having an opening in the bottom, a directing-chute extending downward from said opening, and a supplemental section sliding upon the chute so as to be made longer or shorter."

MECHANICAL PROGRESS.

Manufacturers and Machinery.

Men who conduct great business enterprises are naturally conservative and averse to innovations and experiments. And yet it is through experimental knowledge, acquired by reducing theory to practice, that all progress in the useful arts is made. But it is not the business of the purely practical man to theorize; he is concerned only with actual results, and adopts those means which he finds ready-made to his hand, and which he thinks are best calculated to produce these results. The field of scientific speculation, in which the investigator reasons from cause to effect, and applies well-known principles, and the laws of matter in working out those mechanical problems which relate to production and industry, belongs exclusively to the inventor. He is the manufacturer's best friend and benefactor, and yet he is sometimes regarded by the latter almost in the light of an enemy, because he is the instigator of changes and innovations, because he will not let "well enough" alone, but is continually coming forward with some new mechanical device or machine in the line of improvement, which revolutionizes the existing order of things, and which the manufacturer is compelled to adopt. Hence there are many fossilized mill-owners who dread the appearance of the inventor with his new machines, as the sick man dreads the potion of physic or the surgeon's knife which is to cure his infirmities and give him a new lease of life. He would rather he let alone, and plod along in the same old beaten track which leads to no progress, provided his contemporaries in the same line of business are content to do the same. Even if it can be demonstrated that the new invention is one in the interest of true economy, and will pay for itself ten times over in the course of a few months, he is reluctant to investigate its merits, and don't care to experiment with it. He can only be interested on compulsion. Especially if its adoption would involve any considerable immediate outlay, he can't see any good in it, and won't touch it until compelled to do so by the action of some more enterprising and progressive rival, who "knows a good thing when he sees it," and who believes that "the best is the cheapest" in the long run. It is undoubtedly true that the continual improvements in machinery involve frequent changes, which are sometimes expensive and burdensome to manufacturers. But on the whole, the latter, as well as the great consuming public, are large gainers by these changes, on the score of improved processes and cheapened production.

In this age of progress no producer of textile, leather or metal fabrics can afford to ignore any new device or invention which secures the best results with the greatest economy of time, labor and raw material. In the race of trade competition he will be forced to take hold of these new things sooner or later, and he had better be among the first than the last to take advantage of them. Of course we do not recommend the practical manufacturer to grasp at every new patented machine which comes along, regardless of merit. While open to conviction, and ready to investigate, he also needs to be cautious, deliberate and discriminating in his action, in order to be sure to get the best, and not throw away his money on mere pretentious and catchpenny devices. There is no danger of his being deceived or imposed upon if his investigation is properly conducted. He is not called upon to take the word of any man, however well known or expert in machinery, as to the merits or capabilities of any new specialty. A mere guaranty of certain results should hardly satisfy him. It is not unreasonable for him to require the proof, the practical ocular demonstration, and the owner of any really meritorious patent will never shrink from the real test, however rigorously applied; but after the demonstration is complete, and its utility is established beyond doubt or question, there should be no holding back, if terms are reasonable, on the part of the buyer. A new and good thing in the machinery line, which is really wanted and needed by manufacturers, will not long go a-hogging for customers.—*Manufacturers' Gazette.*

COMPRESSED STEEL.—Further tests of the new French treatment of steel for rendering it tough appear to confirm its value, imparting to it also a fineness of grain, an increased hardness and a notable accession of strength to withstand rupture, this effect being most marked in the case of highly carbonated steel, and in this respect the metal is made to resemble tempered steel, without being in all points identical with it. The cause of this alteration in physical condition is attributed to the rapid heating and no less rapid cooling of the metal; that is, when the red hot steel is first strongly compressed, which is the peculiar feature of this process, the conversion of the mechanical energy into heat serves to raise the temperature of the entire mass at the same time that the particles of the metal are more closely cemented together; this effect is followed by a rapid cooling, due to the contact of the plate of the hydraulic press with the surface of the metal, and the very close pressure materially increases this conducting effect of the cold metal.

NEW MECHANICAL CONSTRUCTIONS.—However correct the original designs of a complicated machine appear on paper, practical experience

teaches that small modifications are required in the details, before perfect accuracy of action is secured. Capitalists who engage in the manufacture of, or invest in new devices, and do not take into account the delay and expenses due to this cause, find their estimates sadly out of gear. It is seldom that even the simpler mechanical inventions, when essentially different from machinery previously in the market, work to entire satisfaction at once, even if the more skillful designers have made the plans. Many a fabulous profit, expected to be realized already within the first year of the investment in this special mechanical device, is wrecked on this shoal, or is at least seriously diminished in its proportions. Of course men of experience always realize this risk, and make some kind of allowance for it; but those who invest widely in engineering devices, and especially the novices, have their tempers not a little ruffled by this experience, and are too ready to blame the engineers and machinists for what seems, in the nature of things, to be an inevitable accompaniment to the manufacture of essentially new mechanical constructions.—*Am. Engineer.*

An Improvement in Glass Manufacture.

It is said that an important discovery has recently been made in the manufacture of glass, which bids fair to revolutionize that art as completely as the character of the iron trade has been changed in its methods by the introduction of processes for making steel cheaply on a large scale. It is in effect that any desired degree of hardness, within a rather wide range, may be communicated to glass, and that by very simple means. It is nothing more than the equable distribution of heat through the mass, and then an equable cooling. The discovery is credited to Frederic Siemens, and a full account of the process appears in the current number of *Science*. The difficulty of heating and cooling glass at an equal rate throughout is the great stumbling-block that has stood in the way of success. Without this the material was liable to crack or explode, a familiar illustration of which is furnished in the breaking of a tumbler when hot water is poured into it, the danger of fracture increasing with the thickness of the glass. The application of radiant heat overcomes the first half of this difficulty, and the second is obviated by surrounding the edges with a material that prevents the heat from leaving them more rapidly than that from other portions. By placing the glass between plates of suitably prepared metal, the softened substance can be embossed with any wished-for design, and after leaving the mold it is four or more times as hard as ordinary glass, being, in fact, so "firm" in its substance, that the diamond fails even to scratch it. Hence, it must be made to exactly the size and shape wanted, but after having been so made it is at least three times as strong as ordinary glass of the same thickness, and appears to be even less liable to give way on account of flaws than is cast-steel.

Castings have already been made of floor-plates, grind-stones, pulleys, railroad sleepers, etc., and it is believed that its use can be indefinitely extended to many of the uses of wood and metal in the arts, and especially in the building trades. Nothing is said of the cost of the new glass, which is a most important point in determining the extent to which it will be employed for the purposes above noted. But at the first blush it would appear to be capable of being produced much more cheaply than its equivalent in iron or steel. It consists of about 15 per cent of potash, 75 per cent of silica (sand), smaller quantities of lime and alumina, and traces of other material. All of the articles named except the first are literally "as cheap as dirt," and potash is not very costly; while the quantity of fuel required is probably less than that needed to reduce the ores of iron to the metallic form. Hence it is not impossible that many of those now living will see the time when people will reside in glass houses, and not be more afraid of throwing stones than if they tenanted structures made of ordinary bricks and mortar.

A NOVEL LOCOMOTIVE.—A new locomotive that promises good results in economy is undergoing trial on the Pennsylvania railroad, says the *Philadelphia Press*. It is known as the Coventry engine, named after the inventor, a Chicago man. Outwardly, except that the smokestack is close to the cab, there is nothing to distinguish it from a common locomotive. The novelty is in the boiler, which has a return flue, thus doubling the length of the tube, and considerably more than doubling the time of the retention of the heated gases within the boiler. As the heat in the return flue has been frequently tested at between 1100 and 1200 degrees, the inventor claims that it is better to utilize it than to let it escape like a rifle shot from a straight tube. He claims also that the length of the tube insures the consumption of much gas and smoke that must otherwise escape, and that cinders are precipitated by gravity, so that not only is provision made by the invention for the maximum of steam, but for the minimum of dirt. It is a bituminous coal engine. Mr. Coventry says that the engine can be run at a saving of at least 15 per cent under other engines of its kind, and is cleaner than any other bituminous coal engine can possibly be. He hopes to have the boiler adopted in any engines that the road may build, both for freight and passenger service. The railroad officers admit that the engine is cleaner than the others that use bituminous coal. The claim of economy will be fully tested within a week or two.

SCIENTIFIC PROGRESS.

The Life and Age of Fishes.

Every few years the papers are flooded with paragraphs announcing great and sudden mortality among the fishes on some portion of our seaboard. We not infrequently meet with such headings—"A fish pestilence in the gulf," or "The sea covered with dead fish," etc. Sensational as such notices may appear, they are not at all exaggerated. As far back as 1844, on the southern Atlantic Coast of the United States, there was a great mortality among the fish in that region. Ten years later, in 1854, a similar occurrence took place. Again, during the three successive years of 1878, '79 and '80, large numbers of dead fish covered those waters for hundreds of miles in extent. In the winter of 1881-2 a most unusual mortality occurred along the middle Atlantic Coast. It was during this period of fish mortality that the extermination of the newly discovered, deep water "tile fish" occurred. This fish, it will be recollected, was discovered by the Fish Commission in 1879, and large commercial profit was expected to be derived from their catch. Careful search has been made for these fish since that time, but without success.

Many theories have been put forth to account for these phenomena, such as "poisoned water," "extreme cold," "earthquake shocks," "submarine eruptions of gas," etc., but nothing has been advanced as yet which appears to be acceptable to careful students of this problem. There are many other phenomena connected with fishes, such as the sudden disappearance of certain varieties from their accustomed haunts, and their re-appearance as suddenly in other localities. Then again, the total absence of certain fishes from haunts where they have been present in vast numbers for many years, and their re-appearance in equal numbers 10 or 15 years later. These phenomena deserve careful study at the hands of competent students.

The Age of Fishes.

It is not generally known, says a recent correspondent of the *New York Herald*, that there is hardly any limit to the age of fish. Prof. Baird of the U. S. Fish Commission is authority for the statement that there is authentic evidence to show that carp have attained an age of 200 years. Prof. Baird also says there is a tradition that within 50 years a pike was living in Russia whose age dated back to the 15th century. "There is nothing," says he, "to prevent a fish from living almost indefinitely, as it has no period of maturity but continues to grow with each year of its life." There are gold fish in Washington that have belonged to one family over 50 years. They do not appear to be much larger than when they were first placed in the aquarium, and are quite as lively as when they were young. There are so many fish stories in circulation that the ordinary reader has almost made up his mind that fish and truth do not go well together. Probably some persons will doubt what is said by Professor Baird about the age fish can attain. If they do they are simply doubting the best known authority on fishes. The Russian minister at Washington says that in the royal aquariums at St. Petersburg there are fish to-day that are known by the records to have been in those same aquariums for 140 years. Some of them are, he says, over five times as large as they were when first captured, while others have not grown an inch in length. An attaché of the Chinese Legation corroborates this statement. He says there are crocodiles kept in some of the palaces in China that are much older than any of those in Russia.

THE MOST WONDERFUL THING IN THIS WORLD, aside from a man, is a book, and the great wonder is that so few people read books. We call ourselves a reading people, and so in a sense we are, but there is very much of the reading enjoyed in these times that is to no purpose. You can find some kind of reading matter in every home, but very often it has been selected without regard to its worth. The books may have been bought because they were pressed upon the purchaser by an agent, or because of the binding, or the pictures, or the number of pages. There are not in any communities very many good private, and very few public libraries. The great mass of people are more concerned about getting rich or keeping up with the fashion than in feeding the mind and keeping up with the times. A taste for good reading is worth more to a young man or woman than the best farm, or the best start in business without it. A man's life is measured not by the abundance of the things he possesses, but by the volume of soul that he has. The Chautauqua literary course covers a wide field, includes a most excellent selection, encourages a system in reading, and should be entered into by every young person who cares for the cultivation of his mind.

IRON AND STEEL CRYSTALS.—An exchange says that the microscopic determination of the different qualities of iron and steel is now regarded as one of the most valuable aids in metallurgical industries. Thus the crystals of iron are double pyramids, in which the proportion of the axes to the bases varies with the quantity of the iron; the smallness of the crystals and the height of the pyramids composing each element are in proportion to the quality and density of the metals which are seen also in the

fineness of the surface, and as the proportion of the carbon diminishes in the steel the pyramids have so much the less height. In pig-iron and the lower qualities of hard steel the crystals approach more closely the cubic form. Forged iron has its pyramids flattened and reduced to superposed parallel leaves, whose structure constitutes what is called the nerve of the steel; and the best quality of steel has all its crystals disposed in parallel lines, each crystal filling in the interstices between the angles of those adjoining, these crystals having their axis in the direction of the percussion they undergo during the working. Practically, good steel has the appearance, microscopically, of large groups of beautiful crystals.

PHOTOGRAPHING THE INTERIOR OF GUNS.—Experimenters have been made at the Royal Gun Factories, Woolwich, in order to test the application of a new electric lamp designed for making examinations and photographs of gun interiors. This system of summarizing the bore of guns by means of electricity has only been a short time in use, and has proved of great value, but the want of an electric dynamo has prevented its general adoption at many places where it would have been of considerable use, and the authorities have now taken up readily a portable battery designed by Johnson & Phillips for the purposes of supplying the place of a dynamo in such cases. The battery without having necessarily powerful, is chiefly serviceable on account of its compactness, as it can maintain a light of unerring brilliancy for inspection, with all the lights they may desire. The experiment was to try the battery and a dynamo in competition. Two eight-inch guns were placed side by side in the new boring mills, and photographs were taken of their interiors by both processes, the results, so far as could be judged, being equally satisfactory.

MECHANISM OF THE BEE.—An investigator into the mysteries of animal life asserts that a bee's working tools comprise a variety equal to that of the avers mechanical. He says that the feet of the common working bee exhibit the combination of a basket, a hrush, and a pair of pincers. The brush, the hands of which are arranged in symmetrical rows, is only to be seen with the microscope. With this brush of fairy delicacy the bee brushes its velvet robe to remove the pollen dust with which it becomes loaded while sucking up the nectar. Another article, hollowed like a spoon, receives all the gleanings which the insect carries to the hive. Finally, by opening them, one upon another, by means of a hinge these two pieces become a pair of pincers, which render important service in the construction of the combs.

SENSE OF COLOR IN ANIMALS.—J. Gruber has investigated the sense of color and illumination in animals. To decide whether animals had a sense of color or of light, he placed them in a box so arranged that qualitative rays fell on one or the other of its two divisions, which communicated with one another. Five mammals, seven birds, two reptiles, three amphibians, two fishes, three molluscs, 27 insects, two spiders, and two worms were experimented with. It was found that the sense of color, as well as the power of perceiving light, was much more widely distributed among animals than has been generally supposed. The variations in the sense of color in various animals are very great, but a much greater number of observations must be made before a definite solution of the problem can be obtained.

ORIGIN OF THE LOMBARDY POPLAR.—According to Mr. Bossier, a botanist who has lately studied Oriental botany, this poplar is a distinct species, which he calls *Populus pyramidalis*. It is believed by the best authorities to have originated in Persia. Some writers, on the other hand, state that it is truly indigenous to Italy, but the evidence, however, we think, is strongest in favor of Persia, from whence, most probably, it was introduced into Italy, where it is now a favorite tree and extensively grown.

THE EARTH'S CURVATURE.—The question how far an object on the surface of a level plain can be removed from a man before the curve in the earth's surface makes it invisible may be answered as follows: The depression of the curve of the earth's surface is for two miles 2.67 feet, three miles six feet, four miles 10.67 feet, six miles twenty-four feet, ten miles sixty-six feet, and fifteen miles, 150 feet.

THE MEDITERRANEAN ONCE AN ISLAND SEA.—An English geologist thinks he has found evidence that the Mediterranean was at one time shut off from the Atlantic; that it was divided into two distinct basins by a strip of land extending from Italy to Africa; and that most of its islands, notably Sicily and Malta, were connected with the mainland.

SUGAR BY ELECTRICAL ACTION.—New sources of electrical economy appear to be constantly coming to the front. One of the latest is a process for refining sugar by electricity at an expense of 40 cents a ton. The inventor asks \$12,000,000 for the patent. It is said that the process is to be tested in England.

VACCINATION FOR CATTLE.—Pasteur's method of vaccination for cattle plague has proved successful in India for horses, cows, sheep, buffaloes, asses and elephants.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... 25 .80 \$2.30 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Nov. 28, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Working Low Beds of Gravel; Must Stop Mining, 353. Passing Events; Death of the Vice-President; Nickel and Cobalt from Solutions; Improved Compound Steam Engine; Electric Railways, 356. The Late A. C. Knox; A New Shaft Coupling; A Michigan Lubricator; Superintendent or Manager of Mines; Hydraulic Nozzles, 357.

ILLUSTRATIONS.—Method of Working Low Beds of Auriferous Gravel, 353. The "Grim Death" Coupling; Hydrostatic Double Connection Lubricator; Portable Lubricator, 357.

CORRESPONDENCE.—Mining Debris, 354.

MECHANICAL PROGRESS.—Manufacturers and Machinery; Compressed Steel; New Mechanical Construction; An Improvement in Glass Manufacture; A Novel Locomotive, 355.

SCIENTIFIC PROGRESS.—The Life and Age of Fishes; Iron and Steel Crystals; Photographing the Interior of Guns; Mechanism of the Bee; Sense of Color in Animals; Origin of the Lombardy Poplar; The Earth's Curvature; The Mediterranean once an Island Sea; Sugar by Electrical Action; Vaccination for Cattle, 355.

ENGINEERING NOTES.—The Cable Road Principle Applied to Navigation; Compound Locomotive Engines; Sand Bags for Engineering Purposes, 359.

USEFUL INFORMATION.—What Tinfall is; Engraving on Glass; A New Buoyant Fabric; Microscopic Mountings; Oil Adulterations; The Preservation of Copper Sheeting; Restoring Plush; To Clean Kid Gloves; Insoluble Glue; Cement for Plaster Casts, etc.; Extreme Cold in Tin, 359.

GOOD HEALTH.—My Boy, Do You Smoke; The Coca Leaf; Ancient Hypodermic; Imagination and Dying, 359.

MISCELLANEOUS.—Notices of Recent Patents, 354. Practical Hydraulics, 353.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 350-61.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 364.

Business Announcements.

Draughtsman—W. H. Smyth, S. F.
Razors and Badges—Nathan Joseph, S. F.
Chemist—F. Sustersic, Big Spring, Tex.

See Advertising Columns.

Passing Events.

During the past week we have had constant rains, which have extended all over the State. The rainfall for the month exceeds that of any previous November of which records have been kept. In some places damage has been done and railroad traffic has been impeded, but the general effects of the long continued storm have been of benefit to the State.

The new mill at Candelaria, Nev., for the Candelaria Water and Milling Company has been commenced and will be running in three months. This is one of the signs of a revival in mining matters in that part of Nevada.

The Walker Lake Bulletin takes from the statistics of Wells, Fargo & Co. figures which show that during the twelve months ending Nov. 1st the shipments of ore and bullion from the northern end of the county, including only as far south as Soda Springs, was \$594,000. For the twelve months preceding the amount was \$566,000. During the last year the Mount Cory was a producer for but four months and still the total has increased. This increase arises from the proceeds of the numerous mines which have been opened and worked in the districts along the line of the C. & C. R. R. and as yet includes but little from the new gold mines of Hawthorne district. Mining matters are looking up in that whole region.

Death of the Vice-President.

The sudden death of the Vice-President of the United States was announced by telegraph on Thursday morning. Mr. Hendricks had a very short illness indeed, and such a result was anticipated by no one, not even by members of his own family. Thomas Andrew Hendricks was born in Muskingum county, Ohio, near the city of Jamesville, September 7, 1819, and was therefore 63 years, 2 months and 17 days old at the time of his death. He was said to have been addicted to none of the vices, either great or small, that so often beset public men, and even his political opponents will admit that his walk through life was unusually circumspect. From the time he was admitted to the Bar until his election to the Vice-Presidency he was active in the practice of his profession, excepting only the period during which he was Commissioner of the General Land Office and the four years he was Governor of Indiana. Mr. Hendricks' election to the office of Vice-President of the United States and his inauguration on the 4th of March last are matters of history and require but passing mention. Of his subsequent career and actions it is enough to say that they have, like those of all public men, been severely criticised at times, but no one ever called in question his private or official integrity.

On receipt of the news of the death of Mr. Hendricks, a Cabinet meeting was called, and it was decided that the President and members of the Cabinet should attend the funeral of the Vice-President. When the Cabinet adjourned the President issued the following:

EXECUTIVE MANSION,

WASHINGTON (D. C.), Nov. 25, 1885.

To the People of the United States: Thomas A. Hendricks, Vice-President of the United States, died to-day at 5 o'clock P. M. at Indianapolis, Ind., and it becomes my mournful duty to announce the distressing fact to his fellow-countrymen. In respect to the memory and eminent and varied services of this high official and patriotic public servant, whose long career was so full of usefulness and honor to his State and to the United States, it is ordered that the national flag be displayed at half-mast upon all public buildings of the United States; that the executive mansion and several executive departments in the city of Washington be closed on the day of the funeral and he draped in mourning for a period of 30 days; that the usual and appropriate military and naval honors be rendered, and that on all legations and consulates of the United States in foreign countries the national flag shall be displayed at half-mast on reception of the order, and the usual emblems of mourning be adopted for 30 days.

By the President, GROVER CLEVELAND.
T. F. BAYARD, Secretary of State.

Nickel and Cobalt from Solutions.

Mr. C. H. Aaron, of Nogales, the well-known author and metallurgist, has patented through the MINING AND SCIENTIFIC PRESS a process for separating nickel and cobalt from ore or metallurgical products with which they may be associated. The process consists in precipitating nickel and cobalt from a solution in the form of zanthates or methyl-sulpho-carbonates. The substance is treated in any of the usual ways by means of acid, or by roasting and lixiviation, so as to obtain a solution of salts of nickel or cobalt, or of both, and which may also contain salts of other substances. The solution may then be treated in any usual way for the removal of iron, copper, lead, lithium and silver, if present. It is not necessary to remove zinc, manganese, arsenic, tellurium, selenium, or any earths, alkaline earths, or alkalis which the solution may contain, any or all of which, for the purposes of this process, may remain in the liquid if present therein.

The solution should be neutral or but slightly acid. To the solution thus prepared Mr. Aaron adds an aqueous solution of a soluble zanthate, or the corresponding methyl-sulpho-carbonate may be used in place of zanthate. By this means the nickel and cobalt in the solution are precipitated as zanthate or methyl-sulpho-carbonates, while the other substances remain in the solution, if present. For the purpose described several substances may be used, but the inventor prefers sodium salt on account of its being easily made, and on account of its comparatively low molecular weight. The precipitate is collected and washed, and may then be dried and calcined, yielding the oxide of nickel or of cobalt, or a mixture of both, if both metals be present; or the mixed precipitate may be treated with ammonia be-

fore calcination. The ammonia dissolves only the nickel compound in this case, and the cobalt compound may be collected, dried and calcined. The nickel compound is precipitated from the ammoniacal solution by neutralizing the latter, the nickel compound being then collected, dried and calcined.

Improved Compound Steam Engine.

An improvement has recently been made in this city in steam engines of that class having two or more cylinders of unequal diameters placed with their axes in line, and with the piston connected to one cross-head, or other suitable means for causing their coincident reciprocation in parallel lines, steam being supplied from the boiler to the first or smaller cylinder, from which it is allowed to expand, exerting its final force on the pistons of the larger or remaining cylinders.

In direct-acting engines of this class, not employing a receiver in which to expand the steam in its passage from the high to the low pressure cylinder, a great disturbance of the acting force of the engine is produced by expanding high-pressure steam from the first cylinder direct to the low-pressure cylinder, causing a sudden jump of the engine at the commencement of the stroke or disastrous strains brought upon the connections. To overcome this difficulty, two plans have been resorted to. The first and most common is to make less difference in the relative areas of the pistons, a less ratio of expansion, and in some cases a throttling or wire-drawing device is employed in conducting the steam to the low-pressure cylinder. The effect of this is to limit the possibilities of economy in the consumption of steam by a fixed low rate of expansion or by wire-drawing the steam, with its equally limited results. The second plan is to conduct the exhaust steam from the high-pressure cylinder into a separate receiver or chamber of sufficient capacity to nearly equalize the intermediate pressure, from which it is conducted to the steam chest of the low-pressure cylinder, giving a steady and uniform force to the engine, dispensing with all intermediate throttling devices, causing no limit to the desirable higher ratio of expansion and consequent economy thereof by the construction of the engine, as is the case with the first-mentioned plan.

Mr. George E. Dow, of the Dow Steam Pump Works of this city, an accomplished mechanic and inventor, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency, certain improvements to provide means for a better distribution of the steam than heretofore used in operating engines of this class. In Mr. Dow's new engine there is a receiver surrounding the high-pressure cylinder and connected to the intermediate passage of the valve used for the distribution of the steam. This arrangement embodies the advantages attributed to the second plan referred to, with the addition of increasing the economy of the engine still further by dispensing with the pipes and conduits for the transmission of steam to and from a separate receiver, which usually cause the loss of heat and efficiency by impact and surface conduction, the loss forming a large percentage of the advantage due to the higher ratios of expansion, but not otherwise realized. Live steam from the boiler may be admitted directly to the receiver or the connecting passage of the valve for use at such times as starting up when cold, accelerating the power of the engine in an emergency by using direct steam (non-compound) upon the larger area of the low-pressure piston, in which case the small area of the high-pressure piston is in equilibrium of pressure, exerting no power.

Mr. Dow has applied his improvement to direct-acting engines for operating pumps, the rods or plungers of which are connected directly to the reciprocating parts, and where there is no fly wheel to distribute or equalize force. It may be observed that to apply this invention to an engine of rotative construction, where a crank and fly wheel are employed, the valve may be operated by an eccentric on the shaft in the usual manner of steam engines. The intermediate steam-raising chamber may be reduced in size or removed entirely, maintaining no more than a passage to the port, providing for the use of live steam, when desired, direct to the low pressure piston.

In the operation of this engine, the steam,

after having done part of its work in the first cylinder, is conducted to the low-pressure cylinder, through the valve in the chest, which is surrounded by live steam of a high temperature, and by which means heat is supplied to the expanding steam on its way to the low-pressure cylinder. The expansive power of the steam is improved materially by this means, affecting the economy of the engine thereby, and permitting in an engine of this construction, improved results as a much higher ratio of expansion can be employed.

The distribution of the steam is by means of the valve, and with a single passage only to operate the pistons of both high and low pressure cylinders, with means for operating in conjunction an intermediate steam-reducing chamber, or when said chamber is not needed, facilitating by the same means an independent live-steam connection for use, when desired, to operate the low-pressure piston direct. The low pressure steam is conducted to the piston of the secondary cylinder in a dry and superheated condition and loses none of its heat by coming in contact with the colder walls of a series of pipes and conduits, as is the case in engines of the ordinary compound type when separate steam beaters to pass the steam through are not employed. Mr. Dow has applied improved valve gear, also his own invention, to this engine.

Electric Railways.

Notwithstanding the general expectation that electricity would be utilized on street railroads, so far the experience has been rather discouraging, and while we hear in the public prints that roads are being successfully operated by electricity, when the facts are investigated no satisfactory results are shown. The Cleveland road is often referred to, for instance, as showing that cable and horse railroads will not be used much longer. Yet that road is not a distinguished success. The electrical part of the road is merely a short continuation of certain horse-car lines, and there are only two electrical motors, which run irregularly. They were first put in operation in August, 1884. Only one motor is run at a time, and by no means constantly. The wire for conducting the electricity is below ground and there is a slot through which passes, from the car, a sort of connecting arrangement, so that the current may be brought to the reversing dynamos which propel the car. The electricity is furnished from the same apparatus which runs the Brush lighting system, so they do not know how much of the power of the engine these motors consume.

The road is practically an electric toy, with little appearance of ever amounting to much. For some unexplained reason the motors are run very irregularly and seem to require a great deal of repairing and overhauling.

The Daft motor, which was tried on 9th avenue, New York, was a very light engine. There is a larger and much better one in mechanical arrangement also running. A central rail is used to convey the electricity, and this rail has to be kept highly polished, or it does not answer its purpose. The motor was intended for drawing four cars, but in the experimental trials two were drawn. They started from 14th street, and went along pretty fairly until they came to an up grade, when they immediately slowed down. Of course, on the return, with the favoring grade, they could come at any desirable speed. Only a few irregular trips have been made. The motor weighs about 18,000 pounds; and it is the opinion of engineers that there will be no economy over steam.

One feature worthy of remark is that there is a perfect sheet of fire from the rail, where the brush comes in contact with it, so that the motor will frighten horses at night more than a steam-engine would.

In Baltimore there is an electric road about two miles long, which seems to be doing better than the others. The electric conductor is above the ties. There are two Daft motors, but the trains run on one turn-table, going when they are ready. No data of expenses have been made public.

It seems evident that as far as the motors, etc., now built are concerned, there is not much to hope from electric roads. There may be, of course, decided improvements to come, which may change the whole status; but at present the appliances in use give no promise of as perfect success as has been hoped. There is very

great room for improvement in the whole electric system as applied to railroads.

The popular impression about these roads seems to be that the cars follow a great magnet. Few people have taken the trouble to inform themselves about the details, and there is much ignorance on the subject, even among educated persons. In the first place, the dynamos to generate the electricity must be operated by steam engines, and the electrical currents carried by wires or rails along the length of the roads, and must be transferred by suitable means to dynamos running reversely on the motors. These must be geared down to the driving wheels in order to get motion. The steam engine furnishes the power in the first place, and many think that the direct action of the steam engines will always be more economical and economical than through the medium of electricity.

Of course, it cannot be foretold what will be effected in time to come. Now, an electric motor that weighs 18,000 pounds will draw just the same load as a steam engine weighing 18,000 pounds, and can draw no more. When the track is wet there is much loss of power. The electric motors have had very exhaustive trials, but it is a significant fact that at no one place in the United States are roads constantly operated by them. At Baltimore it has cost them \$10 for every five cents collected. Some of the roads seem to have been organized more for selling stock than anything else, from appearances.

The Late A. C. Knox.

On the 9th inst., Mr. A. C. Knox died at Lone Pine, Inyo county, while on duty as agent and traveling correspondent of the PRESS. Mr. Knox has been in the employment of Dewey & Co., publishers of the PRESS, for over 20 years almost continuously. He was, for a number of years, our city agent, and as such was well known among San Francisco business men. Afterward he resumed traveling through the interior of this and neighboring States, and has visited nearly all the agricultural and mining sections of any importance. During his many extended trips he has collected a vast amount of information concerning the resources of the various regions. The publication of his letters has been of benefit to the localities described, and to the subscribers of the PRESS.

Mr. Knox was a highly educated man and an intelligent observer. After graduating from college he became a theological student for a year, but finally became a teacher, and was professor of Latin and Greek in an Eastern college for some seven years. He was a constant reader and student all his life, such time as he could spare from his active business being passed, as much as possible, among books.

The fact that he was employed by one firm for so long a time as twenty years would alone show that Mr. Knox was honest and upright. During that time he has attended to collections and other work connected with the business department; and it is pleasant to be able to say that he proved himself a man of the strictest integrity. Somewhat modest and retiring in disposition, he was at the same time of a genial nature and well liked by all who knew him well.

Mr. Knox had been ill at Lone Pine for some weeks, and his son, Charles H., went from San Luis Obispo, and was with his father when he died. Circumstances prevented the remains being brought here, so that they were interred at Lone Pine. Mr. Knox leaves a wife, who is a resident of this city.

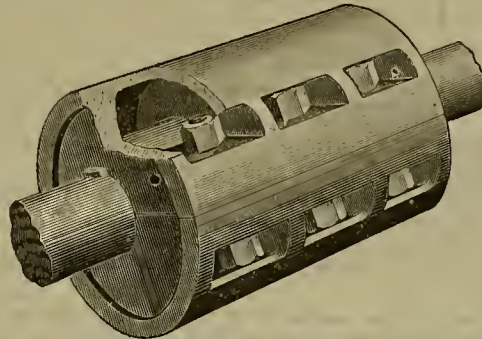
Thousands of our subscribers will remember our late business associate, and many will miss him almost as an old friend. He had a wide acquaintance, as might be supposed. Before coming into the employment of Dewey & Co. he was a resident of Virginia City, and for a time of Sacramento. Mr. Knox was a man of independent thought and one who kept in the van of intellectual progress. His father was a resident of a slave State, and it is told of him that he voluntarily freed his slaves, and more than that, made provision for them so they could get on by themselves in free States.

A memorial service will be held on Sunday, Nov. 29th, at the Presbyterian Church on Larkin street, near Pacific. Rev. Dr. Eastman, the pastor of that church is a graduate of the college with which Prof. Knox was formerly connected.

A New Shaft Coupling.

We herewith present an engraving of a new style of shaft coupling, which was designed and made at the San Francisco Tool Works. These couplings are a new modification of the old English muff coupling, which has been in use 60 years, with this difference: the metal is disposed in two shells instead of one, and the clamping screws are placed in the annular space between the shells. The Tool Company have exhausted the whole field of "ingenious" couplings, wedges, sleeves, cones, taper-screws, eccentric bushes, etc., and condemn them all for withstanding heavy, constant strain on shafts not in line.

The makers claim for these California made couplings that they are uniform and interchangeable; can be removed without disturbing a shaft; are fastened or removed with a common

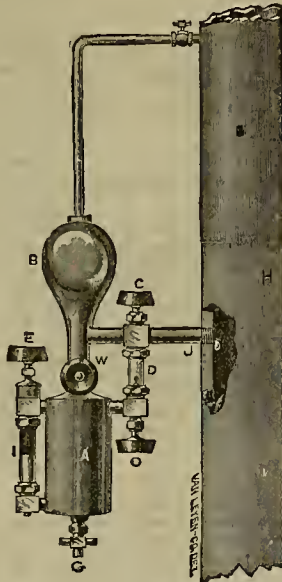


A CALIFORNIA-MADE SHAFT COUPLING.

screw key; have no projecting parts; can be employed as pulleys to drive machinery; are four diameters long and stronger than the shafts.

This is simply a strong, simple "muff" coupling, consisting of two principal pieces only. There are no concealed screws or wedges, taper

Fig. 1.



HYDROSTATIC DOUBLE CONNECTION LUBRICATOR.

bushes, or internal screw threads. Its construction and application are readily seen from the engraving.

THE Los Angeles Herald says: In addition to the little quartz mill running near Alpine Station, and making a good profit, another five-stamp mill has been brought from San Francisco and landed at Ravena, from which place it will be taken to a gold ledge in the Charlotte district, near the Tujunga canyon not far from the old mill erected a few years ago.

THE teredo, so destructive on San Francisco bay, is almost unknown at Vallejo and on Carquinez straits. Piles driven in a wharf at Martinez in 1852 are still intact. This is due to the presence of so much fresh water from the rivers. Wherever fresh water occasionally comes the teredo cannot flourish.

THE Plumas Eureka Mining Company paid in London on the 9th instant a dividend of 37½ cents a share, aggregating \$52,734, making a total of dividends to that date \$1,846,331.

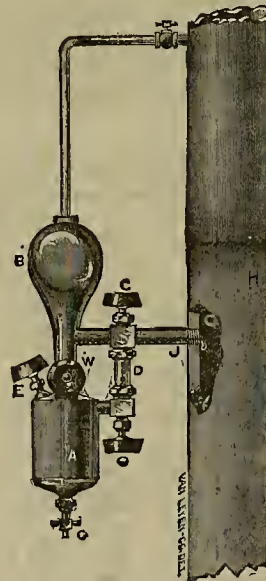
A Michigan Lubricator.

Engravings on this page illustrate the Michigan lubricator, several sizes and styles of which are made for various descriptions of work. Fig. 1 shows the hydrostatic double connection lubricator. This cup will show for itself its simplicity of construction. It has a glass gauge which shows at all times the quantity of oil in the cup, and sight feed glass which shows how fast the oil is being used; drop by drop passing up to the parts to be lubricated. It requires no attention and is always positive in its feed. Referring to the letters on the cut, A is the oil reservoir; B, condensing chamber; C, valve to shut off steam from sight feed, in case the glass breaks; also to regulate pulsation; D, visible feed chamber; E, oil filling plug; G, valve to draw off water; H, steam pipe; I, glass gauge, indicating amount of oil in

cup; J, oil discharges to connect with steam pipe; O, valve to regulate feed of oil; W, valve to admit water into reservoir.

The company manufacture these lubricators in large quantities, and dealers in brass goods and steam fittings will find it to their advantage to open a correspondence with the

Fig. 2.



PORTABLE LUBRICATOR.

the agent. The lubricator is made with double connection.

Fig. 2 shows the portable lubricator, and special attention is called to this lubricator, of which the subjoined cut is an illustration. This is specially designed for small engines, threshers, steam pumps, etc., and is manufactured with reference to transportation over rough roads.

These lubricators are made in capacity to hold half-pints, pints, half-gallons and gallons. They are finished in brass or nickel-plated, as desired. Messrs. Parke & Lacy, of this city, are agents for the Pacific Coast.

THE plan for the extraction of carbonate of soda from the water of Owen's lake by evaporation has proved a success, and more extensive works are to be erected.

THE workmen in the railroad yards at East Oakland are busy getting out the material for a permanent bridge across the Colorado river at Yuma, A. T.

Superintendent or Manager of Mines.

The county of Lake in this State sued the Sulphur Bank Quicksilver Mining Company for irregularities in making its "statement" of property, etc., subject to taxation, and when a decision was against it, took an appeal to the Supreme Court. Without considering all the grounds, some of the points made in the decision of the Supreme Court, on the appeal, are of interest to all mining companies. These points, which we take from the decision, are as follows: The assessment put in evidence shows property assessed to "Sulphur Bank Quicksilver Mining Company, F. Fiedler, agent." It is contended for the appellant that from this it can not be told whether the assessment is to the mining company or to F. Fiedler, or to agent. We think there is nothing in this point. If the same question was put to any one with ordinary sense in the business walks of life, he would have no difficulty in understanding that the assessment was to the Sulphur Bank Quicksilver Mining Company, and that the reference to F. Fiedler, agent, was only to him as agent of the company. We think the same common-sense view should be taken by the Judges.

It is insisted that certain of the descriptions of real property found in the assessment are radically defective. But all the descriptions were taken by the Assessor from a list furnished him by Fiedler, who was the superintendent of the defendant company. It is said, however, that the statute—Political Code, Sections 3629 and 3630—requires that the statement of the property of a corporation must be made by its President, Secretary, Cashier or Managing Agent, and that Fiedler was neither of these; that he was only superintendent, and therefore, not authorized to furnish the list to the Assessor. The only difference we can see between the "managing agent" and "superintendent" of a mining company is one of name. We therefore conclude that he was not only authorized, but required, upon demand, to furnish the Assessor with a list of the property of the company of which he was superintendent, and that the company is estopped from questioning the sufficiency of the description so furnished in an action to collect the tax.

Hydraulic Nozzles.

A complaint has been filed by Joshua Hendy against Frank H. Fisher, alleging that on the 7th of May, 1880, the defendant conveyed to him an individual half interest in a patent hydraulic nozzle well known in California, he agreeing to furnish money to prosecute in the United States Circuit Court for infringement of said patent and to furnish money to prosecute persons to recover royalty for infringement of the patent for their joint account. Fisher granted to him the exclusive privilege of the manufacturing and sale of these patent machines, the profits to be equally divided between them. He brought suit in the United States Circuit Court in the name of Frank H. Fisher against Richard Haskin, J. H. Haskin, Joseph Craig and R. R. Craig for infringing said patent, and on the 4th of September, 1882, the Court adjudged that the defendants had infringed upon the patent, and that the complainant was entitled to an accounting of profits. An accounting was thereupon had, and the infringement amounted to \$16,465.33. On March 7, 1884, a final judgment was entered in the case in favor of Fisher and against Haskin et al. for the amount named. Upon this award \$1000 only has been paid. Since then a large number of persons and corporations throughout this State have infringed upon the patent and a large amount of royalties have been collected by Fisher and appropriated to his own use. It is alleged that Fisher is insolvent, but that he is still engaged in collecting royalties for infringements of the patent. The prayer of the complaint is that Fisher "be compelled to make discovery of all royalties collected by him;" that he account for the same and that he give the name and residence of those from whom he collected; that he be restrained from collecting such royalties or the judgment against Haskin; that a receiver be appointed to collect said judgment and all royalties which may be due, and to prosecute such actions as are necessary to make such collections.

ANOTHER announcement is made that the Providence mine, Grass Valley, has been sold,

ENGINEERING NOTES.

The Cable Road Principle Applied to Navigation.

Wm. McCormick of Astoria, has devised a plan to navigate the narrows of the Dalles, which is described by the *Astorian* as follows: Between the head of the Cascade and the foot of these narrows there are fifty miles of navigable river. The narrows average about 250 feet in width and are 8400 feet long, with a fall of seventeen feet in that distance; the walls are vertical, of basaltic rock, ranging in height from thirty to eighty feet, the water is very deep, and the bottom is presumably of such a nature as to prevent the use of a submerged cable. He proposes to build what he calls a floating towpath, which is a long, narrow raft or boom of logs, built in sections of fifty feet each. Each section is composed of eight logs; four bolted firmly together to form each side, being then framed together with square timbers, the whole forming a raft twelve feet wide, upon the upstream end of which are two pulleys, one above the other, revolving in a longitudinal direction, the purpose of which is to carry an endless wire rope. The sections will be coupled together with boom chains, there being one chain for every log in the outfit. The wire rope will have a set of pulleys supporting it at intervals of fifty feet for the whole distance, which is 10,000 feet from the foot of the narrows, to a point 1600 feet above the head. The power is to be furnished by steam at a point on shore. The manner of adjusting the slack, and thereby the tension of the rope on the engine drum, as well as that of getting the boat's tow-line past the pulley is difficult to describe without drawings. It appears that the arrangement is similar to the cable roads of San Francisco, and if it comes up to his expectations it will be a success, as it will enable boats, especially barges, to pass the narrows with nearly as much speed as they will make in ordinary water, while the boom serves to fend them off from the shore, thus avoiding the building of a canal and seventeen feet lockage. The scheme will cost about \$70,000, and is supplementary to his plans of a rapids tugboat at the Cascades. The two together would, if practically successful, open the river from Astoria to the foot of Tumwater Falls, which is the upper one of the Dalles series of rapids, a distance of 210 miles, and leaves but one short portage between the grain fields and deep water.

COMPOUND LOCOMOTIVE ENGINES.—A hot discussion of the merits and demerits of compound locomotives is now going on in *Engineering*, the last number containing five letters on the subject, only two of which are in their favor. The most important of the latter urges chiefly that, of the four chief classes of steam-engines, marine engines are now all but universally compound; portable engines and stationary are more and more built compound, and "why then should not the compound be equally successful when applied to locomotives, when it has the additional advantage of dispensing with coupling-rods?" The surprising information given in the same letter, that experiments on the Eastern railroad of France show a frictional loss of 35 per cent of the indicated horse-power "with four-coupled engines" should be taken with a good many grains of salt.

Another letter suggests, in favor of the new type, that it is a great deal easier to write on the cars behind them, the piston pulsations being less noticeable; but those on the other side take the more definite ground that they do not handle trains well, owing to difficulty in starting, are not liked by the men, and do not burn as little fuel as has been claimed, either absolutely or comparatively, when all proper allowances are made. All of which tend simply to show that the expediency of compounding locomotives, and especially of any specific plans for doing so yet in use, cannot yet be regarded as proven, although the steady increase of attention to the subject in several different countries shows that many experienced engineers have found reason to hope much from it.—*Railroad Gazette*.

SAND BAGS FOR ENGINEERING PURPOSES.—During the war of the rebellion sand bags were used for the foundations of fortifications on soft ground, notably during the siege of Charleston, where bags of sand were dumped on a mud bank forming an artificial island, upon which a fortification of sand bags and cotton bales was built of sufficient resistance to carry 15 inch "swamp angels," which were used to shell the city some seven miles distant. It has been supposed that all possible points were occupied, and until the use of sand bags was devised, it would have been impossible to erect a fortification upon such materials. In concrete work, such as the strengthening of the foundations of the Washington monument, it is sometimes advisable to apply the materials in bags, and afterward burst them by blows of rammers. A few years ago an inlet of about one-sixth of a mile in width on the eastern coast of New Jersey, was closed by an embankment made out of 80,000 bags of sand. The cost was one dollar per cubic yard of embankment. The deposit by the sea began as soon as the current in the channel was stopped, and now 100 acres of land have been reclaimed. This shore is sandy, and the great action of the waves and currents serves to wear or build the land very rapidly.

USEFUL INFORMATION.

WHAT TINFOIL IS.—It may not be generally known that tinfoil, as now so widely known to the trade, is not a foil of tin alone, but composed mainly of lead, with but a slight alloy of tin. The manifold appliances of tin foil to articles of consumption and medicine is not regulated with any law such as exists in European countries, forbidding the use of lead or composition, or otherwise impure tinfoil, in all cases where it may, through oxidation or contact with the goods, become poisonous and injurious to the health of the consumer. Too little attention has been paid to this subject thus far. It is too he hoped that ignorance, and not willful oversight of the facts, has led many manufacturers and dealers to use an article accompanied with such risks for the sake of saving a trifle in the cost. Besides, this saving is in most instances imaginary, as the German pure tinfoil combines such a fineness and a large yield with relatively great softness and strength, that it will practically answer most purposes, and not cost more than an equal surface of the lightest composition foil, while the heavier grades of the latter will be much more expensive to use. The yield of the regular German tinfoil is seventy-two square feet, or 10,368 square inches per pound; a heavier grade yields sixty-six square feet. The sheets are of large size, and waste in cutting is consequently small.

ENGRAVING ON GLASS.—The hard point for inscribing and engraving rare stones is doubtless older than the lathe, and was certainly used in engraving glass during classical and mediæval times. The Flemish, Dutch and Germans, within the last three centuries, used it with great success, as testified by examples of their work still remaining. Diamond or other hard stone point—or steel points similar to those used by some glass carvers of the present day—may be employed in engraving glass, and handled in the same way as ordinary gravers for metal or wood. The glass should be coated with a mixture of gum and milk, on which, when dry, a pattern may be drawn or transferred previous to engraving. Very fine line and hatching and stipple effects can be produced by this method. Some of the specimens in the Slade collection of the British museum are exquisitely done, especially those attributed to Wolfe and Heemskerk. The great drawback to such engraving, when delicately finished, is that it cannot be well seen unless it is held close to the eye and in a good light.—*Art Journal*.

A NEW BUOYANT FABRIC.—An experiment which should be highly interesting to the public at large took place in the Thames at Westminster recently. Several persons, including a lady, a clergyman, and military and naval officers, all clad in the garments which were apparently those in common use, embarked in a small boat, and on arriving in midstream proceeded to jump into the water. They appeared to be perfectly at their ease, and, making no movement, rested calmly with their heads appearing above the surface. The explanation of the phenomenon was that the clothes worn by these people were made of a fabric in which fine threads of cork were interwoven with other material. Mr. Jackson, the inventor, is to be congratulated on the complete success of the ingenious device, which is a vast improvement on the unwieldy Boyton dress. The *Pall Mall Gazette* thinks that timid sea travelers can now equip themselves in garments which, while being undistinguishable from those of ordinary mortals, will make death by drowning an impossibility.

MICROSCOPIC MOUNTINGS.—Henry Dalton, the late eminent English microscopist, used to make on glass, from the scales and hair of Brazilian butterflies, the representation of a bouquet, which, seen through a powerful instrument, showed eighty-two distinct flowers of various shades and colors. To the naked eye the bouquet looked like a small shot. There are not more than fifty Dalton slides in this country, and they can scarcely be purchased for love or money. Gray's Elegy, containing thirty-two verses, has been photographed by the aid of a microscope on a slide within a space of one-tenth of an inch square, and is perfectly legible when read through a powerful instrument.

OIL ADULTERATIONS.—Adulterations of animal oil or mineral oil may be detected by adding sulphuric acid, when, if animal oil is present, that portion will be charred, forming black rings in the sample being tested. Vegetable or animal oils can also be detected by adding an alkali to the sample, thus causing them to saponify immediately, as mineral oils have not the property of saponification very readily. Oils are frequently adulterated with cotton-seed oil, which is very dangerous, from its tendency to ignite waste spontaneously. Spontaneous ignition from oil must generally arise from each adulteration, which should be carefully guarded against.

THE PRESERVATION OF COPPER SHEATHING.—M. Carnot reports, on behalf of the committee on chemical arts, that a small quantity of metallic manganese, as an alloy containing 75 per cent of copper and 25 per cent of manganese, prevents the formation of cuprous oxide, which

is the cause of the formation of soluble salts, which accelerate the corrosion of sheet copper employed for the sheathing of ships. By this method, the durability of copper exposed to the action of sea water is greatly increased.

RESTORING PLUSH.—It is customary to use ammonia for the purpose of neutralizing acids that have accidentally or otherwise destroyed the color of fabrics. This must be applied immediately or the color is usually imperfectly restored. After careful use an application of chloroform will bring out the colors as bright as ever. Plush goods and all articles dyed with aniline colors, faded from exposure to light, will look as bright as ever after sponging with chloroform. The commercial chloroform will answer the purposes very well. This information will be found very useful, as chloroform, which is quite cheap, readily restores the color of faded plush garments that have been consigned.

TO CLEAN KID GLOVES.—Stains may be removed even from the most delicately colored kid gloves without injury by suspending them for a day in an atmosphere of ammonia. Provide a tall glass cylinder, in the bottom of which place strong aqua ammonia. Be careful to remove from the sides of the jars any ammonia that may be splattered upon them. Suspend the gloves to the stopper in the jar. They must not come in contact with the liquid.

INSOLUBLE GLUE.—In order to render glue insoluble in water, even in hot water, it is only necessary, when dissolving it for use, to add a little potassium bicromate to the water and expose the glued part to the light. The proportion of bicromate will vary with circumstances, but for most purposes it will be necessary to add only about one-fiftieth of the amount of glue present.

CEMENT FOR PLASTER CASTS, ETC.—To repair broken articles in plaster, a good cement may be prepared as follows: Dissolve small pieces of celluloid in ether. Decant the liquid after a short while. The pasty residue is a cement that will dry rapidly and not dissolve in water if the articles should be exposed to it.

EXPERIMENTS conducted by the Dutch State railroad, on the behavior of different paints on iron work, have shown that red lead best resists the action of the atmosphere. It was discovered, too, that the coat holds better on iron plates cleaned by pickling than when the plates have been scraped or brushed.

MINCE MEAT is now put up dry, in sealed packages. It is said to be of superior quality, and will keep any length of time, winter or summer, in any climate, and especially and peculiarly adapted for spring and summer use; no risk in spoiling in warm weather; always ready and handy for use.

EXTREME COLD ON TIN.—Extreme cold converts tin into a semi-crystalline mass containing large cavities. The pipes of a church organ have been so altered by cold as to be no longer sonorous.

GOOD MEALTH.

My Boy, Do You Smoke?

Among civilized nations the use of tobacco is strictly a modern vice, unknown 250 years ago. Its antiquity among the American Indians can only be conjectured. Smoking is now very generally admitted to be a serious detriment to health, especially when the practice is taken up at an early age. It is strictly forbidden in the German army—or at least it is not allowed under a certain age.

The United States Navy annually takes into its service a large number of apprentice boys, who are sent all over the world and taught to be thorough sailors. It has been the policy of the government since the war to educate the "blue jacket," upon the principal that the more intelligent a man is, the better sailor he is likely to become. There is no lack of candidates for these positions. Hundreds of boys apply, but many are rejected because they cannot pass the physical examination. Major Houston, one of the Marine Corps, who is in charge of the Washington Navy Yard barracks, is the authority for the statement that one-fifth of all the boys examined are rejected on account of heart disease.

His first question to a boy who desires to enlist is: "Do you smoke?" The invariable response is, "No, sir," but the tell-tale discoloration of the fingers at once shows the truth. The surgeons say that cigarette smoking by boys produces heart disease, and that in 99 cases out of 100 the rejection of would-be apprentices on account of this defect comes from excessive use of the milder form of the weed. This is a remarkable statement, coming, as it does, from so high an authority and based upon the results of actual examinations going on day after day, and month after month. It should be a warning to parents that the deadly cigarette is sure to bring about incalculable injury to the young. A law passed restricting its use to the duds would not, perhaps, bring popular disfavor, because it might reduce the number of these objects about our streets, but boys indulging in the cigarette ought to be treated to liberal

doses of "rod in pickle" until the habit is thoroughly eradicated.

THE COCA LEAF is said to be an excellent stimulant for the nervous system when chewed. It is of the nature of opium, but less violent and more lasting in its action. Bernays says: "There is so much concurrent testimony as to place beyond doubt the fact that the moderate use of coca leaves as a masticatory enables fatigue to be endured with less distress and with less nourishment. Markham says that he chewed coca very frequently, and, besides the agreeable, soothing feeling produced, he found that he could endure long abstinence from food with less inconvenience than he would otherwise have felt; and it enabled him to ascend precipitous mountain sides with a feeling of lightness and elasticity and without losing breath. To the Peruvian Indian coca is a solace which affords enjoyment and has a most beneficial effect." Quoting from the same authority: "The incredible fatigue, says Von Tschudi, endured by the Peruvian infantry, with very spare diet, but with the regular use of coca, and the laborious toils of the Indian miner kept up under similar circumstances throughout a long series of years, certainly afford sufficient ground for attributing to the coca leaves not a quality of mere temporary stimulus, but a powerful nutritive principle." The average Peruvian Indian chews a very large quantity of coca leaves every day. Good authorities place the amount of cocaine daily absorbed by such of these people as chew to excess at from 30 to 40 centigrams. The excessive use of coca is well known to be injurious, and the unsteady gait, the yellow colored skin, the dim, sunken eyes, the quivering lips and general apathy are the indications of the inveterate coca chewer. It is, however, considered the least injurious of all narcotics in use, and in the higher regions of the Andes its effects are less marked than in warmer and damper districts. As a palliative agent in the hands of a skillful physician cocaine is capable of greatly alleviating human suffering.

ANCIENT HYDROPATHY.—Hydrotherapy is not a modern invention. It was at Rome in the reign of Augustus, that hydropathic practice had its birth under the happy inspiration of a freedman—Antonius Musa. This physician prescribed water as a drink, in baths and in douches, and he found in this remedy, simple as it was, the secret of a new system of therapeutics. Augustus had only just been elected consul for the eleventh time, when he fell ill with a dangerous sickness. Feeling his end approaching, he assembled the magistrates, the senators and the principal knights, and then, having conferred with them on the affairs of the republic, he placed the seal of the empire in the hands of Agrippa. It was then that Antonius Musa undertook to cure him by a new method, and succeeded by means of cold water applied both internally and externally. Full of gratitude, Augustus bestowed on Musa a large sum of money and a gold ring, and had a statue raised to him, and placed beside that of Esculapius; also conceding to him and to whoever then exercised, and hereafter should exercise the same profession, nobility and the exemption from payment of taxes. Musa was not long in gaining a universal reputation. "Ah, Musa," cried Virgil, "no one may flatter himself that he will ever surpass thee in science!" Hydrotherapy was already superseding every other branch of therapeutics. Horace, himself, had recourse to this famous physician, and the poet, after having sung the praises of Falernian, sought the virtues of cold water. Horace set out for Velia, where Musa prescribed for him a hydropathic treatment, and afterwards took the sulphur baths at Baie. But for the loss of a distinguished patient, this mode of treatment would have become general. The death of young Marcellus ruined for a time the system and its founder.

IMAGINATION AND DYING.—In reference to the influence of the imagination on the body a doctor tells the following story in the *Chicago Times*: "A big hulking fellow about 10 miles from the town I was practicing in got the idea that he was going to die at just 11 o'clock in the forenoon of a certain day. About 9 o'clock a messenger came for me. I hurried out. When I got there the crank had 15 minutes to live, according to his calculations. He did look like a man on the verge of eternity. His eyes were dim and sunken, his face had that peculiar pallor which heralds the near approach of death, and his breathing was very labored. The family were gathered around and weeping as they took a final leave. Something had to be done quick. There was a smart-looking woman there, and I called her aside. Pointing to the clock on the mantel-piece, which the patient was watching, I said: 'When I have his attention turn that ahead.' Then I crowded into the family group, hustled them into next room, sat down on the edge of the bed and began telling that fellow one of the most horrible murder stories you ever heard. I located it right in the town where he knew everybody, named the woman killed, went into blood curdling details, and so completely interested the man that he forgot his 11 o'clock appointment. When I gave him a chance to look again it was 20 minutes to 12, and he was actually mad for a time, claiming he had been tricked. He finally got to laughing and we all took dinner together. The next day he whipped two men at a barn-raising for twitting him about the programme of death that miscarried."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KENNEDY.—*Ledger*, Nov. 20: The water power to be used for boisterous purposes is expected to be ready to be placed in position in a few days. The intention is to operate through the main or south shaft. Men have been at work renewing the wood-work wherever necessary, and placing the works in good condition. The shaft is 800 feet deep; it will be drained by means of a bucket holding 500 gallons. There are three levels, and the work of freeing the mine of water will take considerable time. When work was suspended, the ore in the bottom of the mine averaged about \$6 per ton. There were no facilities for saving sulphurets, and the mill was not equal to crushing more than half a ton to the stamp per day. Under those circumstances it could not be made to pay. But with proper machinery there is little doubt that the property can be put on a paying basis. The Mammoth mill has resumed operations, running during daytime only.

Calaveras.

SOLD THEIR INTERESTS.—*Calaveras Chronicle*, Nov. 21: Edward Fahey and Andrew McFadden, who owned a quarter interest each in the What Cheer mine, sold their interests to the Oakland company who have been opening and prospecting the mine, for \$1000 each. The company had a short time since bought out the interests of M. Boughton and A. F. Newton for \$750 each. The company has been to considerable expense in putting up machinery and opening the mine, but the developments were sufficiently encouraging for the company to consummate the purchase of the entire mine from the former owners.

MACHINERY.—More machinery for the Nevill mine at Angels, passed through town Tuesday last. The first load of castings that passed through here for the same place reached their destination with numerous hardships in the transportation on account of the bad condition of the roads.

Marin.

THE KIMBALL RANCH MINE.—*Marin Co. Journal*, Nov. 20: The new mine on the Kimball ranch keeps up its grand promise. Mr. Rose placed a 6-stamp mill in position last week, but found that the engine that he took out from San Rafael was too small to run it. He managed to run through two or three shovels of soft rock and dirt and from this he took a ball of silver worth about \$5. The promise from this sample is about \$4000 per ton. Mining men who visit the place say it is one of the richest deposits ever discovered anywhere. There is no stock and no interest for sale. The owners are sanguine that they have a bonanza and would scout the idea of selling any part of it.

Mariposa.

THE FRANCIS MINE.—*Herald*, Nov. 20: The Francis mine and mill are running night and day, with good results. The rain will supply plenty of water, a commodity that has been quite scarce there for the past two months, and the mill will be run to its fullest capacity in the future. The raise from tunnel No. 2 to the tunnel above has been completed, supplying plenty of fresh air, and good rock is taken from tunnel No. 1. A chute connects the two tunnels, and cars are run to the mouth of tunnel No. 2, from which the ore is carried in a chute to the mill. Messrs. de Bourdage and Chodzko are well pleased with the prospect for a paying property.

Napa.

NAPA SILVER MINE.—*Calistogan*, Nov. 20: Friday last we visited Johnson & Grigsby's silver mine. The quantity of ore raised to the surface has been greatly increased, the dump being much larger than it was a few months ago. Work is being prosecuted on the three levels of the mine now, though the number of men employed in and about the property is about the same as heretofore. Very rich ore is being brought to the surface daily, and is obtained only in the work of drifting, as there has not yet been any stoping done. The owners of the mine will not, this winter, construct the proposed dam in the Coltrin Canyon, nor erect a mill the present season, this work having been deferred till next year—perhaps the coming spring. On account of the comparatively slow progress made in developing the mine, people are occasionally inclined to believe that it is of little value, but, on the contrary, it is a magnificent piece of mining property. This will be made apparent when everything is finally ready for business; and then there will be displayed as fine specimens of engineer's work and as perfectly equipped mill and mining property as can be found in California.

Nevada.

PEABODY MINE FILLED WITH WATER.—*Tidings*, Nov. 18: A small disaster has occurred at the Peabody mine, caused by the storm. The shaft is close to the bed of Rhode Island Ravine, which rages sometimes when the rains are roaring. Last night, or this morning, a hole broke through the bottom of the ditch into the mine and that let the water of the ditch and of Rhode Island Ravine into the excavation below. There was one man in the mine at the time and he got out with difficulty. Of course the mine soon filled up, and tools, pump and other property are in there under the water. There will be no great difficulty in pumping out the mine; only a few days work.

MINES IN EUREKA TOWNSHIP.—George Mainhart, one of Nevada county's best miners, has just returned from a tour of inspecting mines in Eureka township, in the vicinity of the town of Eureka. Mr. Mainhart went in the interest of some Sacramento parties, who will do some extensive work up there next year. Mr. Mainhart says that the California mine (quartz), near Eureka, has just been sold, to San Francisco parties, for something in the neighborhood of \$20,000. The California was owned by Bohanan and partners, and has very promising prospects for its future as a gold producer. It

is the intention of Mr. Mainhart to get into the Eureka district as soon as the winter is over.

EUREKA MINE LEASED.—*Tidings*, Nov. 18: Elisha and Thomas Andrews have leased the old Eureka mine, for an indefinite period, from Robert F. Morrow, who acts for the company owning the mine. The Messrs. Andrews have purchased an 8-stamp mill from Weissbein Bros., and will erect the mill on a site opposite the water wheel of Bush & Gauthier. This mill is to be run by water power supplied from Stone's ditch. A Pelton wheel will be put in, and all modern improvements will be used in the mill. The fall of water at the wheel will be about 80 feet, which will be sufficient to run more stamps, should the lessees see fit to erect them. Work of crushing will at first be commenced on the old dump of the Eureka, and when the best of the sorted rock from that large pile shall have been exhausted, then ore will be crushed from the mine. A party of miners will go to work in the old Mobile tunnel (the Richardson ground), and will take out ore on shares from the ledge in the tunnel until they have reached the Eureka ground. The Mobile tunnel starts in the hill west of the Eureka old works and runs in about 250 feet in a direction north of west. The miners think they can strike the glorious old Eureka ledge in a little way through this tunnel, and if they succeed, Grass Valley can lay claim to another bonanza in her already rich quartz developments. The mill to be erected will be placed on Powning & Co's, patented ground, and besides being used for the Eureka work, will also crush custom rock when circumstances allow.

Placer.

IRON SMELTING.—*Republican*, Nov. 20: January 2d is the day set for beginning work at the Hotelling iron furnace, and at that time 40 or 50 men will be added to the force of about 30 working there at present. Shaft No. 2 has recently been sunk 126 feet, making the total depth 192 feet, and a large quantity of good ore has been found. Drifting is about to be begun. William Greerhauser, the superintendent of the furnace, leaves to-day for the East. He will be gone about a month and will bring back with him three or four men skilled in various kinds of work connected with the mine and smelting furnace.

Shasta.

GRAVEL.—*Republican Free Press*, Nov. 21: Mr. Garber, of Portuguese Flat, who was in Redding Tuesday evening, thinks that from appearances his company will have a good run this winter on their gravel claim. For the past two seasons little has been done through scarcity of water. Their ground prospects very rich, and will doubtless pay well under favorable circumstances.

SHUT DOWN.—J. O. Stewart, of Copper City, was in town last week and reported that the mine had shut down on account of the wet weather, the mine at present being in such a condition that ore cannot be extracted when it storms. At the mill they have been furnishing employment to some 20 men, who are temporarily laid off. Mr. Stewart says that they have shipped some \$10,000 in bullion since starting up, and that the process works well. He thinks that by reducing the expense of handling the ore to the lowest figure that a profit can be made.

NOTES.—*Shasta Democrat*, Oct. 21: A new pump for the Clark mine at Quartz Hill was taken to the mine yesterday. McCusick, ex-Postal agent, returned here Monday evening on a visit to the mines. We are told that fully 150 men are employed by the Iron Mountain mining company.

Sierra.

PIKE CITY.—North San Juan Times, Nov. 20: We made Pike City a visit on Thursday. The hands at work in the Alaska had just been paid off, and many of them were enjoying a holiday. We found the Alaska mine working full-handed, though the new stamps were not running. The mine is now working to its full capacity. When the additional twenty stamps are set going its gold producing capacity will be doubled. The Alaska is certainly the best mine within a radius of fifty miles of that place. The town of Pike City is increasing in population daily, and if the Alaska remains as good a paying institution as at the present, the town in another year will contain treble its present population.

THE FUTURE OUTLOOK.—*Sierra Tribune*, Nov. 23: The success of the Young America claim has given a great stimulus to prospecting for mines in this district. During the last few months many discoveries have been made that give promise of turning out well. By next summer we believe that Sierra City will be the center of greater mining activity than exists anywhere else on the Pacific Coast. On all sides the work of prospecting is pushed vigorously, and discoveries that promise well are frequent.

PAY GRIT.—A private letter received at this office states that our old friend, B. F. Littlejohn, has struck a 3½ foot gold-bearing ledge in his claim at Middle Waters, and that the vein appears to increase in richness as depth is acquired. The rock also carries large quantities of sulphurets. The finder thinks he has a pretty good thing, and as soon as spring opens he will endeavor to put up some kind of a crushing apparatus.

A BIG CLEANUP.—We are informed that \$1600 was cleaned up for the last 10 days' run at the Belmont Consolidated quartz mine, Poker Flat. That is pretty good, considering the milling facilities they have. The Belmont is a valuable mine.

LET A CONTRACT.—The Lewis Consolidated Mining Company has let a contract to parties to run 100 feet of tunnel at their claim. They have also laid in supplies at the mine, and otherwise prepared for doing a good winter's work.

LIVELY TIMES.—We confidently predict for this district, the coming summer, lively times. Capitalists are getting their eyes opened to the merits of our mineral resources.

THE CLEVELAND MINE.—The Cleveland is now ranked as one of the most promising mining properties in this district. The lower tunnel is in about 300 feet, and the ledge, which was encountered there several days ago, is said to show 2½ feet in width of as fine looking quartz as can be found anywhere. The striking of the vein in the lower adit, at a depth of 250 feet from the surface, determines that the mine is a valuable one beyond a peradventure of doubt. The eight-stamp mill is completed, and if it has not

already started up, will within a day or so. Parties who ought to be good judges of such things, have placed the milling value of the ore at from \$40 to \$50 per ton. If it pays one-half that the owners will grow rich very fast, as the mine, being worked entirely through tunnels and the mill run by water power, the expense of extracting the ore and getting out the gold therefrom will be but nominal. Antone Demartine has exhibited a great deal of energy and pluck in pushing ahead the developments on the property.

CLEANUP.—*Mt. Messenger*, Nov. 20: The Ruby Co. cleaned up for last week 106½ ounces. There are 33 men working. Supt. Colman has crossed the channel, raised 25 feet and found gravel on a bench, 7 carloads of which yielded \$2 per carload. It was pay day at the Extension last week, and \$4,675.75 was distributed among the miners. There were 72 names on the pay roll last month.

THOS. HENRY and Abe Lightall are running a tunnel on the Fairchild quartz ledge near the head of Kanaka creek. Henry Raymond is sinking a shaft on his quartz ledge, already down a considerable depth.

SIERRA CITY.—*Cor. Mt. Messenger*, Nov. 20: The outlook of the place is most encouraging at the present time—a great deal more so than at any time in the past. Young America, has already paid some dividends. This mine is some distance from the city. Young America is a good mine, and one which will last for years, from the amount of ore at present in sight. The extension to the Young America is not prospected much as yet. The Phoenix, has a very fine location and every natural advantage to work it on an economical plan. It is rumored that the mine has changed hands or will in a short time. A San Francisco company is the prospective purchaser. The Kentucky is a good property, with every advantage that a company could wish for, having the same water privileges and advantages as the Phoenix. The Marguerite was discovered by A. C. Busch & Co., and was sold to the present company, which has been working it about three years. No work has been done during the past year owing to some trouble with the company. The mine has very rich rock. The mines I have spoken of are all high grade rock, and with a little capital all could be made big dividend paying mines, and no better locations and advantages can be found in the State of California. There are a great many other ledges within a few miles of the city, which have not been prospected to any extent.

Siskiyou.

PICK AND PAN.—*Yreka Union*, Nov. 20: All is activity in the Salmon mines and the indications are favorable for a long and profitable run. The rich placer mines around Hawkinsville are being worked to good advantage, the big ditch furnishing an abundance of water since the late rains. The Oro Fino hydraulic miners have commenced work and look forward to a long season. The extreme richness of the mines about Oro Fino make even short runs quite profitable. During the dry season many tons of quartz were taken out, and the mills and anartras in that section will be started at once. The profits of William McConnell's Klamath river claim were not as large this year as last, but the enterprising owner has no cause to complain. He worked at a great disadvantage from the first, having encountered a large body of sand, and at no time during the season was bedrock reached. At the commencement of the season he employed 45 hands, but finding it necessary to abandon one derrick, the force was reduced nearly one-half. The running expenses this year were about \$15,000 against \$20,000 last year, when he cleared \$9000 on the season's work. Next spring he will open the claim lower down which will enable him to work richer gravel than he has yet handled.

Trinity.

NEW RIVER.—*Journal*, Nov. 21: While at the New River mines this week we learned that about 75 men will winter there. The Hardtack, Ridgeway, Mountain Boomer, Grover, Cleveland, Modoc, Uncle Sam and other mines will continue developments during the winter and also crush ore. All have good rock and the district may be said to be fairly prosperous. We have much faith in its future, feeling certain that the first great rush being over the district will build up on its merits and prove one of the most prosperous quartz mining camps on the coast.

Tuolumne.

NEW MILL.—*Union Democrat*, Nov. 21: Messrs. Tullock and Ashlock returned Thursday from Sugar Pine, having completed the new mill on the Hogle & Dagner mine upon which they have been engaged for some time. The mill is now all ready to run, and will be started up as soon as the necessary belting is received. It is built with frames for three 5-stamp batteries, but as yet only one battery has been set up. It is intended to add the other batteries to the crushing capacity of the mill whenever the ore output justifies it. The motive power of the mill is steam. Crushing will probably be commenced now in a very few days. The pocket miners on Bald Mountain still continue to strike pockets. Last week was quite golden, a number of rich pockets were taken out by different parties. Al. Harkness, we are to hear got his first in the sugar again. There are several partially developed mines now lying idle on Bald Mountain with good prospects in sight which if worked would no doubt pay handsomely, but they require time and labor as the past has proven that this mountain of wealth will not yield its golden treasure without a faithful and industrious effort.

RIVER WORK.—*Tuolumne Independent*, Nov. 20: Mr. J. R. Moffit informs us that he is well satisfied with his season's work in the river near Jacksonville. Although he "did not get all the gold he wanted," his experience with his new mode of river mining has convinced him of its value and importance to the mining interests of the State. By means of his new and novel construction of movable dams, he got them out quickly and safely when the floods came, as also all his other apparatus which is likewise constructed with a view of quick removal in emergency. By this new plan of movable dams he is also able to get into the river bed earlier in the season, and to stay until the last moment in the fall. This year he had but 200 feet of rubber hose to convey water from the dam across his mine, but next season he will have 800 feet. This hose (his own

invention) is four feet in diameter, and carries an immense body of water. For pumping he uses a new style of turbine wheel (also his own invention); fitted with cogs it has positive action; it threw an 80-inch continuous stream with a force that sent the water four feet from the outlet. Its capacity is only a question of power. In the river bed he encountered large boulders, some of them ten feet through. He gets rid of these by putting several sticks of giant powder in a bag, the middle one with fuse. The bag is let down in the water, close to the rock, and the charge exploded. By this means these immense masses were knocked into splinters. No expensive drilling was needed to get rid of them. The charge must be close against the rock, as otherwise the water between the boulder and the bag would act as a cushion, and render the blast of no effect. Being now fully prepared, and with much additional experience, he will be able to get into the river bed and to work next season much sooner. He has other improvements and new plans for working river beds, which will develop this great mining industry, and render it profitable in places where, heretofore, it has been too expensive for profit.

GOLD.—During the past two weeks, Al. Harkness, on the Garrett claim, at Brown's Flat, has taken out about seven thousand dollars. In one day the pocket yielded seventy-two ounces. In a little over a year, different parties, to whom the claim has been leased by Mr. Garrett, have taken out over \$50,000—the true figures are probably nearer \$60,000.

NEVADA.

Washoe District.

CHOLLAR.—*Enterprise*, Nov. 21: The main lateral drift south on the 3100 level is now in 412 feet from the switch at the west drift from the Combination shaft. This south lateral drift of the Chollar may well be termed the "lightning drift" of the lower levels, for the regular weekly rate of progress is about 83 feet—faster work than has yet been done at that depth on the Comstock. It is being run in the black dyke formation, composing the west or foot wall of the ore vein; the ground works very favorably; no water is met with, the air is good, and the men can work to excellent advantage. The proposition is to run it through to the Potosi north line, 200 feet distant, which will take about three weeks. Then, if deemed expedient, through that mine, 700 feet further, to the Bullion north line. In case this is done, the Bullion company propose sinking the Ward shaft 700 feet deeper, and drift north from it to connect with this lateral drift coming from the Chollar on the 3100 level. This would make a very advantageous connection for air circulation and exploration purposes, and a drift south from the Ward or Bullion shaft could connect through to the Yellow Jacket shaft with good facility. During the past week an important reduction of inflowing water has been made on the 2100 level. Some years ago, in running the lateral drift on this level, to connect with the Savage incline, two long dirt holes were bored from the face which did not hit the incline, but to the westward of it. Two fine streams of water were tapped, however, which have flowed strongly ever since. The drift subsequently connected with the incline, which was found to lie further east. A few days ago the underground foreman suggested to Superintendent Hamilton the possibility of stoping out that water, and acting upon that proposition two long wooden plugs were driven those two holes. This had the effect to effectually shut out an objectionable inflow of nearly 100,000 gallons of water per day, making quite a perceptible difference in the work given for the big hydraulic pump to do.

HALE & NORCROSS.—On the 3100 level the main lateral drift is being steadily advanced, following along the easterly skirting of the ore vein, which lies entirely to the west. The face is in a mixture of good ore and vein matter, and porphyry and clay, with no water, and is now in 110 feet north of the deep winze station. In another week this drift will be advanced to an equal extent north with the main lateral drift on the level above—the 3000—and both will be about 100 feet from the Savage south line. On the 3000 level the crosscut west, about 50 feet south from the face of the north lateral drift is again being advanced, in order to get room to put a diamond drill into its face. The drill will be followed up by the crosscut, the main purpose being to reach and explore the point where the continuation of the good ore body met with on the 2900 level should be found. On both lower levels, 3000 and 3100, the water is getting pretty well drained out, and gives very little trouble.

CON. CALIFORNIA & VIRGINIA.—On the 1750 level the ore breasts are showing and yielding well, the daily extraction being about 125 tons, giving an average assay of \$19 per ton. On the 1650 level the main northwest drift is again being pushed ahead, going after the old stopes of low-grade ore—bonanza leavings. It is in nearly 200 feet. From the Jones lease section, above the 1500 level, about 100 tons per day are extracted. This ore is shipped to the Eureka mill, on the Carson river, for reduction, and assays about \$16 per ton.

YELLOW JACKET.—The Brunswick mill having dispensed with its auxiliary steam power and being run entirely by water, does the same amount of work as heretofore, and the regular yield of the mine, about 175 tons per day, is continued. The lateral drifts north from the 1200 level of the Crown Point to explore and prospect the mine at that depth is making good progress, notwithstanding the great heat, and is penetrating the north portion of the mine, where good ore is expected to be met with.

CROWN POINT.—Nearly 500 tons per day are now being extracted from this and the Belcher mine. Most of it comes from the upper levels of Crown Point. That from the Belcher is principally from the 1700 level. During the last week or two several tons per day have been contributed from the 1200 and 1750 levels of Crown Point, which is of higher grade than that from the upper workings.

OPHIR.—On the 400 level the lateral drift south from the main west drift is now in a little over 200 feet, still following the excellent and promising vein formation in which it was started. Good little bunches and streaks of ore are occasionally met with, and a good concentration of the same is liable to be met with at any time.

BEST & BELCHER.—On the 1000 level the cross-cut west was extended 52 feet, making a total length of 142 feet. Some good quartz and clay are met with; also, a little water.

MEXICAN.—On the 500 level the middle crosscut east has been discontinued, and two lateral drifts north and south started from it at a point 200 feet east of the main lateral drift. They are intended to explore a highly-mineralized portion of the vein, passed through at that point. They are each in about 50 or 60 feet.

GOULD & CURRY.—On the 1000 level west cross-cut No. 1 has been suspended, and No. 2 started about 170 feet south of the north line, or opposite the shaft. This new crosscut is now in 100 feet, having made 60 feet during the week. Material in face hard, dry vein matter.

ALTA.—The west drift on the 700 level has connected with the upraise from the 950 level, giving a fine air circulation and increased facilities for explorations on the 700, where good streaks are found among the great mass of low-grade ore.

SIERRA NEVADA.—The lateral drift north on the 520 level was advanced 37 feet during the week, making a total distance of 273 feet. The water has decreased, and the vein material met with is found to be harder with further advancement.

KENTUCK.—The old ore breasts above the 1300 level are giving a considerably increased yield, over 100 tons a day, or sufficient to keep the Rock Point mill steadily running and also, the Douglass mill in lower Gold Hill.

UNION CONSOLIDATED.—On the 500 level the east crosscut, 100 feet south of the Sierra Nevada line, is still pushing ahead in promising vein matter, and is in about 245 feet.

Black Hawk District.

ANOTHER GOLD MINE.—Walker Lake Bulletin, Nov. 18: News came of a new mine in Black Hawk district, near Marietta. A gold bearing ledge has been found, which assays from \$41 as high as \$78 a ton. A shaft has been sunk thirty feet, which shows a ledge as far as developed. Taking it altogether, it is a very promising prospect. It is owned by Thomas Woodruff, Tom Purcell and Jack Doody.

Cherry Creek District.

MILL.—White Pine News, Nov. 21: Sometime this week the Ti-Cup mill will be started up on May Ann ore, and they expect to have a run of about two months. They are now taking out lots of fine ore. The furnaces at Jasper and Spacemont are running out some fine bullion, and parties from there say it will pay handsomely. If it does, look out for a boom there next spring.

Columbus District.

THE NEW MILL.—True Fissure, Nov. 20: All was stir and activity on the big west of town yesterday morning, when the teams began to arrive with the machinery for the new mill of the Candelaria Water and Milling Company, formerly known under the name of the Princess. Spectators outnumbered the workmen three to one, and the congratulations that passed between them were hearty. Contractor White put six men at work last Tuesday, but the severe storm of the past few days has kept them idle most of the time since. On Wednesday evening four carloads of machinery arrived, and the weather clearing up yesterday morning, the working force was increased to twelve. A lot of lumber and several more carloads of machinery are on the way. If nothing unexpected happens, the contractor hopes to have the 30 stamps ready to fall inside of 100 days. The resumption of work on this property is only one of the many signs of an approaching revival of business in this camp that will put it on a more solid basis than ever. A good time is in store for us.

BREAK OF DAY.—This mine is located in the White mountains, and is owned by David Davis & Co. There is a shaft down twenty-five feet on the ledge. It is intended to run a tunnel 150 feet in length to tap the ledge at a depth of 200 feet. There are about twenty-five or thirty tons of \$100 ore on the dump.

BOB INGERSOLL.—We are working two shifts. The tunnel is in 185 feet, thirty-five of which are in the ledge. The ledge can be traced for 27,000 feet, and good assays can be obtained for the whole distance. The mine is located in the White mountains, eleven miles from Fish Lake valley.

TIP-TOP.—The tunnel on this Santa Fe property is being pushed rapidly ahead in favorable ground, and is making a good showing.

CLIMAX.—Kent & Co. are making good headway in driving their tunnel. They expect to tap the ledge in a few days.

BALDWIN.—Work on the Baldwin, at Santa Fe, is progressing as usual.

AXAN.—Davey & Hastie are doing good work with encouraging returns. "Copper John" is still taking out the usual amount of copper from the Santa Fe mine. All the prospectors and chlorides in Columbus district are doing well.

Esmeralda District.

THE AURORA MINES.—Walker Lake Bulletin, Nov. 18: Mr. R. B. Mitchell, of San Francisco, the attorney for the Consolidated Esmeralda, (limited) of London, England, arrived in town on Monday. He is here for the purpose of passing the title to the large mining properties in Aurora, lately purchased by the London company. Work upon the properties will soon be commenced.

Hawthorne District.

CLOSE WORK.—Walker Lake Bulletin, Nov. 18: The tailings of the Kinkaid mill for the last four or five months have been tested at the Virginia assay office, and show no value. The ore averages \$15 per ton. This is in reality working it "for all it is worth." The mill is now running steadily and will soon commence crushing the rich rock recently discovered in the Montreal mine. Foreman McNeil feels confident that he can run as close on the rich rock as on the lower grade.

FROM THE LAPANTA.—Virginia Enterprise, Sep.

21: D. B. Lyman, Superintendent of the Sierra Nevada, Gould and Curry and Best and Belcher mines, returned evening before last from a visit to the famous Lapanta mine, Hawthorne District. He speaks of it as a rich and remarkable discovery. The ledge is from one to three or four feet in width, rich in free gold, with but little silver, with walls of limestone formation. The main shaft or incline is down about seventy feet, and from the dump at the surface he took a fair average quantity of the decomposed ore, which gives an assay of \$232.95 in gold and only \$2 in silver. From a piece of the hanging wall he got an assay of \$435. There are other smaller veins in the hillside of the same kind and quality of ore, one about 200 feet further down the hill being eight inches in width at the depth of thirty-five feet, although it showed only two or three inches at the surface. Lyman thinks there is at least \$100,000 in sight in the Lapanta, and looks for very rich results from further explorations.

Jackson District.

THE PENNSYLVANIA INCORPORATED.—Silver State, Nov. 20: The Pennsylvania Mining Company of Jackson District of this county has been incorporated in San Francisco. The capital stock is \$10,000,000, divided into 100,000 shares. The Directors are A. W. Sisson, George A. Scott, D. W. Earl, M. L. Cheney and John F. Caswell. A mill is now being erected on the mine, which is situated about thirty-seven miles a little north of west from Winnemucca.

Pahranaagat District.

WORK SUSPENDED.—Pioche Record, Nov. 18: Work has been temporarily suspended on the Bialbec mine, in Pahranaagat, until adequate milling facilities are procured. This is the mine that work has been vigorously pushed ahead in by Eugene Howell, who has opened it up in good shape, having uncovered an 8-foot ledge of good grade rock, in the drift running west from the bottom of the mine, and has just recently made a test of 34½ tons of the ore averaging \$86 and upwards per ton, and working it up, wet crushing, to 83 per cent and 87 per cent, shipping in bullion last month, as a result from the 34½ tons two bars valued at \$2542, showing a saving of over \$73 per ton. This is much more than was expected, as the ore was of decidedly rebellious character, many doubting its milling to any percentage. But, bullion speaks for itself, and now since Mr. Howell has demonstrated what can be done with the property in putting it into the shape of a paying proposition, he will move himself in interesting capital toward putting up a mill of large and adequate capacity at Hiko, which the property fully warrants and justifies. The removal of the little mill from the mines of Pahranaagat valley is a severe blow to the miners there. True, the mill was only a 5-stamper, and at the place it was erected but a sufficient quantity of water could be obtained to run but twelve hours out of the twenty-four. It was but little better than nothing to the miners, but that little helped so much, and now, being deprived of it, they are left in a sorry plight, as the ore is of such a quality that it will not pay to ship to Salt Lake, yet it paid a handsome profit when worked near the mines. It is to be hoped that arrangements can be made so that Mr. Howell will be able to lease the mill at Hiko on fair terms. The mines there are now showing well, the quantity and quality of the ore being good.

Tuscarora District.

WILL NOT START UP.—Times-Review, Nov. 19: There was a report around town that the Grand Prix mill would start up in a few days. We are informed by Superintendent Dixon, however, that such is not the case. The ore, to save two handlings is taken direct from the mine to the mill, and that probably gave rise to the rumor. There is considerable amount of fair grade ore being extracted, and probably the mill will start up sometime during the winter, there being sufficient fuel, etc. on hand for several months' run. Work was resumed at the Central Con. this morning. The engine was started up and preparations are being made to start a drift west at the 80-foot level to strike a body of ore that there is reason to believe lies in that direction. Only a day shift will be run at present.

Taylor District.

BULLION.—Cor. Eureka Sentinel, Nov. 20: The Argus Mining Company and Monitor Mining Company of this district are looking better, and as bullion shipments speak for themselves, no puffing is necessary. We have several outside promising districts, which will attract attention next summer.

ARIZONA.

TAILINGS.—Prescott Courier, Nov. 18: Messrs. Cartmell and Hughes have finished running through the tailings at the old Aztlán mill, on Groom Creek, and, as we understand, have made a handsome profit out of their venture. Too much credit cannot be given to Mr. Cartmell for his ingenuity and perseverance in putting together and refitting the burnt and distorted machinery that lay amidst the ruins of the mill. Looking at them as they were eight months ago, not one man in a hundred, with Cartmell's limited means, would have had the pluck to take hold of them, or the ability to do anything with them. Mr. Cartmell will have his ten stamps at work early next month on a lot of ore from the Happy Jack mine, on Lynx Creek, which he has purchased from Hugo Richards. Doctor Farnham went out to Lynx Creek, yesterday, to turn his five-stamp mill into a dry crusher. The doctor reports his discovery of a very rich gold lead on his Iron Clad claim.

COLORADO.

SHUT DOWN.—Elk Mountain Pilot, Nov. 19: The Avery mill at Gothic has shut down for the winter, and the Sylvanite mine will ship from 150 to 200 tons of ore outside just as soon as they can haul it. The mill at Gothic is a success and all right with the exception of some alterations that are needed in the roaster. In order to make these changes it would require several weeks to get the new machinery here, and Mr. Avery deemed it best to close the

mill until next spring, when the changes will be made that will probably make the mill a complete success. What ore was run through the mill from seventy to ninety per cent of the silver was saved, which is a very good saving. The Sylvanite mine is now producing very good ore which is found in the vein that is more solid and not broken up. We regret to announce that the Hewson tramway to the Augusta mine will not be completed this winter owing to the weather being unfavorable at that altitude. The Queen of the Gulch, in Dark Canyon, is being worked by contract. This property is owned by a Pennsylvania company, and Joseph McCullough and L. L. Howe have a contract to run the tunnel on the vein 100 feet. The tunnel is now about 65 feet long. There has been more rustle among the miners this fall than usual, and Rock Creek is attracting the attention of capitalists. Our mines and marble interests are bound to come to the front. The Black Queen keeps taking out a quantity of splendid ore and shipments are still being made. This property can be classed among the most important in the county. Work has been started up on the Black King, an extension of the Queen. This is a large vein and croppings similar to the Queen. The Lost Horse has struck harder ground but is being pushed ahead. I. G. Sanbrough has been putting things in shape for the winter, and will open up his property on Lost Trail creek. Henry Redden is hard at work on his property and has a good showing. He is one of the stand-bys of the camp. Ed. Skinner is working the Cape Briton. Several claims have been patented this season around camp and work will probably be started upon them. Our marble properties will probably change hands in course of a short time and we will see another industry started up that will be of great benefit to our county and State.

IDAHO.

BAY HORSE.—Cor. Salt Lake Tribune, Nov. 20: The smelter closed for the season, and but little being done in the mines. The cause of this is largely due to the litigation between the Beardsley and Excelsior companies. Bay Horse was never more prosperous than just before these court proceedings began last spring, and now her future is badly clouded. It is a pity that a camp with so many good properties developing should have such a shadow cast over it, and we can only hope for an early solution of the troubles and for the coming of brighter times than ever. The closing down of the smelter stops most of the work at the mines. The smelter has sent out a large quantity of bullion during the season, the merchants have done well, and there has been considerable improvement in the town. Clayton, located eighteen miles farther up Salmon River, has had a prosperous season. The smelter, operated by A. J. Crook & Co., has sent out forty cars of bullion, ten cars of first class ore and matte, making in all about 500 tons. The smelter is operated by water, and averaged 22 tons of ore per day, and has given employment to 20 men at works, 75 in coal camps, and 65 at the mines owned by the company. They own some good mines, and their operations next season will be extensive. The smelter will close for the season about the 15th. Bonanza and Custer are quiet towns now, having gone into winter quarters. The Custer Company is crushing thirty tons of Badger ore per day, giving employment to thirty men in the mill and fifty in the mines, timber, etc. They are working \$40 rock at a profit. Chris Morler, the superintendent, appears to be a good man for the place, and looks well after the interests of his company. The Dickens mine is partly filled with water, and being tied up in suits, is lying idle. The Montana did a large amount of dead work the past season in the way of running a lower tunnel to drain the mine. They took out sixty tons of \$300 ore and had it worked at the Custer mill. The interest belonging to D. B. Varney was sold a few days ago to satisfy a judgment, and was bid in by A. and J. Pfeiffer, after which the ten men employed were discharged and the property closed till next season. J. G. Morrison took out about \$1,500 from his placer claim and did a little work on his Washington and Paradise claims. The former has very rich ore, and ought to be in the hands of a good company to operate. The Whale had a few tons of ore worked in the spring, but is now lying idle. Pfeiffer Bros., at Bonanza, and J. H. Lee & Co., appear to have a lucrative trade in general merchandise, each carrying a heavy stock. The Yankee Fork country possesses many good ledges, but has been unfortunate in not getting adequate capital to operate with.

THE CROCUS MINE.—Wood River Times, Nov. 18: The Crocus mine, in Scorpion gulch, continues to improve with every foot of development. The incline is down 135 feet, and a drift runs on each side at that depth. The ore vein is two and a-half to three feet in width, and the ore averages \$30 per ton in gold and \$7 to \$9 in silver. When concentrated the result is \$80 to \$90 ore. There is about 100 feet of ground in the mine that is opened and can be stopped clear to the surface. There are about 12 men at work in the mine; with the teamsters, contractors, and leasers included, 20 men are kept at work on the Crocus ore, and the property pays a good profit, besides its own development. The lessees are Chase & Hodgman, who own the concentrating works at Indian creek. They intend to work all winter, and will evidently make considerable money on their lease while opening up a good property.

MONTANA.

BUTTE.—Miner, Nov. 18: Copper mines of Butte are working at a small profit, and can continue to do so at these prices, but the sole reason is on account of the facilities for working both mines and furnaces. The hopeful views given above are entertained by all friends of copper mining, and a realization of the same is most heartily to be looked for. In and around Butte there is the same general run of news to report this week from all the mines, with nothing of a startling nature to enliven the mass of flattering appearances. The mines and furnaces are plodding along with their accustomed energy, and there is no decrease in the output of either, nor is there an unusual increase. The following is a summary of the regular weekly visit to the various properties mentioned: Moulton.—The main shaft is down 35 feet below the 600 foot level, and sinking is

going steadily ahead. The ground is hard, and there is no perceptible increase in the flow of water. It has not yet been necessary to start up the pumps, as the tank handles it without any trouble. The stopes are producing as much ore as ever, and all of the company's machinery is in first-class working order. Alice.—The drifts on the 800 level are both in good ore, which is being taken out and milled, the assay value being above the average. Sinking has been suspended, awaiting the arrival of the new bob for the pump. The bob-pit on the 800 station is cut and ready for the reception of the machinery. Both mills are running to their full capacity.

OREGON.

QUARTZ.—Grant's Pass Courier, Nov. 20: Messrs. McCallister & Stanley are now down on their ledge on Rogue river 40 feet and have a well defined vein some eight feet wide, with a gouge of 3 to 18 inches. Some of the assays run as high as \$300 per ton. The vein now appears to be turning and dipping into the hill. The sinking of the next 10 feet will be watched with great interest, as the vein will then in all probability have its true pitch and a very fine body of ore may be looked for. The Stanley mine on Evans creek, is one of the best prospects in this section. It is down about 10 feet with well defined walls and carries a large amount of copper, with gold through the whole vein. We are in hopes that work will be prosecuted on this vein. The Eastman ledge situated a mile below this town is down about 12 feet. It shows some copper stained ore. Some rich float has been found on the other side of the river near the Jewett ledge, and parties are in hope that they will shortly strike the vein. Messrs. Brown & Walker are now engaged in opening up their claim at the mouth of Green creek. Their ground prospects most favorably, and they will shortly put on a hydraulic and work it on a large scale.

DRY DIGGINGS.—Several miners are now engaged in drifting with very fair returns. This is a never failing source when men wish to make a small raise; the ground paying uniformly small wages.

THE GRAVE CREEK.—The Steam Beer Gravel Claim Company have made a large reservoir, and have lowered the flume and with the present prospects for water will no doubt make a better showing than they have for years.

BRIMSTONE.—This old and well known claim now leased to Mr. Davis is now in better condition for a good winter's run. Much ground has been burned and cleared, and we shall be surprised if it does not this year yield as it has of yore. The Goff gravel claim has enlarged its ditches, built a reservoir, and it is now in very interesting ground—very heavy gold having been struck just prior to their closing down last year for want of water, we may look for very valuable developments. The Maloney Bros. are mining to some extent. If capitalists would only extend a ditch to this, there are 200 acres of ground that every tool will pay with a pipe and ample fall.

LOUSE CREEK.—The Van Peer ledge is down some 15 feet. The mine has never been prospected as it should be; the ore running high in fine gold.

MILL.—Oregon Sentinel, Nov. 20: A quartz mill in Jacksonville is now an assured fact as nearly the full amount asked for as a bonus has been raised. The terms of contract call for an \$8000 mill and Mr. L. D. Brown expects to start below to-morrow night to order it.

AT WORK.—Jacksonville Times, Nov. 20: Dan Hunt informs us that many of the miners of Josephine county are at work. Wimer & Sons' mines near Waldo, as also Deselles & Connell's, are running on full time. The Melford reduction works are now in running order and are testing ore from different mines. At Wm. Clark & Co.'s claim in Alt-house, Josephine county, a \$50 slug was picked up not long since. Simmons, Ennis & Co.'s huge enterprise is not moving at present, though active operations will no doubt be begun soon. Thos. Berryman, who has been drifting for several years on Applegate, has struck another good pay-streak and is doing well. Very few of the miners in Jackson county are at work yet, owing to the scarcity of water. A few days' rain would set all of them going, however. Boyd & Johnson are now prospecting a quartz ledge in the Blackwell district, which prospects well in silver. They sent some of the ore East for assay, and the returns are quite flattering. C. W. Triplett recently finished a large reservoir on the Steam Beer claim on Grave creek, owned by Rast, Critser & Fullerton, which will enable them to make a much more extended run than usual. Considerable prospecting is still being done in different portions of Jackson and Josephine counties. When the quartz mills at Jacksonville and Medford are in operation, there will be much more inducement to prospect for quartz. H. E. Ankeny went down to Galice creek recently with a representative of a Chinese firm, who are negotiating for the Ankeny hydraulic claim in that section. This is an extensive mine, but has not been worked profitably for some years past.

UTAH.

REVIEW.—Salt Lake Tribune, Nov. 20: The week has been devoid of special feature, but the mild and clear weather has permitted activity in getting the ores to market, and the output has been large. The receipts of bullion and ore in this city for the week ending November 18th, inclusive, were, of bullion, \$86,657.57; of ore, \$22,610, a total of \$109,267.57. For the previous week the receipts were \$161,962.45 in aggregate, of which \$124,314.65 was in bullion and \$37,647.80 was ore. The output of the Ontario for the week was \$34,444 in bullion, raising its aggregate for the present year to \$1,441,463.21. The Stormont sent up two bars of silver on the 14th, \$2960. The product of the Hannauer smelter for the week was eleven cars, \$28,210; of the Germania, ten cars, \$24,013.57. There is nothing from the Horn Silver, but it is given out that the superintendent expects to tap the ledge through the new workings, about the first of the year. Ore receipts were \$5800 from the Crescent, \$3690 from the Lead mine, \$2980 from the Sampson, \$2100 from the Spanish, Utah, \$6500 from the Queen of the Hills, \$1700 from the Mayflower, Idaho,

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and
GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

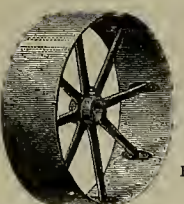
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

TO MINING MEN.

Competent man of practical knowledge desires position. as Superintendent. Experience in Mexico and California. Speaks Spanish. Address

PACIFIC IRON WORKS.

127 First St., San Francisco.

QUARTZ PULVERIZERS TO LET.

CAPACITY PER DAY AND PRICE:

5 Tons per day..... 25 cents per day.

10 " " 50 " " "

20 " " \$1 00 per day.

For further particulars address, W. C. S., 1821 Howard Street, San Francisco, Cal.

CUT THIS OUT AND PRESERVE IT.

A CHANGE OF POSITION DESIRED.

A first-class Chemist and Mineralogist, at present Superintendent of a mining and milling company in California, wants to change his position. Besides being expert in assaying, as well as analytical chemistry, he has great experience in mining and reducing silver and gold ores. He would prefer a position in a refinery or reduction works. He can give first-class references.

Address this office under A. L., 1700.



DEALERS IN

Mining Machinery

Can Increase Their Trade

IN NEVADA COUNTY

By Advertising in

THE "TIDINGS"

(Daily and Weekly.)

Published at Grass Valley, Nevada Co., Cal.

THE "TIDINGS" has a large circulation in the best gold mining region on the Pacific Coast.

Write for terms and sample copies.

H. S. SPALDING, Publisher.

THE PACIFIC COAST ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE--40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire, The BEST ROCK DRILL HOSE Made

J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.

DEWEY & CO.'S

Scientific Press



Patent Agency.

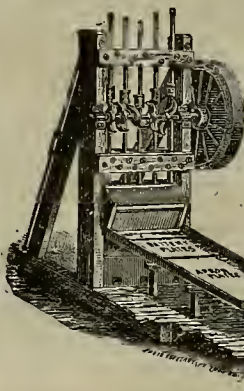
ESTABLISHED 1863.

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

A. T. DEWEY.

W. B. EWER.

GEO. H. STRONG.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES

FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

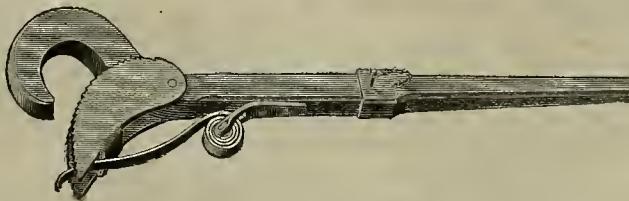
The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND NICKEL PLATING WORKS,

653 & 655 Mission St., San Francisco, Cal. E. G. DENNISTON, Prop'r.



IMPROVED PIPE TONGS.

[PATENTED OCTOBER 23, 1885.]

This cut illustrates a Tongs that can take any size pipe without screwing or setting it. It cannot slip, for the more you pull the tighter it gets. There is no need of pressing the handles together, for it has only one stock or handle. It is very simple and durable. For further information, address

HENRY F. W. SOHST, 1804 Dupont Street, San Francisco, Cal.

The most Complete Compound manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid and Alkali-Proof.



Property Owners are interested personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees, No. 310 California Street, San Francisco.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belt-
ing, Abendroth & Root's Spiral
Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Haz-
ard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers
Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:
Fulton and Union Streets, Chicago, Ill.
NEW YORK OFFICE:
Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:
No. 248 Eighteenth Street, Denver, Colorado.
MEXICO OFFICE:
No. 11 Calle de Juarez, Chihuahua, Mexico.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

**SELBY
SMELTING and LEAD CO.,**
416 Montgomery St., San Francisco.

**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for Gold, Silver and
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

**BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

**METALLURGICAL WORKS,
STRONG & CO., 10 Stevenson Street, S. F.**
ORES SAMPLED, TESTED, ASSAYED.

**THOMAS PRICE,
Chemical Laboratory, Assay Office,**

**BULLION ROOMS & ORE FLOORS,
624 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.**

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

**Assayers' Materials,
MINE AND MILL SUPPLIES,**

CHEMICAL APPARATUS AND CHEMICALS, DRUG
OISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists
Mining Companies, Milling Companies, Prospectors, etc.,
to our full stock of Balances, Furnaces, Muffles, Crucibles,
Scorifiers, etc., including, also, a full stock of
Chemicals.

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast, we
confident from our experience we can well suit the demand
for these goods, both as to quality and price. Our
New Illustrated Catalogue, with prices, will be sent on
application.

Our Gold and Silver Tables, showing the value per
ounce Troy at different degrees of fineness, and valuable
tables for computation of assays in grains and grammes,
will be sent free upon application. Agents for
Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

**J. KUSTEL. H. KUSTEL.
METALLURGICAL WORKS,**

318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my
Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.

Practical Instruction given in Treating Ores by im-
proved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

**WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.**

118 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.
C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the
most suitable Process for Working Ores.

Special attention paid to Examinations of
Mines; Plans and Reports furnished.

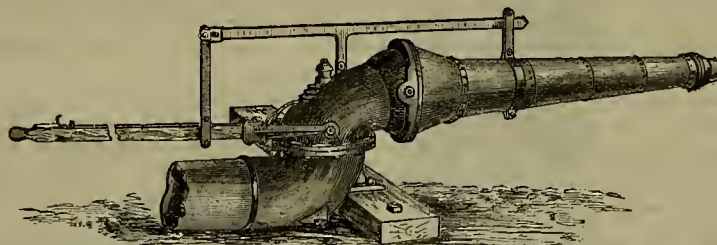
C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.
Location of Works: Melrose, Alameda Co., Cal.
Office: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 up-
ward per ton; Jewelers' sweepings and scrapings bought
or worked for the owners at a fixed rate per ton. Rebelli-
ous ores especially solicited. Ores worked and practical
working tests made by any process, to wit: Amalgama-
tion in battery and copperplates for free gold ores.
Amalgamation in pans for silver and gold ores, with or
without roasting. Leaching of silver ores. Chlorination
of gold sulphurets. Assaying, Chemical Analyses of Ores,
Metals and other substances.

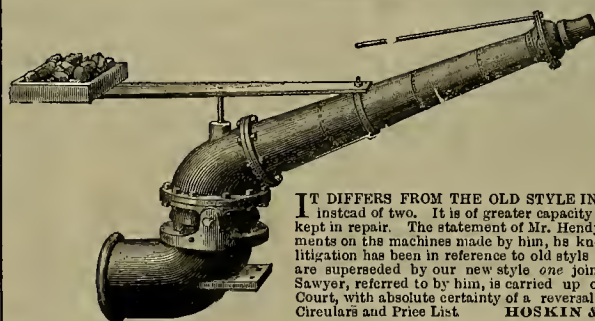
IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the **IMPROVED FORM OF HYDRAULIC GIANTS**, which we manu-
facture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under
the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et als.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,
38 to 51 Fremont St., San Francisco, Cal.



This cut represents our

**IMPROVED
HYDRAULIC
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT
instead of two. It is of greater capacity and more easily worked and
kept in repair. The statement of Mr. Hendy that all styles are infringe-
ments on the machines made by him, he knows to be utterly false. All
litigation has been in reference to old style two jointed machines, which
are superseded by our new style one jointed. The decision of Judge
Sawyer, referred to by him, is carried up on appeal to U. S. Supreme
Court, with absolute certainty of a reversal in our favor. Send for
Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

PATENT LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning
and Salivation

The most perfect appliance for people engaged in
Smelting, Dry Crushing, Guano Works,
Quicksilver Mines, Lead Corroding, and all
other occupations where there is dust, poisonous vapor,
or bad odor.

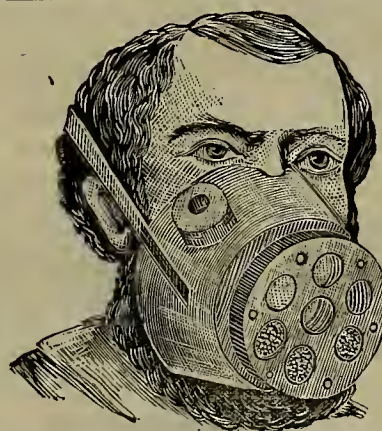
In Feeding Threshing Machines, and similar
work, they are indispensable, as no foreign substances
can be inhaled when they are worn.

The Respirators are sold subject to approval after trial,
and if not satisfactory the price will be refunded. Price,
\$3.00 each or \$30.00 per dozen. Sent post-paid to any
address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,
330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testi-
monials of well-known parties who are at present using
them.



JENKINS PATENT VALVES.

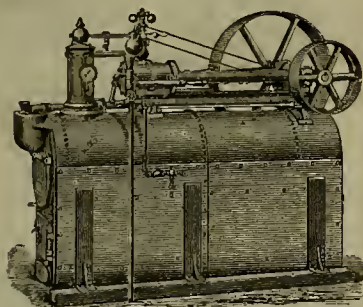
Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over
other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impos-
sible to make them tight except by regrinding, which is expensive if done by hand, and if don-
by machine soon wears out the valve, and in most cases they have to be dis- connected from
the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is
manufactured under our 1880 Patent, and will stand 200 lbs. steam. Sample orders solicited.
To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.



**SKINNER ENGINE COMPANY'S
CELEBRATED**

**PORTABLE ENGINES and
BOILERS.**

Three Gold Medals at the New Orleans Ex-
position over 25 Competitors.

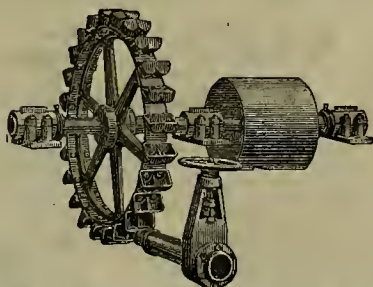
ALL SIZES CARRIED IN STOCK.

STEEL BOILERS

All sizes and styles made to order. (2-sheet
Steel Boilers a specialty.) 2000 H. P. sold on the Coast
during past three months.

STEARNS MANUF'G CO.,
29 & 31 Spear Street, San Francisco.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED
by the Idaho Company at Grass Valley, Cal., and
gave 90 2 per cent., distancing all competitors. Send for
Circulars and guaranteed estimates.

L. A. PELTON,
Nevada City, Nevada Co., Cal.
AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

THE FAMOUS

DUPLEX

The most wonderful Cur-
ative Agent in the world.

Full Power Belt, for Lady or Gentleman, price \$10.

Cures without the aid of Medicine

General Debility, Nervous Prostration, Rheumatism

Neuralgia, Disease of the Liver,

Sciatica, Paralysis, Kidney or

Bladder, Seminal Weakness, Dyspepsia, Female Weakness,

Sick Headache, Insipient Catarrh, Insipient Con-
sumption, Lame Back, and many other diseases.

For particulars and Circulars address
BELT PACIFIC ELECTRIC CO.
SOLE PROPRIETORS,
330 Sutter St., San Francisco.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & CO.'S SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 10, 1885.

- 330,014.—WINDMILL—Edward Gilman, S. F.
330,020.—SAW-MILL SET WORKS.—D. L. Harbach, S. F.
330,111.—BLACKING BRUSH AND SCRAPER.—C. E. Hatch, Vallejo, Cal.
330,025.—SPRING VEHICLE.—M. P. Henderson, Stockton, Cal.
330,135.—BOILER FURNACE—John Mailer, S. F.
330,151.—MOTOR FOR PROPELLING CARS, ETC.—L. C. Pressley, S. F.
329,957.—INSECT DESTROYING DEVICE.—F. A. Ruhl, Stockton, Cal.
329,958.—CORE FORMING APPARATUS—Richard Savage, S. F.
329,659.—CORE MAKING MACHINE—Richard Savage, S. F.
330,162.—VEST PATTERN—Shively & Clark, Toana, Nev.
330,071.—ELECTRICAL CONDUCTOR.—A. C. Tichenor, S. F.
330,072.—ALLOY.—A. C. Tichenor, S. F.
330,078.—SIPHON PUMP.—F. Wittram, S. F.
330,080.—PIANO ACTION.—Fred'k Zech, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Mining Share Market.

The rise in the Carson river, which gives all the mills a chance to run, is making Comstock matters look up considerably, though stocks in this city remain about the same. All the mills, large and small, along Six-mile and Gold canyons, are now well furnished with motive power, and are running full blast. In the mines the effect of this increase of milling facilities is already beginning to become perceptible. More men are gradually being put to work in the extraction of low-grade ore, and the shipment of ore over the railroad correspondingly increased. There is a vast amount of this low-grade ore in the upper workings of the mines, especially at the Gold Hill end, and also at the north end and the old bonanza sections of the Consolidated California and Virginia, and its working is merely a matter of practical solution as to whether it can be made a paying proposition at the present cost of extraction and milling. There is a huge vein of low-grade ore extending from the Yellow Jacket through the Imperial, Exchequer and Alta to the Bullion mine for over a thousand feet in depth and near the surface, and this will be eventually explored and made available if it can be made to pay. But poor men cannot work it and capitalists will not, unless they can make it pay. This low-grade ore proposition is very naturally connected with the future sustenance and prosperity of the Comstock.

Active and effectual work is going ahead in the middle mines, following up the prospects of developing another rich Comstock bonanza. Thus far, however, only rich veins and bunches of ore have been met with.

At the south or Gold Hill end more men are occasionally being put to work as required. One or two small drafts of miners have been made recently in Yellow Jacket and Crown Point, yet these were merely temporary affairs. More men will be worked as eligible opportunity and the encouragement of paying ore offers.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco.

GOLDEN GATE PRINTING AND PUBLISHING CO., Nov. 21st.—Object: Carrying on a general printing and publishing business. Directors: Amos Adams, R. A. Robinson, Robert Brown, M. B. Dodge and J. J. Owen. Capital stock \$15,000, in shares of \$5 each.

KELLOGG MALLEABLE STONE PAVING CO., Nov. 25th.—Object: Manufacturing malleable stone and concrete macadam to be used in street and other paving. Directors: F. H. Kellogg, C. W. Beach, A. S. Reid, Henry F. Williams and D. A. Macdonald. Capital stock \$50,000.

Bullion Shipments.

Lapanta, Nov. 18, \$10,000; Germania, 17, \$4870; Ontario, 17, \$31,444; Hanauer, 17, \$5140; Queen of the Hills, 17, \$3900; Spanish, 17, \$2100; Hanauer, 18, \$3160; Crescent, 18, \$3100; Lead, 18, \$1500; Germania, 19, \$4856; Hanauer, 19, \$2570; Samson, 19, \$2980, Crescent, 19, \$2700; Queen of the Hills, 19, \$1300; Hanauer, 20, \$2610; Queen of the Hills, 20, \$1165; Germania, 21, \$4421; Hanauer, 21, \$5140; Stormont, 21, \$2800; Lead, 21, \$1200; Germania, 22, \$4278; Hanauer, 22, \$2750; Queen of the Hills, 22, \$1400; Bannock, 22, \$2247; Alice, 22, \$24,832; The banks of Salt Lake report the receipt for the week ending Nov. 18th, inclusive, of \$86,657.57 in silver and \$22,610 in ore, a total of \$109,267.57.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Baker Divide M Co.	California.	10.	25.	Oct 29.	Dec 1.	Dec 21.	D. M. Kent.	330 Pine St.
Buchanan M Co.	California.	14.	15.	Oct 30.	Dec 5.	Dec 21.	P. J. Sullivan.	121 Post St.
Booker Con M Co.	California.	8.	05.	Oct 23.	Nov 27.	Dec 17.	G. W. Sessio.	309 Montgomery St.
Bulwer Con M Co.	California.	2.	20.	Oct 23.	Dec 10.	Jan 20.	W. Willis.	309 Montgomery St.
Chollar M Co.	Nevada.	18.	05.	Oct 21.	Nov 24.	Dec 16.	C. E. Elliott.	309 Montgomery St.
Con Amador M Co.	California.	10.	05.	Nov 2.	Dec 2.	Dec 18.	F. B. Latham.	327 Pine St.
Daley Cement M Co.	California.	5.	02.	Nov 19.	Dec 23.	Jan 12.	C. J. Collins.	512 Montgomery St.
Del Norte M Co.	California.	1.	20.	Oct 8.	Nov 14.	Dec 7.	J. B. Cronan.	230 Montgomery St.
Equitable Tunnel M Co.	Utah.	32.	10.	Aug 3.	Nov 15.	Dec 4.	C. J. Collins.	512 Montgomery St.
Guadalupe M Co.	California.	1.	05.	Oct 12.	Nov 16.	Dec 14.	R. Elton.	310 Pine St.
Golden Jacket M Co.	Nevada.	1.	05.	Oct 27.	Dec 3.	Dec 26.	H. G. McClellan.	331 Montgomery St.
Hale & Norcross M Co.	Nevada.	87.	05.	Oct 8.	Nov 12.	Dec 3.	J. F. Lightner.	309 Montgomery St.
Julia Con M Co.	Nevada.	21.	10.	Nov 4.	Dec 9.	Dec 30.	J. Stedford.	419 California St.
North Gould & Curry M Co.	Nevada.	9.	20.	Nov 23.	Dec 24.	Jan 11.	C. H. Mason.	331 Montgomery St.
North Peck M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Jan 4.	H. Deas.	309 Montgomery St.
New York Hill M Co.	California.	9.	15.	Oct 30.	Dec 3.	Dec 24.	J. B. Leighton.	313 Montgomery St.
Nevado M Co.	California.	13.	05.	Oct 29.	Dec 3.	Dec 23.	J. W. Paw.	310 Pine St.
Sassuit M Co.	California.	8.	05.	Oct 23.	Nov 30.	Dec 30.	J. W. Sessio.	309 Montgomery St.
Savage M Co.	Nevada.	64.	50.	Oct 5.	Nov 9.	Nov 30.	E. B. Holmes.	309 Montgomery St.
Sulphur Bank Q M Co.	California.	4.	50.	Aug 29.	Oct 9.	Nov 3.	T. Wittingham.	338 California St.
Trinity M Co.	California.	1.	10.	Nov 2.	Dec 8.	Dec 24.	G. W. Pearson.	417 Kearny St.
Tuolumne M Co.	California.	1.	05.	Sept 15.	Nov 13.	Dec 15.	H. J. Hyland.	309 Montgomery St.
Union M Co.	California.	1.	02.	Nov 7.	Dec 10.	Jan 4.	H. Deas.	339 Montgomery St.
Willow Creek M Co.	Nevada.	2.	1 00.	Oct 12.	Nov 16.	Dec 14.	R. Elton.	310 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Head Center & Tranquility M Co.	Arizona.	J. W. Pew.	310 Pine St.	Annual.	Dec 8
Sally Snelling Co.	California.	Called by Directors.	416 Montgomery St.	Special.	Jan 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Caladonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Nov 25
Jackson M Co.	California.	D. C. Bates.	328 Montgomery St.	10.	Oct 5
Kossuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	06.	Mar 16
Manhattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept 1
Mt Diablo M Co.	Nevada.	R. W. Heath.	315 Pine St.	20.	July 30
Trinity M Co.	Nevada.	J. W. Pew.	310 Pine St.	50.	Feb 13
Plymouth Con G M Co.	California.	W. Van Norden, Pres.	23 Nassau St, N. Y.	50.	Apr 6
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Oct 15
Syndicate M Co.	Nevada.	J. Stedford Jr.	419 California St.	10.	Sept 8

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GOROM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.			Red Bluff.			Sacramento.			S. Francisco.			Los Angeles.			San Diego.													
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.											
											
Nov. 19-25																													
Thursday	—	44	NW	Cl	.30	56	N	Cy.	.55	59	NW	Cy.	.32	62	E	Cl	1.33	64	S	Cy.	.46	65	SE	Th					
Friday21	44	S	W	LR.	.00	56	S	W	Cy.	.00	58	S	W	Cy.	—	60	S	W	Cy.	.77	56	SE	Cy.	.23	64	S	W	Tb.
Saturday02	46	SE	LR.	.00	53	S	Cy.	—	56	S	Fr.	.38	59	SE	Fr.	.09	58	SE	Cy.	.01	66	S	W	Th				
Sunday35	49	E	Cy.	1.12	54	S	Cy.	.27	55	S	LR.	.43	59	S	W	Cy.	.26	60	E	Cy.	.00	66	W	Cl				
Monday .....	.06	53	SE	Cy.	.00	52	S	Cy.	.03	53	SE	Cy.	.08	57	SE	Cy.	.58	65	W	Cl.	.00	66	S	Cl				
Tuesday .....	.42	52	S	Fr.	1.90	51	S	LR.	1.18	52	SE	LR.	1.67	56	SE	LR.	.00	63	W	Cl.	.00	64	W	Cl				
Wednesday03	54	S	W	Cy.	.43	54	S	Cy.	.75	57	SE	Fr.	.96	58	SE	Fr.	.78	64	W	Cl.	.31	62	W	Cl				
Totals	1.09	—	—	—	3.75	—	—	—	2.83	—	—	—	8.84	—	—	—	8.81	—	—	—	1.03	—	—	—					

EXPLANATION.—Cl, for clear; Cy, cloudy; Fr, fair; Fy, foggy; — indicates too small to measure. Temperature wind and weather at 12:00 M. (Pacific Standard time), with amount of rainfall in the preceding 24 hours.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 7.	WEEK ENDING Nov. 12.	WEEK ENDING Nov. 19.	WEEK ENDING Nov. 25.				
Alpha.	.65	.70	.70	.65	.60	.70		
Alta.	.20	.25	.25	.30	.25	.25		
Andes.	.30	.60	.35	.40	.30	.30		
Argentina.	1.65	1.90	1.30	1.75	—	1.30	1.35	
Belcher.	1.35	1.70	1.45	1.55	1.25	1.80	1.15	1.25
Best & Belcher.	1.35	1.70	1.45	1.55	1.25	1.80	1.15	1.25
Bullion.	—	—	—	—	—	—	—	—
Bonanza King.	—	—	—	—	—	—	—	—
Belle Isle.	2.25	2.50	2.70	2.60	2.35	2.15	2.50	2.15
Bodie Co.	2.25	2.50	2.70	2.60	2.35	2.15	2.50	2.15
Benton.	—	.10	—	—	—	—	—	—
Bodie Tunnel.	—	—	.15	—	.15	—	—	—
Bulwer.	.25	.50	.40	.35	.30	.35	—	—
California.	1.35	1.70	1.50	1.65	1.45	1.60	1.30	1.40
Challenge.	—	.15	—	—	—	—	—	—
Champion.	—	.35	—	—	—	—	.20	—
Chollar.	.75	1.00	.75	.85	.65	.75	.50	1.10
Confidence.	.90	1.00	—	.90	—	—	—	—
Con. Imperial.	1.35	1.70	1.50	1.65	1.45	1.60	1.30	1.40
Con. Pacific.	—	—	—	—	—	—	.70	1.10
Crown Point.	1.15	1.25	1.20	1.25	—	1.20	1.60	1.75
Day.	2.50	—	—	2.50	3.00	3.10	—	—
Day & Con.	2.50	—	—	2.50	3.00	3.10	—	—
Eureka Tunnel.	—	—	—	—	—	—	—	—
Exchequer.	.25	—	—	.25	—	.25	—	.25
Grand Prize.	.35	—	—	.35	—	.35	—	—
Gould & Curry.	.95	1.10	.95	1.10	.75	1.00	.65	.80
Goodshay.	—	.15	.10	.45	—	—	—	—
Hale & Norcross.	3.00	4.15	3.00	4.20	3.37	4.05	3.60	3.90
Holmes.	3.00	4.15	3.00	4.20	3.37	4.00	4.00	4.50
Independence.	—	—	—	—	—	—	—	—
Julia.	—	—	—	—	—	—	—	—
Justice.	—	—	—	—	—	.10	—	—
Martin White.	—	—	—	—	—	—	—	—
Mono.	5.75	8.50	5.75	8.75	6.25	7.50	4.70	6.00
Mexican.	.80	1.05	.95	1.05	.80	1.00	.70	.80
Mt. Diablo.	—	—	—	—	—	—	2.50	2.25
Northern Belle.	—	—	—	—	—	—	—	—
Nevado.	.40	.60	.30	.40	.30	.40	.25	.35
North Belle Isle.	—	.20	—	—	—	—	—	—
Occidental.	1.15	1.20	1.30	1.50	1.05	1.35	1.05	1.05
Overman.	.25	.30	—	.30	.25	.30	.20	.30
Potosi.	.55	.65	.55	.60	.45	.60	.45	.50
Pinal Con.	1.20	1.65	1.60	1.80	1.75	1.75	1.75	1.75
Sage.	—	—	—	—	—	—	—	—
Sierra Nevada.	.70	1.95	1.05	1.20	.90	1.10	.70	.90
Silver Hill.	—	—	—	—	—	—	—	—
Silver King.	—	6.25	—	—	6.75	7.00	—	—
Sonoma.	—	.10	—	.10	—	—	—	—
Syndicate.	.25	.55	.20	.25	—	.25	—	.20
Tieja.	.75	.90	.30	.85	.60	.80	.45	.60
Union Con.	.50	.75	.30	.75	.70	.65	—	.65
Yellow Jacket.	1.10	1.95	1.45	1.60	—	1.50	1.60	1.75

Sales at San Francisco Stock Exchange.

WEDNESDAY A. M., Nov. 25.	200	Holmes	5.00
200 Andes	250	Jackson	7.50
200 B. & Belcher	1.15	50 Kentuck	.75
200 Bodie Con.	2.00	150 Mexican	.65
200 Bullion	3.50	200 Mono	3.70
300 Bullion	3.50	150 Navajo	.25
50 Belcher	1.45	50 Overman	.25
50 Con. Va. & Cal.	1.35	20 Ophir	.35
500 Chollar	1.05	1950 Potosi	.45
450 Crown Point	1.65	11 Syndicate	.20
50 Caladonia	1.00	100 Savage	1.70
250 Con. Pacific	1.50	100 Nevada	.70
250 Gould & Curry	7.00	130 Union	.70
300 Hale & Nor.	3.70	10 Yellow Jacket	1.60

An interesting illustrated article on White Bronze Monuments and Statuary appeared in the *Scientific American* of Nov. 14th. It is well worth reading. James Linforth, 116 Front St., S. F., is the General Agent for the Pacific Coast.

San Francisco Metal Market.

(WHOLESALE.)

THURSDAY, Nov. 26, 1885.	
ANTIMONY—Per pound.	12 @ —
Hallet's.	13 @ —
Cookson's.	13 @ —
BORAX—Reined.	24 @ —
IRON—Glenbrook ton.	22 00 @ —
England, ton.	22 50 @ —
American Soft, ton.	24 00 @ —
Oregon Pig.	22 00 @ —
Clippard, No. 1 & 2.	22 00 @ —
Clay Lane White.	24 00 @ —
Shott's, No. 1.	24 50 @ —
Steel—English, lb.	16 @ —
Black Diamond, ordinary sizes.	13 @ —
Flow.	8 @ —
Machinery.	8 @ —
Sanderson Bros.	13 @ —
COPPER—	
Brass, sizes.	20 @ —
Fire-hose, sizes.	20 @ —
Bolt.	20 @ —
Yellow Metal.	12 @ —
Ingot.	13 @ —
LAB—Pig.	1 05 @ —
Bar.	4 75 @ —
Pipe.	7 @ —
Sheet.	8 @ —
Shot, discount 10% on 500 bag.	1 85 @ —
Drop, 8 bag.	1 85 @ —
Chilled, do.	2 25 @ —
ZINC—German.	9 @ —
Sheet, 7x3 ft, 7 to 10 lb, ens the cask.	7 10 @ —
QUICKSILVER—By the flask.	29 75 @ 30 00
Flasks, new.	1 05 @ —
Flasks, old.	85 @ —
TINPLATE—Coke.	5 15 @ 5 40
Charcoal.	6 15 @ 6 25
NEW YORK PRICES—	
California Borax.	7 10 @ —
Pig Iron, American.	17 00 @ 18 50
Quicksilver.	42 @ 42 1/2
Lead.	4 10 @ 4 15
Copper.	2 15 @ 2 16
Tin.	20 @ —
Bar Silver.	1 02 @ —



NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.
STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.
GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY AND PLATING CO., 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St., San Francisco, Cal.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'fg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

**N. W. SPAULDING
SAW COMPANY**

Manufacturers of
SPAULDING'S

Inserted Tooth

AND
CHISEL BIT
CIRCULAR

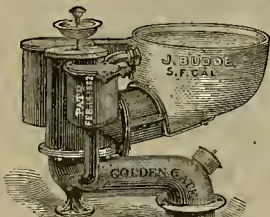
Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.



FLOUR AND OTHER MILLS.
Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco.

**THE GOLDEN GATE
PLUG CLOSET.**



The only secure-locking device to keep sewer gas entirely away from dwelling houses.

JOSEPH BUDDE,

Manufacturer, 126 First Street,
Between Mission and Howard, S. F., Cal.

All kinds of Water Closets, Slop and Waste
Hoppers always on hand.

Write for Information.

**PROFESSOR S. NORTHE'S
EARPHONE**

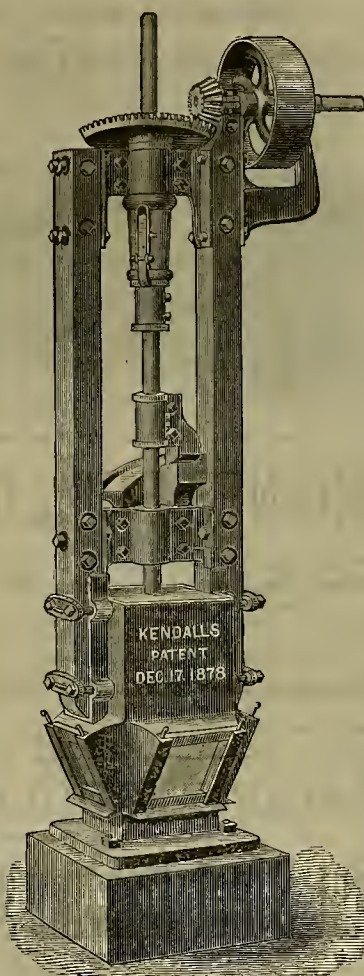
Every deaf person
should Try It!

Send for Circulars, or



FOR THE
DEAF.

CALL AT 615 POWELL ST., S. F.



L. C. MARSHUTZ

T. G. CANTRELL

**NATIONAL
IRON WORKS,**

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

**Stationary and Compound
Engines,**

**FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.**

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

**KENDALL'S PATENT
QUARTZ MILLS.**

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL

Send for Circulars and Price List.

WINSOR HOUSE, KELSEY HOUSE,

S. W. Cor. 9th and Washington Sts.,

Two Blocks from Cars.

OAKLAND, CAL.

Cor. Telegraph Ave. and 24th St.,

OAKLAND, CAL.

FIRST-CLASS HOTEL.

Transient and Regular Boarders.

C. C. WHEELER,
Proprietor.

Four Cottages. Large Grounds.

Low Rates to Families by the Month.

C. C. WHEELER,
Proprietor.

The Kelsey House and Cottages are situated on large and beautiful grounds. The Billiard and Reading-Rooms have been handsomely fitted up for ladies and gentlemen. In close proximity to the Perry Seminary for young ladies, the Sackett School, the Misses Field's Home School for Young Ladies, California Military Academy, Hopkins Academy, Pagoda Hill Kindergarten, and many other schools. Cars pass the house every seven minutes from Broadway Station to State University. Ten minutes from Broadway and forty minutes from San Francisco. Special rates to regular boarders and families. Telephone communications to local points free.

P. S.—Correspondence invited from tourists; also from families in the interior having children whom it is desirable to have educated in the best of schools.



Send for Catalogue
and Price List.

HORSE POWERS, WINDMILLS, TANKS
and all kinds of Pumping Machinery built to order.
Awarded First Premium for Windmills at
Mechanics' Fair, 1885.

F. W. KROGH & CO.,
51 Beale St., San Francisco.

BADGES FOR ALL SOCIETIES,

Police, firemen, etc., presentation prizes or charms, in gold, silver, or metal, sold at society prices by the agents of the Universal Badge Manufacturing Co., NATHAN JOSEPH & CO., 641 Clay St. Workmen and K. of P. badges in gold, \$1 each, sent C. O. D. Trade supplied.

American Exchange Hotel,
SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from
Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS. Proprietors.

SITUATION WANTED—AS ENGINEER OF A QUARTZ
mill. Address Engineer, 339 Eighteenth St., S. F.

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folom, Ste

California Brass Foundry,

No. 125 First Street, Opposite Minna.
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED. V. KINGWELL.

THOMAS THOMPSON THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BOILER OF

Steam Engines, Flour Mill, Mining, Saw Mill and Dredging Machines

Brodie Rock Crushers, Steam Power, Hydraulic, Side Walk and Hand-Power ELEVATORS.

Manufacturers of B. E. Hendrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. ORDERS SOLICITED.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

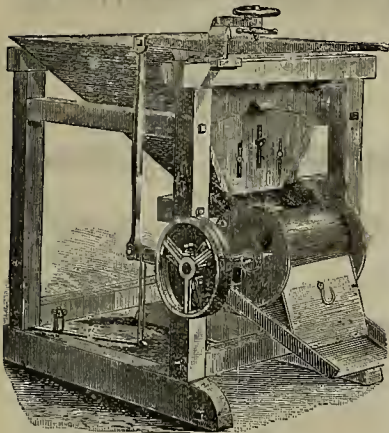
uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

THE ORIGINAL

Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

San Francisco Cordage Factory.

Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

FULTON IRON WORKS,

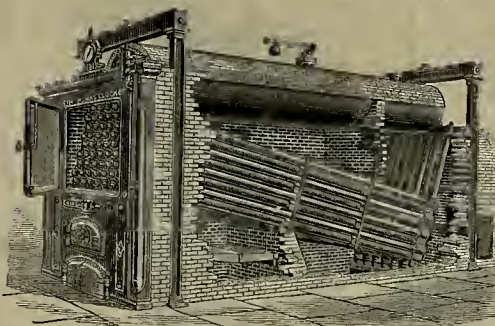
HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

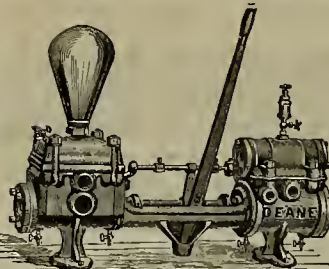
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers, Tustin Ore Pulverizers.



DEANE STEAM PUMP.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

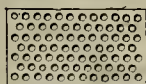
ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 3 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

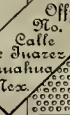
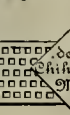
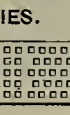
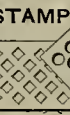
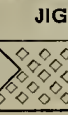
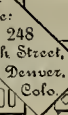
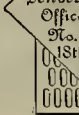
NEW YORK OFFICE,

ROOM 43,

NO. 2 WALL ST.

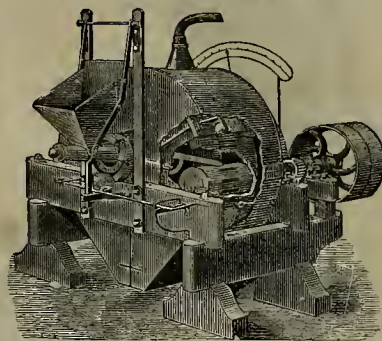
PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.



Tustin's Pulverizer WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

.....MANUFACTURER OF.....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

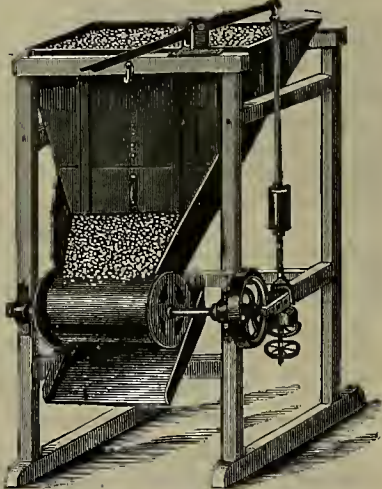
SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, SAN FRANCISCO, CAL.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

For Best Slide Valve Engine

and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street,

SAN FRANCISCO.

AUTOMATIC

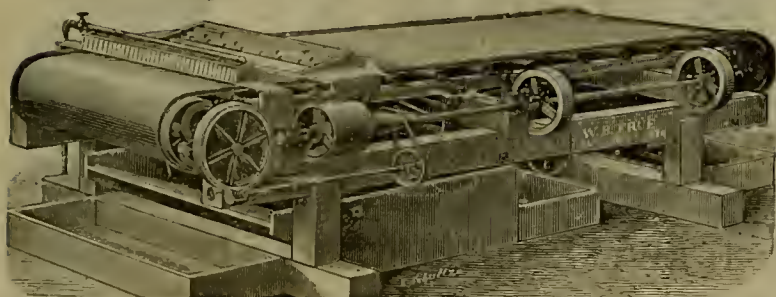
ENGINES

A Specialty.



PATENTS. Thousands of Inventors throughout the Pacific Coast can and will willingly attest to the promptness, reliability and success of Dowsy & Co's U. S. and Foreign Patent Agency. No. 252 Market St. Elevator, 12 Front St., S. F.

\$1,000 CHALLENGE!



PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS!
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

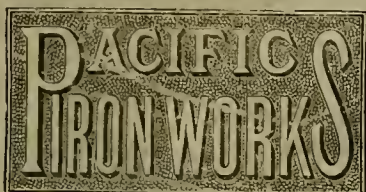
N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF
MINING MACHINERY.

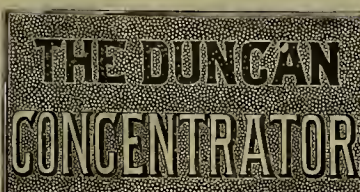
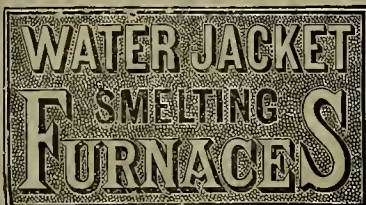
San Francisco: 127 1/2 St. Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

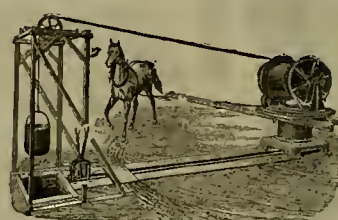
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



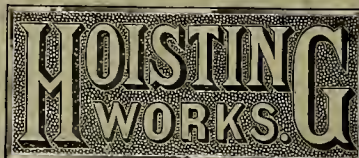
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



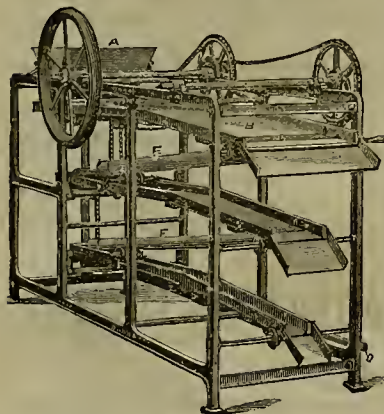
Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass; may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. TATUM & BOWEN, San Francisco and Portland, Agents.

Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.] The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

—BUILDERS OF—

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS.

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AG'TS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET. SAN FRANCISCO.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tebama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Milk Driers, Furnaces, Churns, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Out and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (line). Orders Promptly Executed.



INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Brick for Glover Tower.

INVENTORS, TAKE NOTICE!

L. PETERSON, MODEL MAKER,

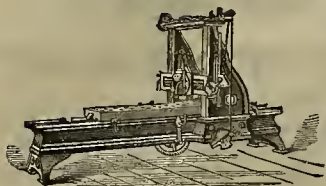
255 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of models, Tin, Copper, and Brasswork.

DEWEY & CO. { 252 MARKET ST. S. F. } PATENT AGENTS.
Elevator, 12 Front St.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



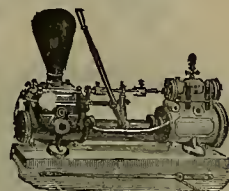
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

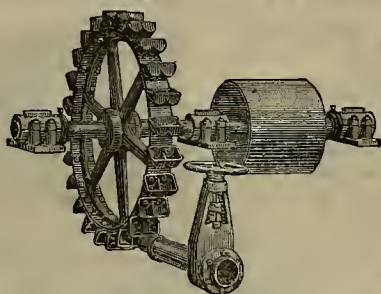
Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery ENGINES and BOILERS.

SOLE AGENTS FOR

Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.

SEND FOR CIRCULARS.



PELTON
HURDY-GURDY WATER WHEEL.

SOLE AGENTS FOR

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



WIRE FENCING Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Barbed Wire.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve, Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heime" Patent Safety Boiler (Water Tube),

50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEY—Fifty per cent lighter and 25 per cent cheaper than cast-

iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

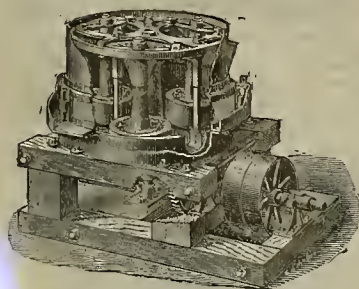
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company, 60-stamp Mill for Quartz Mount

Mining Company.

Send for Circular and Price Lists.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

MANUFACTURER OF

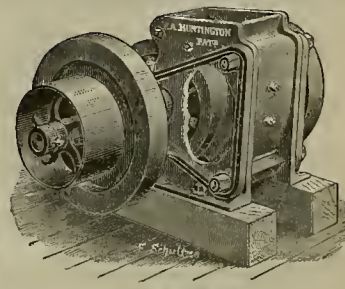
Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 5, 1885.

VOLUME LI
Number 23.

The Late Peter Donahue.

The engraving on this page is a very good likeness of the late Peter Donahue, who died in this city last week, and who was one of those sterling and progressive characters of which California has furnished so many examples. From a plain mechanic, working in a shop, he grew by his own exertions to a millionaire, in control of great undertakings. He was one of those to whom San Francisco owes much. Having made his fortune here he continued his investments or undertakings in the States, most of them tending largely towards our industrial advancement.

In early days a miner, he shortly afterwards turned his attention to mechanical pursuits, building saw-mills, working at the blacksmith's forge, making boilers, etc. He established the first iron foundry in this city, and made the first casting ever molded in California. In those pioneer days he established the shop which afterwards grew into the great Union Iron Works, now the largest establishment on the coast. When these works were removed from the old place, on the corner of Mission, First and Fremont streets, not very long since, he commenced the construction on the old site, of what will be one of the finest buildings in this city.

The originator of the present system of supplying San Francisco with gas, Mr. Donahue continued until his death his large interests in the company. He was an extensive builder of railroads, being the principal owner of the San Francisco and North Pacific, with its ferry lines. The railroad from this city to Gilroy, 80 miles, was built by him and afterward sold to the Southern Pacific. He was the originator, too, of the first street railroad in this city. On page 375 of this number of the PRESS is a more extended sketch of Mr. Donahue's life. He was a director of the Hibernia Bank, and had been for over 20 years. He was also a director of the National Gold Bank, and of the State Investment and Insurance Co. Mr. Donahue was President of the Society of California Pioneers in 1872-73, being up to that time the youngest President the society ever had.

Mr. Donahue carried a reputation for the strictest integrity and made many friends. His funeral was one of the largest ever seen in this city, for a private citizen. The engraving, for which we are indebted to the courtesy of the *Resources of California*, is a good representation of Mr. Donahue's countenance.

FOREIGNERS AND PLACER CLAIMS.—The Supreme Court has decided that no foreigner who has not at least declared his intention of becoming a citizen can acquire title to a placer mining claim. The decision is the result of an appeal against a decision of the Superior Court in the case of Lee Doon et al. vs. Tesh, which involved the title to the Clark & Co. placer claim in this State. William McConnell, one of the plaintiffs, is excepted from the effect of this decision, having conformed to the requirements of the law in the matter of citizenship.

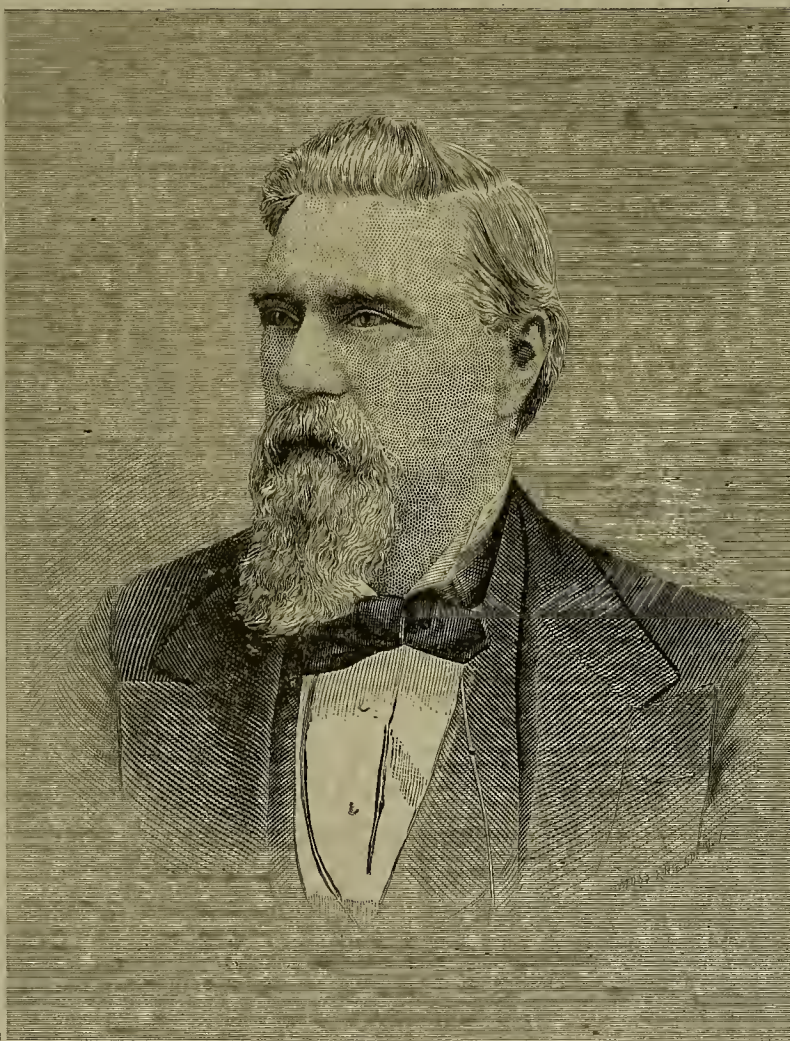
The report of the Government officer who visited Granite Creek (B. C.) mines is published. He gives a glowing account of the prospects for miners there. He saw \$400 taken out in a rocker in a single afternoon by two men. Several claims are yielding from \$250 to \$400 a day.

A College of Science and Mining for Dakota.

At the last session of the Legislative Assembly of the Territory of Dakota, provision was made for the establishment of a School of Mines for Dakota, at Rapid City—the "gates city" of the Black Hills. The object of this school is to furnish facilities for the education

the terminus for the present of the Elkhorn Valley Railway, now completed to Buffalo Gap, only 45 miles distant.

A NEW QUARTZ BATTERY.—A battery on an entirely new plan is soon to be put before the public. An eight-stamp one has already been built, tested and proved so satisfactory that the company owning the patent are now build-



THE LATE PETER DONAHUE.

of such persons as may desire to receive special instruction in chemistry, metallurgy, mineralogy, geology, mining, milling, engineering, mathematics, mechanics' drawing, the fundamental laws of the United States, and the rights and duties of citizens.

A commodious brick building for chemical and mineralogical laboratories has just been completed, at a cost of \$10,000, and will form one wing of the final structure. Instruction in this institution will be free to all citizens of the Territory, of either sex. Arrangements have been made for extensive illustrative collections of minerals and fossils.

Professor W. P. Blake, formerly of the College of California, at Oakland, has accepted the presidency of the institution, and will proceed with its organization.

Rapid City is a flourishing place, and will be

ing one of twelve stamps. The mill is, in every detail as to feed, stamps, dies, stems, shoes and tappets, the same as an ordinary straight battery, at the same time all the heavy and expensive wood-work is dispensed with, and yet the battery sets firm. As soon as the twelve-stamp one is completed we will give our readers more details concerning it. The inventor is Almarin B. Paul, who has had 36 years' practical experience in milling ores—enough, certainly, to bring forth a practical working mill.

P. W. CUNNINGHAM, of Winnemucca, has received an order from John Nelson, of Dun Glen, Nev., for 16 rockers to be used in washing gold-bearing gravel at the new placer mines recently discovered in Barber's canyon, Nev. Very good prospects are found and it is thought the gravel will pay to wash in rockers.

Timber Lands and Mines.

The recent order of the Commissioner of the General Land Office, on which we have commented, seems to have been misunderstood, according to the interpretation that official now puts upon it. He says he has transmitted to the Secretary of the Interior over 30 cases of timber trespasses, reported by special agents, against the Montana Improvement Co., and recommenced suits for the recovery from said company, jointly with the Northern Pacific Railroad Co., of \$750,000 damages to the United States. This company has a stock capital of \$2,000,000, of which the Northern Pacific Railroad is said to own a majority, and is reported to the General Land Office as one of the most expensive and dangerous depredators of public timber in the Northwest.

He denies specifically that he has taken any official action relative to the cutting of timber from mineral lands "for agricultural, mining or other domestic purposes," under the provisions of the Act of June 30, 1878, other than to submit to the Secretary for consideration certain amendments to existing rules, the chief object of which is to prevent the taking of timber in evasion of the law, for speculation and export, and says that these amendments, which are now being considered by the Secretary and himself, do not contain the asserted provision that individuals entitled to take timber must cut it themselves and cannot hire the work done or employ servants to do it. The Commissioner has made no such recommendation.

Gen. Sparks says emphatically there is no truth in the statement that there is coolness between the head of the Interior Department and himself, and that no rules, amended or otherwise, have been promulgated by him that have not been approved by the Secretary. If it is possible to prevent the wholesale cutting of timber on Government lands by corporations, it is to be hoped the officials will continue their efforts. What little a few miners or mining companies cut does not amount to much, and they should continue to be allowed to supply their wants. But when it comes to big companies cutting and selling it, they should be stopped at once.

A new money order system of Wells, Fargo & Co. has gone into effect. These orders will be issued for any amount from \$1 upwards, payable to either the bearer or order in 8000 places in the United States and Canada. Receipts will be given and money refunded should the orders be lost. The orders will be remitted as exchange upon all the large cities of the United States. The following are a few of the rates to be charged: From \$1 to \$5, 5 cents; over \$5 to \$10, 8 cents; over \$10 to \$20, 10 cents; over \$20 to \$30, 12 cents; over \$40 to \$50, 20 cents.

The Ontario Mining Company, of Utah, paid \$75,000 in dividends on the 30th ult. This is the twelfth dividend this year, an extra one having been paid in October, making \$900,000 since January 1st, equal to \$6 per share. Since incorporation there have been 144 dividends, amounting to \$6,950,000. The Ontario is the longest lived and most prosperous silver mine now being worked in this country.

The Small Hopes Mining Company of Colorado paid \$687,500 in the first nine months of the year.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos.

Mineral and Metalliferous Veins.

How Formed, How Filled, and Where Found.

EDITORS PRESS:—Most metals occur in veins associated with certain minerals. All rocks, but especially metamorphic rocks in mountain regions, are seamed and scarred in every direction, as if broken and again mended, as if wounded and again healed. All such seams and scars of whatever nature and by whatever process formed, are known by the general name of veins.

In this article, "dikes," or those kinds of fissures that were filled at the moment of formation by igneous or eruptive injections, will not be considered. True veins, he it noted, are accumulations, mostly in fissures, of certain mineral matters usually in a purer form than they existed in the rock. The accumulations have in all cases taken place slowly. Veins are of three kinds: veins of segregation, veins of infiltration and great fissure veins. Some writers claim many other kinds, but these may be regarded as intermediate varieties.

Veins of Segregation.

In these the vein matter does not differ greatly from the inclosing rock. There seems to be no distinct line of separation between the vein and inclosing rock—"no distinct wall to the vein." The reason is, apparently, that these veins are not formed by the filling of a previously existing fissure, but by the segregation or concentration of certain materials in certain spots or places and at certain lines in the rock, either when the latter was in a plastic condition from heat and water, or else by means of percolating mineral solutions after the manner that concretions of lime, clay, flint, iron-ore and geodes are formed in strata.

Veins of Infiltration.

Metamorphic rocks have, probably in all cases, been subjected to very powerful horizontal pressure. And more—the wide folds into which such rocks are thus thrown and the great fissures thus produced, the strata are often broken into many sections by means of the great squeezing and crushing. The small fissures thus produced are mostly filled by "lateral secretions" from the walls, or else by percolating waters holding in solution the more soluble matters contained in the rocks. The process is similar to the filling of a cavity left by some organism (fossil casts) and still more to the filling of air-blebs in traps and lavas, and the formation of agates, carnelian, zircon, zeolites and amygdulæ of various kinds. In veins of infiltration, therefore, a beautiful ribbon structure is often produced by the successive deposition of various-colored materials on the walls of the fissure. Veins of this kind also, since they are the filling of previously-existing fissures, have well-defined walls. The filling consists most commonly of silica and calcite, both of which are often the matrix or gangue, containing metallic ores. Veins of this kind, therefore, often make good paying mines, but not so good as great fissure veins. The latter we will now consider.

Great Fissure Veins.

These are fillings of the great fissure, produced by extensive movements of the earth's crust. The most obvious characteristics of the veins of this class are their size, their continuity for great distances and to great depths, and their occurrence in parallel systems. As the vein is a filling of a previously existing fissure, the distinction between the vein and wall-rock is usually well marked. The contents of fissure veins are also far more varied than those of other kinds.

Metalliferous Fissures.

All the kinds of veins mentioned above may contain metals, but the segregative veins are usually too irregular and uncertain, and the infiltrative veins too small and limited to be greatly profitable. True, profitable metalliferous veins are almost always great fissure veins. The contents of such are of two general kinds, viz., vein-stuffs and ores. The principal vein-stuffs are quartz, calc-spar, carbonate of iron, heavy spar, fluor-spar, and carbonate of baryta. But by far the most common of these is quartz, and next is calc-spar. Often, however, the vein-stuff is an aggregate of minerals forming a true rock. Most of the vein consists usually of vein-stuff. The ore exists in comparatively small quantities, sometimes forming a central rib or sheet, sometimes in irregular, isolated masses, and again in small strings, or seams or grains, scattered irregularly through the vein-stuff, and sometimes extending a little way into the wall rock. The "chemical forms" in which metals occur are very various; sometimes as pure metal (as always the case of gold and platinum, and sometimes in the case of silver and copper), but more commonly in the form of metallic sulphides, metallic oxides and metallic carbonates. Of these the sulphides are by far the most common, and the latter seems to have been the original form or state, from which the former subsequently changed, "evidently an evolution of chemical affinities in accordance with immutable, natural laws." These multifarious changes, during long periods of time, have cul-

minated in the production, in available forms, of all the various metals and minerals that are now utilized by our race. But regardless of all that exists and of all the long time necessary for its production, it is not the easiest job in the world for a prospector to find a good mine. It is seldom accomplished, as you all know, even by the luckiest and pluckiest of Nature's noblemen. Your pardon for this digression, and I will resume my subject.

Irregularities of Fissure Veins.

Although more regular than other kinds, yet fissure veins are often quite irregular, sometimes branching, sometimes narrowing or pinching out (walls almost in contact), again widening and dividing in such a manner that it takes a mining genius to follow them. These irregularities are probably the result of movements after the fissure was formed, or even after it was filled.

How Formed.

The cause of great fissures is evidently always movements, and usually foldings or wrinklins of the earth's crust, produced evidently by the contraction of its interior. Accepting the "nebula hypothesis" of the globe, it is logical also, to infer "a secular cooling," whereby the contraction of the interior causes fissures to be broken, through some portions of its crust. This usually occurs in mountain regions in which, also, most great fissures are found. The facts being thus, we will say no more on that subject, but consider how these veins are filled.

How Filled.

The contents of mineral and metallic veins were deposited from hot alkaline solutions, or hot mineral waters, coming up through fissures. The vein-stuffs, especially quartz, and the metallic ores, especially the sulphides, were thus deposited. They were deposited from solutions, as the beautiful crystals so often found in veins could be formed in no other way. The quartz of veins is always of the variety having a specific gravity of 2.6, and therefore was produced by slow deposit from solution. The fluid cavities, so often found in quartz vein stuff, are a proof of formation by humid process. The solutions were hot: fissures extending deep into the interior of the earth could hardly remain empty of water, and from their great depth the contained waters must be hot. Now, the solvent power of water, when heated and under pressure is well known. Scarcely any substance wholly resists it. The invariable association of metalliferous veins with metamorphic rocks demonstrates the agency of heat. The solutions were alkaline. Alkaline carbonates and sulphides are the only natural solvents of quartz, the most abundant of vein-stuffs. Now there seems no reason to doubt that in most cases at least, and probably all cases, that vein-stuffs, or the contents of veins were deposited from hot alkaline solutions. And further, it is evident, from their intimate association with the vein stuffs, that the metallic ores were deposited from the same solution. There seems little reason to doubt, then, that all mineral and metalliferous veins are fillings of previously existing fissures, and that their contents have been deposited from hot alkaline waters, holding the various mineral substances in solution. This conclusion, endorsed by various scientists, is, also, strongly supported by the phenomena of hot alkaline springs in various portions of the world, as well as the additional proof shown by the Geysers, in the National Yellowstone Park and elsewhere on the globe. In short, to be brief, once conceive clearly that mineral veins are simply filled water-ways, and all these complex phenomena solve themselves.

Where Found.

Usually metalliferous veins are far more numerous in mountain regions, and especially in metamorphic rocks. This is owing to the fact that at such places and in such rocks their existence is made possible. But to be brief and definite on this subject, as my space is limited, I will conclude this article with the remark that metalliferous veins—good, bad or indifferent, are found only where they exist, and from the experience of most prospectors, it is claimed that the "good ones" are even hard to find where they do exist. Probably they are very near the truth.

CHAS. F. BLACKBURN.
Blackburn Mining Dist., Idaho Territory,
Nov. 24, 1885.

Fine Gold.

EDITORS PRESS:—I have lately noted a fact regarding the gold coming from a number of quartz mines in the immediate vicinity of this town that may interest your readers. I refer to the unusually high fineness or value per ounce of the gold—higher, I believe, than that of any other gold mines in this State, and as far as I know, of any quartz gold mines in any country. I will give but two instances. The fineness of the gold from the San Giuseppe mine is .983, equal to \$20.32 per ounce. That from the Neale mine is .950, equal to \$19.64 per ounce. When we consider that the value of chemically pure gold (1000 fine) is \$20.6718 per ounce, the close approach to absolute purity of the gold from the mines is worthy of note.

I do not refer to river gold or placer gold, but to gold found *in situ* in quartz, and I do not believe that the mines of any country—domes-

tic or foreign, can show equal fineness—certainly not equal to that of the first named mine—the San Giuseppe.

If such do exist and they are known to miners in California or elsewhere, it would be interesting to learn their names and localities, and I trust they will send the figures to your paper for publication.

LOUIS BLANDING.
Sonora, Tuolumne Co.

Experiments in Roasting and Amalgamation.

(Continued from our issue of November 21st.)

Summary of Results.

These experiments present many interesting features. They show: First.—That a mere oxidizing-roasting leaves a large percentage of the magnetite intact, and that a continuation of the process is of very little benefit after the pyrites have been roasted dead. Some aluminium sulphate, resulting from decomposition of the garnet, remains undecomposed, a salt that would not interfere with any treatment to which the ore may be subjected. Second.—A direct chloridizing-roasting removes the magnetite almost completely, and very rapidly. Third.—If the chloridizing-roasting is continued beyond a certain time, magnetite is reformed, cuprous chloride becoming oxidized by withdrawing oxygen from ferric oxide. This is very evident in charge No. 5.

Loss of Gold in Chloridizing-Roasting.

It remains, however, to record the most remarkable results of these experiments. In determining the gold value of the ore, before and after chloridizing-roasting, I found an enormous loss of this metal by volatilization. These results were so entirely unexpected that I first concluded an error had been made in the assays. Such was not the case, and in repeating the experiments, by roasting in a muffle, the facts were established beyond any doubt. In the latter case, well mixed samples were carefully assayed, and then one assay-ton mixed with three per cent salt, and roasted for one hour.

Charges Roasted in the Reverberatory Furnace.

No. of Charge.	Gold Value, Before Roasting.	Gold Value, After Chloridizing-Roasting.	Gold Loss, In per cent.
No. 2.	0.916 oz. p. t.	0.426 oz. p. t.	53.5
No. 4.	0.262 "	0.150 "	42.8
No. 5.	0.538 "	0.075 "	86.1
No. 6.	0.650 "	0.075 "	88.5

Charges Roasted in the Muffle.

No.	Gold Value, Before Roasting.	Gold Value, After Roasting.	Gold Loss, In per cent.
No. 1.	0.700 "	0.050 "	93.0
No. 2.	0.525 "	0.075 "	85.7
No. 3.	0.650 "	0.065 "	90.0

There is no doubt that the volatilization of the gold takes place with that of the cuprous chloride. It increased with the quantity of cuprous chloride formed, and then volatilized and decomposed. It is also a function of temperature.

Finally, I am convinced that the magnetite, as a contact reagent, plays an important part in causing this loss, a fact that invites further investigation. I have no doubt that instantaneous roasting in a Stetefeldt furnace would reduce the loss to a minimum, but even here it might be very perceptible. That the condensation of volatilized precious metals is a most difficult task, is well known to metallurgists. Otherwise we would have here a most simple and perfect method to extract not only gold from the Las Minas ores, but gain considerable copper besides. I abandoned chloridizing-roasting in subsequent experiments altogether.

B. Amalgamating Experiments.

Taking into consideration the low grade of the Las Minas gold ores, the high price of salt and chemicals in Mexico, and the local resources and facilities of the country generally, I became convinced that extraction of the gold by amalgamation, after previous roasting, would be the only economical process. With this object in view, the following experiments were undertaken. In experimenting with such gold ores there are only two ways possible: Either to work very large quantities, or to make tests on such a small scale that the results possess analytical exactness. The latter course was the only one that could be pursued. These experiments being somewhat novel and surprising in their results, it will be necessary to enter into details. The apparatus used consisted of one iron mortar, five inches in diameter, with a rather flat bottom (F. M.); one iron mortar, five inches in diameter, with a concave bottom (C. M.); and one wedgewood mortar, with concave bottom (W. M.). In grinding the charges, the iron mortar with flat bottom proved to give superior results as compared with the iron mortar with concave bottom—its grinding effect was the best. The iron mortars were used to imitate the work of an iron pan; the wedgewood mortar that of an arastra. I know from experience that results so obtained can be realized in working on a large scale. The charges consisted of five assay-tons of roasted ore (1 A. T.—29.166 gm.). This was ground, or mixed with water and quicksilver, the latter being added either immediately, or after the ore had been treated with other

reagents (10 gm. quicksilver to a charge of five A. T. of ore).

The charges were amalgamated either at ordinary temperature or with heating. The latter method had no beneficial effect.

After the amalgamation had been completed the charge was thinned with water, and gently stirred, until the quicksilver was united. For separating the tailings from the quicksilver an enameled iron pan (8 in. diam., on the top, 6½ in. diam. at the bottom, and 1½ in. high,) was used. With a little skill and practice, if necessary, with the aid of potassium cyanide, the quicksilver is easily gathered in one mass, and transferred to a beaker-glass. It is now dissolved in nitric acid. Here the following phenomena are observed. In case only a trace of copper, and very little silver, has been amalgamated, the gold remains at the end of the operation as a spongy globule that can be easily transferred to a drying-cup. The gold so obtained is, however, not pure. It may contain some silver, and enclose particles of tailings. The gold must be packed into a piece of lead-foil, inactivated with silver, cupelled, and the alloy redissolved in the customary way. If considerable copper has been taken up in amalgamation, the gold appears as an exceedingly fine powder—after solution of the quicksilver. It is necessary to filter the solution, collect the gold on the filter, incinerate the latter, and cupel the ashes as above. The presence of a large amount of silver produces a similar but less pronounced effect, and also in this case filtering must take place. It will be seen that these tests must give a positive and very accurate result. That in every instance the gold value of the charges was ascertained in the most careful manner, and all reagents tested for their purity, is hardly necessary to mention. In all 51 charges were amalgamated, and those giving the most interesting results are recorded below.

No. 1.—Roasted San Anselmo ore, from charge No. 1 of "roasting experiments." It contained 39.6 per cent magnetite. No copper sulphate present. The charge had been roasted for 16½ hours. Time of amalgamation three hours, with quicksilver added at once. Time of settling one-half hour. (Time for settling the same in all subsequent experiments.) Value of ore 0.916 ounces gold per ton. Extracted 0.195 ounces gold per ton, or 21.2 per cent.

No. 2.—San Anselmo ore, from charge No. 5, roasted chloridizing. It contained 5.6 per cent magnetite, and a very slight amount of cuprous chloride. Quicksilver added at once. Time of amalgamation one-half hour. Value of ore 0.075 ounces gold per ton. Extracted 0.060 ounces gold per ton, or 80 per cent.

No. 3.—San Anselmo ore, from charge No. 1, sifted through a No. 80 screen. It contained 26.6 per cent magnetite. No copper sulphate. Grinding one hour; then quicksilver added. Time of amalgamation 2½ hours. Value of ore 0.450 ounces gold per ton. Extracted 0.125 ounces gold per ton, or 27.7 per cent.

No. 4.—The same ore as in No. 3. Grinding one hour; then 1.5 gm. mercuric chloride added, and a few drops hydrochloric acid (Designolle process) and worked for three-quarters of an hour; then quicksilver added, and amalgamated three-quarters of an hour longer. Value of ore 0.450 ounces gold per ton. Extracted 0.345 ounces gold per ton, or 76.6 per cent. In repeating these charges (Nos. 3 and 4), but without previous grinding, adding quicksilver in one case, and mercuric chloride in the other at once, and amalgamating for 2½ hours ordinary amalgamation extracted 31.1 per cent, and the Designolle process 82.2 per cent of the gold. Further experiments with the Designolle process, in which the mercuric chloride was reduced to 0.5 gm. per charge of 5 A. T., gave less favorable results, extracting only from 51 to 56 per cent of the gold. All the above charges were worked in iron mortars.

No. 5.—Blanket-washings, from San Anselmo ore, roasted oxidizing for 4 hours contained 19.5 per cent magnetite. Copper sulphate completely decomposed. (These blanket-washings were obtained in crushing the 70-ton lot of San Anselmo ore for the purpose of sampling it.) In order to imitate the working of a pan by first grinding without quicksilver, and then amalgamating with raised muller, the ore was ground in the iron mortars for 1½ hour; then quicksilver added, and for one hour amalgamated by stirring with wooden pestles. Value of ore 1.48 ounces gold per ton. Extracted in F. M. 0.82 per ton, or 55.4 per cent. Extracted in C. M. 0.75 per ton, or 50.6 per cent. In the following charges the same ore was ground for three-quarters of an hour, and then quicksilver added, and amalgamated with iron pestles, under grinding for 1½ hours, with these results: Extracted in F. M. 1.40 ounces gold per ton, or 94.6 per cent. Extracted in C. M. 1.09 ounces gold per ton, or 73.3 per cent. Finally, the quicksilver was added at once, and the charges amalgamated for 2½ hours with grinding. Extracted in F. M. 1.42 gold per ton, or 95.9 per cent. Extracted in C. M. 1.23 ounces in gold per ton, or 83.1 per cent.

No. 6.—San Anselmo ore, roasted oxidizing for 4 hours. The raw ore contained 67 per cent magnetite and the roasted ore 31 per cent immediately after discharging no copper sulphate was present, but after cooling it appeared to some extent, undoubtedly in consequence of the presence of aluminium sulphate. (Quicksilver being added to the charge, the amalgamation was continued for 2½ hours. Value of ore 0.800 ounces gold per ton. Extracted in F. M. 0.355 ounces gold, or 44.3 per cent. Extracted in C. M. 0.340 ounces gold, or 42.5 per cent.

(To be Continued.)

SCIENTIFIC PROGRESS.

Relations of Science to the Public Weal.

We give below several interesting extracts from the address of the President of the British Association of Science, delivered at the re-opening of that association at its recent meeting in Montreal. The relations of science to the public weal as well as to literature and art were largely considered. This subject is an important one and the consideration of it is fast engaging the earnest attention of people of all classes in every civilized community. The complimentary reference to what our own Government is doing in this direction is worthy of special notice. We copy as follows:

The importance of promoting science as a duty of statecraft was well enough known to the ancients, especially to the Greeks and Arabs, but it ceased to be recognized in the revival of letters in the fifteenth and sixteenth centuries. Germany and France, which are now in such active competition in promoting science, have only publicly acknowledged its national importance in recent times.

More remarkable is it to see a young nation like the United States reserving 150,000,000 acres of national lands for the promotion of scientific education. In some respects this young country is in advance of all European nations in joining science to its administrative offices. Its scientific publications, like the great paleontological work embodying the researches of Professor Marsh and his associates in this geological survey, are an example to other Governments. The Minister of Agriculture is surrounded with a staff of botanists and chemists. The Home Secretary is aided by a special scientific commission to investigate the habits, migrations, and food of fishes, and the latter has at its disposal two specially constructed steamers of large tonnage.

The Fishing Interests of England and America.

The United States and Great Britain promote fisheries on distinct systems. In this country we are perpetually issuing expensive commissions to visit the coasts in order to ascertain the experiences of fishermen. I have acted as chairman of one of these royal commissions, and found that the fishermen, having only a knowledge of a small area, gave the most contradictory and unsatisfactory evidence. In America the questions are put to nature, and not to fishermen. Exact and searching investigation is made into the life history of the fishes, into the temperatures of the sea in which they live and spawn, into the nature of their food, and into the habits of their natural enemies. For this purpose the Government gives the co-operation of the Navy, and provides the commission with a special corps of skilled naturalists, some of whom go out with the steamships, and others work in the biological laboratories at Wood's Hole, Massachusetts, or at Washington. The different universities send their best naturalists to aid in these investigations. The annual cost of the Federal Commission is about \$200,000, while the separate States spend about \$100,000 in local efforts. The practical results flowing from these scientific investigations have been important. The inland waters and rivers have been stocked with fish of the best and most suitable kinds. Even the great ocean which washes the coasts of the United States is beginning to be effected by the knowledge thus acquired, and a sensible result is already produced upon the most important of its fisheries. The United Kingdom largely depends upon its fisheries, but as yet our Government has scarcely realized the value of such scientific investigations as those pursued with success by the United States.

Less systematically, but with great benefit to science, our own Government has used the surveying expeditions, and sometimes has equipped special expeditions to promote natural history and solar physics. The Department of Science and Art is doing excellent work in diffusing a taste for elementary science among the working classes. There are now about 78,000 persons who annually come under the influence of its scientific classes. The working classes are being roused from their indifference. They show this by their election of scientific men as candidates at the next election. Among these are Professors Stuart, Roscoe, Maskelyne and Rucker.

Value of Science to Commerce—A Lesson for America.

Passing from learned or public professions to commerce, how is it that in our great commercial centers, foreigners—German, Swiss, Dutch, and even Greeks—push aside our English youth and take the places of profit which belong to them by national inheritance? How is it that in our colonies, like those in South Africa, German enterprise is pushing aside English incapacity? How is it that we find whole branches of manufactures, when they depend on scientific knowledge, passing away from this country, in which they originated, in order to engraft themselves abroad, although their decaying roots remain at home?

The answer to these questions is that our systems of education are still too narrow for the increasing struggle of life. The State has al-

ways felt bound to alter and improve universities, even when their endowments are so large as to render it unnecessary to support them by public funds. When universities are poor, Parliament gives aid to them from imperial taxation.

The speaker then went on to show that those countries which were most liberal in sustaining scientific and technical schools were the ones which were taking the lead in all commercial and industrial enterprises.

We must seek by scientific investigation for ways and means to compel nature to reveal her secrets. It is only carrying before us a golden branch plucked from the trees of science that we can hope to excel or even advance in the industrial arts and invention. That country which is the most liberal in its support of institutions of scientific and technical instruction, is the one which will outstrip all others in the modern race of progress.

What American Paleontology Has Revealed.

Prof. Cope has the following on this subject: It is one of the peculiar advantages of the North American continent to the scientist that the geological structures of its great interior is comparatively simple, so that its history can be easily read. It follows that the history of the succession of life is recorded with the same regularity, and may be read by those who will bestow the necessary labor upon it. Those who have, during the last ten years, devoted themselves to this study, have been rewarded by the discovery of the course of development of many lines of animals, so that it is now possible to show the kind of changes in structure which have resulted in the species of animals with which we are familiar as living on the surfaces of the earth at the present time. Not that this continent has given us the percentage of all forms of animal life, or all forms of animals with skeletons, or vertebrates, but it has given us many of them. To take the vertebrates, we have obtained the long-since extinct ancestor of the very lowest vertebrates. Then we have discovered this ancestor of the true fishes. We have the ancestor of all the reptiles, of the birds and of the mammals. If we consider the mammals, or milk-givers, separately, we have traced up a great many lines to their points of departure from very primitive things. Thus we have obtained the genealogical trees of the deer, the camels, the musk, the horse, the tapir and the rhinoceros, of the cats and dogs, of the lemurs and monkeys, and have important evidence as to the origin of man. We have the primitive mammals from which all these kinds that I have mentioned drew their descent, and from which, no doubt, many other lines were derived which we have not yet discovered in North America. Such are the lines of the elephants, the hyenas, the bears, the hogs and the oxen. The ancestors of this strange, pouch-bearing marsupialia, have been found in part. These creatures, now confined (except the opossums) to Australia and its adjacent islands, were at an early period widely distributed over the earth. Some of these are found in the fossiliferous deposits of our plains and Rocky mountains.

ANIMAL AND VEGETABLE FATS.—Dr. Thomas Taylor, a microscopist in the Department of Agriculture at Washington, has been, of late, doing some most excellent work with the microscope. He recently read a paper on the crystallization of butter and fats before the American Microscopical Society, at its meeting in Cleveland, Ohio. A committee of that society was appointed to examine his methods for distinguishing animal and vegetable fats, and, after a four hours' investigation, it reported that every statement he had made was true. His experiments have demonstrated that each kind of vegetable and animal fat has a distinct, typical crystal. He says that the beauty of fat crystals, as seen under polarized light and selenite plate, is beyond the power of the painter to picture. He will soon publish in the *Boston Journal of Commerce* an illustrative article on the subject.

SAND DUNES.—The great sand dunes along the banks of many rivers, and particularly along the shores at the southern end of Lake Michigan, are due to the presence of the *Amphiphila arenaria*, or sand-gathering grass, which possesses a remarkable power of drawing up moisture. Indeed, it may almost be called a miniature water pump, for it is able to keep the earth wet for several inches around it. This wet earth catches and holds the drifting sand. The process goes on, the grass growing and the sand collecting, until a great sand dune is the result.

THE SOURCE OF CARBON IN CROPS.—In a memoir by Sir J. E. Laws it is maintained that while the atmosphere is the main, if not the exclusive source of carbon for crops, the soil is the principal, if not the only, source of their nitrogen.

BONES IN THE SEA.—Bones have been proven to quickly dissolve in sea water. They are consequently seldom obtained during ocean dredgings, although teeth, which resist the action of the water indefinitely, are often brought up.

MECHANICAL PROGRESS.

Steel and Steel Castings.

The raw material or the manufacture of wrought-iron and steel, and also for making castings of all kinds, is obtained by the reduction of iron ores in the blast furnaces, and is handled under the name of pig-iron, which varies greatly in chemical composition, according to the purpose for which it is intended. Wrought-iron is the refined iron from the pig-iron that does not occur in a fluid condition. Steel is the refined metal obtained in a liquid condition and can be cast in molds, and has one advantage over wrought-iron by containing a very small amount of oxide of iron and slag. The microscope shows these two deteriorating impurities in large proportions, forming a mechanical mixture with the refined iron. Malleable iron is the same inevitable pig of the required chemical composition which is first cast in molds and the castings heated in an oxidizing material that eliminates the excess of carbon that is always found in pig-iron and renders it malleable. It is a matter of controversy whether or not steel was known to the ancients; in our own period it dates back only a hundred years, and Sheffield, Eng., the home of tool-steel, enjoys the distinction of location.

The manufacturer of good crucible steel, although largely dependent on manipulation, is due to the material used in it; in other words, good crucible steel cannot be made from inferior material. For this best tool-steel the best material is required, and so far none has been found to approach the celebrated brands of Swedish ores for this purpose. By far the greater part of the cost entering any tool is what is paid for labor, and in view of the many mishaps likely to occur, even under the most favorable conditions the best steel should be used, as it is the most economical in the end, notwithstanding a comparatively slight advance in its cost.

Manufacture of Steel Castings.

At the recent meeting of the American Institute of Mining Engineers, at Chattanooga, Tenn., Mr. Pedro G. Salom, of Tburlow, Pa., read some notes on the manufacture of steel castings, stating some of the difficulties encountered in the work. Although castings were made of steel ten years ago, there are only six establishments now in the United States engaged in their manufacture, and these are probably not 10,000 tons produced each year.

Comparing the three processes, the crucible, the Bessemer and the open hearth, he declared the first could never be successful except for making hard and brittle castings, the result being full of blow-holes or the fluid metal being too pasty to run into the molds. By increasing silicon to from one-half to one per cent, a perfectly solid casting soft enough to machine well can be obtained; but it has lost all ductility, though with a tensile strength of 50,000 pounds and not as brittle as pig metal.

Bessemer castings are less homogeneous and higher in carbon than those produced from open hearth steel. Some very solid cranks of Bessemer steel, though perfect in appearance, all broke in half when an attempt was made to shrink them upon the shafts. But open-hearth cranks made at Chester were easily shrunk, and are now in excellent condition after four years' use. Mr. Salom predicts, however, that all castings required for this and similar purposes will eventually be made of Bessemer steel, with improvements in the present mode of manufacture. An exceedingly interesting discovery announced by Mr. Salom is that, other things equal, each 100th per cent of carbon added to the steel increases the tensile strength of the castings by, approximately, 1000 pounds.

Alloys of Iron.

The alloys that can be formed with iron are numerous. Silicon, sulphur, and phosphorus alloys with it in any proportion; tin, zinc and carbon in limited quantities, and silver and lead will scarcely alloy at all. In the chemical properties and combinations, much depends on the process of manufacture. The external and physical disturbances brought about by the rolling, hammering, hardening and annealing under various temperatures and conditions, not only give a variety of chemical compounds, but a material that must differ wonderfully in its molecular structure.

The effects of carbon, a very simple element, reverts entirely on its treatment and chemical condition when it is to combine with iron to form steel. It has at least two distinct forms in its mechanical mixture with refined iron. How many changes it assumes in its chemical condition is very doubtful. In its combined state it is well known to exist in two distinct forms, one a hardening condition and the other a cementing effect. In its cementing state it is entirely dissolved in the metal, but when heated to a red heat and rapidly cooled in water, a portion of the carbon in its cementing state is converted into its hardening form. Simply hammering cold has the same effect to some extent. In the process of annealing the carbon has only to assume its cementing influence. At any rate, the amount of total carbon has but little to do with its physical influence in the behavior of steel.

MATERIALS FOR COLUMNS.—From experiments performed by Prof. Bauschinger, of Munich, it

was found that of all the materials used in columns for supporting portions of buildings, cast-iron and cement concrete best endured the test of great heat, as in fires and sudden cooling with water. Wrought-iron columns failed much more quickly. Brick pillars showed great resistance, but granite, limestones, and sandstone were not fireproof.

Notes on Cast-Iron.

Cast-iron is stronger in compression than wrought-iron, but much weaker in tension. Not so safe as wrought-iron when subjected to impact or suddenly applied loads.

If thickness of different parts varies much the castings will be strained in cooling. All edges should be well rounded and hollows filleted. Expands at moment of solidification in casting, but contracts in cooling. Contraction varies with size and thickness of casting and quality of metal. One-eighth inch per square foot is generally allowed in small patterns for shrinkage.

Chilled cast-iron is ordinary cast-iron rapidly cooled during solidification, by using a solid cast iron mold protected by a wash of loam, causing a chemical combination of the molten iron and carbon. Very hard. Fracture, silvery. Direction of crystallization strongly marked.

Malleable cast-iron is made by heating ordinary castings from two to 40 hours, according to size, in contact with oxides of iron or powdered red hematite, causing partial conversion into wrought-iron by abstraction of carbon.

Toughened cast-iron.—Toughened cast-iron is produced by adding to the cast-iron, and melting amongst it, from one-fourth to one-seventh of its weight of wrought-iron scrap, which removes some of the carbon from this cast-iron and causes an approximation to steel.

Fah.
Melting point of cast-iron 2750°
Melting point of wrought-iron 3250°
Melting point of steel 3250°

UTILIZING THE MECHANICAL ENERGY OF NATURAL GAS.—Ever since the tapping of the first natural gas well in the Pittsburgh districts the question of how to profitably utilize these energies stored up in this fuel has been kept prominently in view. Not the least important of these was the mechanical energy—the gas issuing from some of the wells at comparatively high pressures, ranging from about 65 to 70 pounds per square inch. In some places the gas was accordingly used to drive engines, the pressure only being utilized and the heating power wasted. Where, however, the gas was carried through pipes for long distances, branch pipes running out at numerous points, the pressure was found to be so greatly reduced as to make this impossible, and as the gas, moreover, carried along and other mechanical impurities, its direct utilization in engine cylinders proved of questionable value and often resulted in the necessity for extensive repairs. Practically, therefore, this plan was of little value and but few benefits were realized from it. Notwithstanding this fact, however, it again came to the surface a short time ago and was spoken of in several papers as entirely novel and well calculated to secure exceptional advantages in point of economy and convenience. Obviously this is all wrong, and careful examination of the history of natural gas and its applications would have shown that the method never advanced much beyond the experimental stage.

JAPANESE CASTINGS.—The Japanese are known to be skilled casters of metals. In the Vienna Exhibition there was a casting representing a peacock with drooping and unspread tail, many of the feathers and their bars presenting the appearance of reality, so delicately were they produced. The Japanese employ more time and labor in perfecting metal-work than the workmen in any other country. They appear to understand the art of blending colors in metal work. While giving to metal-work the most artistic finish, they carefully avoid anything approaching glitter, considering that as beautiful effects can be worked out upon common metals as upon gold and silver. Two of the largest castings in this world are to be seen at Nara and Kamakura, Japan; the one at the latter place is 47 feet high and the other, at Nara, is 53½ feet from the base to the crown of its head. The statue at Nara was supposed to have been erected in the eighth century, but it was destroyed and recast about 700 years since. In endeavoring to recast it several mishaps occurred, and when at last success came, some few thousand tons of charcoal had been used. It is estimated that the casting weighs about 450 tons, and that the alloy is made up of iron, gold, tin and copper.—*Mechanical World.*

A GERMAN MODIFICATION of the Bessemer process is being worked out at the new steel works of the Lillshall Company, in Shropshire, of which the Earl Granville is the leading proprietor. An excellent metal is being produced, and it has been rolled into plates for Galloway-tube boiler making and into plates, angles and other engineering sections to the order of such engineering firms as Sir W. G. Armstrong, Mitchell & Co. The basic material of the Staffordshire Company is also being built into boilers by some of the Lancashire and Yorkshire engineers.

MINING SCIENTIFIC PRESS

A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 13 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos.
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 5, 1885.

TABLE OF CONTENTS.

EDITORIALS.—The Late Peter Donahue: Foreigners and Placer Claims; A New Quartz Battery; A Necessity to the Miner: Timber Lands and Mines, 369. Passing Events; New Metallurgical Apparatus; The Weight of Stamps in Quartz Batteries; A Strong Cable Combination; Feeding Ore to Rolls; A College of Science and Mining for Dakota; The November Rain, 372. Lead Smelting—No. 1; Cable Railroad Systems, 373.

ILLUSTRATIONS.—The Late Peter Donahue, 369. Rectangular Furnaces for Lead Smelting, in use at Leadville, Col., 373.

CORRESPONDENCE.—Mineral and Metalliferous Veins; Fine Gold; Experiments in Roasting and Amalgamation, 370.

SCIENTIFIC PROGRESS.—Relations of Science to the Public Weal; What American Paleontology Has Revealed; Carbon and Vegetable Fats; Sand Dunes; The Source of Carbons in the Sea, 371. MECHANICAL PROGRESS.—Steel and Steel Castings; Materials for Columns; Notes on Cast-Iron; Utilizing the Mechanical Energy of Natural Gas; Japanese Castings, 371.

USEFUL INFORMATION.—The Hook of a Chain; A New Article of Manufacture; To Remove Dry Rot; A New Repeating Rifle; Indian Secrets; Opposed to Boycotting; Antiquity of Trade-Marks; Grease Eradicator; Rat Exterminators, 375.

GOOD HEALTH.—The Pain of Being Hung; Removing Hair and Freckles by Electricity; How Can Typhoid Fever be Prevented; Filters; The Remedy for Obesity; The Time to Wear Glasses; Mouth Washes, 375.

MISCELLANEOUS.—Practical Hydraulics, 374.

Death of a Notable Pioneer, 375.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 376-77.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 380.

Business Announcements.

Mining Machinery—Tatum & Bowen, S. F.
Rock Drills—C. O. Barlow, S. F.
Gold Mines Wanted—Almarin B. Paul, S. F.
See Advertising Columns.

Passing Events.

There is little new to note in the general mining situation. The abundant rains have given water to start up the mills with water-power in several sections; in other regions the booming water courses have done more or less damage to miners' works.

It is to be noted that they will shortly start up the lixiviation process at the Lake valley mines, New Mexico, on the Russell system. The process seems to have been successful in Utah, and possibly it will bring about a revival of New Mexican interests, when at work in that Territory.

Recent advices from Alaska show that considerable prospecting for gold is going on in that remote region. If reports are to be believed, some pretty rich diggings have been found along the rivers. There is a vast amount of territory to be prospected, but there are few settlements, and means of travel are not such as to encourage any but the most adventurous to start out. Moreover, the winters are long, and there are many months when mining cannot be carried on.

A NECESSITY TO THE MINER.—An appreciative reader of the PRESS, in Trinity county, writes: "I have recently adopted quartz mining as a business, and very recently became acquainted with the MINING AND SCIENTIFIC PRESS, which I regard as a necessity to the miner and prospector."

New Metallurgical Apparatus.

Joshua E. Clayton and Simon F. Mackie, of Salt Lake City, have patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an invention, the object of which, as respects its primary features, is as follows: To effect a combination of the following known and existing metallurgical apparatus, to wit, a roasting or heating furnace of suitable construction, with a containing vessel or chamber supplied with suitable tuyeres, for the purpose of introducing into the contained mass of material air, steam, or other gases or vapors, at such pressures as will suffice to enable them to boil or be blown through said mass.

In employing this metallurgical apparatus, which they have patented, the inventors charge, through the ordinary forms of feeding gear, the pulp ore or substances to be treated into the rotating furnace, and this being revolved the ore passes down through it, and coming in contact with the flame from the fire-box or other warm gases or vapors generated, is heated or roasted to any desired extent, and in such heated condition empties from the mouth of the rotator into a receiving chamber.

When this receiving chamber (or hopper) is sufficiently full of pulp or roast, air or steam, or any desirable gas or vapor at a suitable pressure is let into the pipes, and passes into one of the cones (the receiving chamber being formed of three truncated cones), where it is slightly heated by contact with the walls, which are surrounded by hot pulp or roast, and thence through tuyeres into the chamber, huddling or boiling up through the material contained therein, until it escapes into a chamber covering the receiving chamber or hopper, whence it passes out through the rotator.

The air, steam or gas, when it leaves the chamber and enters the chamber into which the furnace discharges, has the same temperature as the hot pulp or material in it, and in its passage through the rotator imparts its heat to the cooler material which is fed into it. A discharge wheel below is put in action as soon as the chamber is full and draws off the roast or pulp from the chamber continuously, so that by regulating the feed and discharge the level of the pulp or roast is maintained at any desired height in the chamber.

Dampers admit of regulating the amount of flame which passes into the rotator, and the heat contained therein is thus controlled independent of any regulation of the fire; hence, a hot fire can be used in the fire-box solely for the purpose of heating the superheater, while none or any desired portion of this heat is allowed to pass into the rotator. The supply of air for oxidizing or roasting in the rotator, or for burning any inflammable products which may be generated in the converter, is introduced under the flame from the fire-box, through a main and pipes, and being cooler and heavier than the flame, tends to remain below it in contact with the pulp or roast in the chamber and rotator, and burn or oxidize the escaping gas or pulp. By making suitable pipe connections with the discharge pipes of the superheater they can pass through the superheater and heat either blast which is introduced into the cone, thence out through the tuyeres into the receiving chamber, or the current of air which passes through the main and discharge pipes over the mass in the chamber into the rotator, and by using one or more superheaters they can heat more than one of these blasts or currents.

Lastly, if they choose, the inventors can use certain pipes connected with the tuyeres to introduce into the chamber or rotator, gases other than air; or by using more than one of the pipes and employing one to introduce one gas or vapor, while the other introduces a different gas or vapor, they can blow into the chamber any desired mixture of gases or vapors.

The skilled metallurgist would see that such a form of apparatus would be advantageously used for a great variety of metallurgical operations not necessary to mention here: hence, it will be apparent that the converter may in most cases, not only suffice to accomplish a desired chemical reaction, but will also prove a generator of heat, which could be utilized in the rotator. Of course, modifications of the mechanism can be made. For example: the furnace, instead of being a rotator, as described, might be a stack roasting-furnace, like the Stetefeldt or Gerstenhoffer types, or ordinary rever-

beratory roasting or heating furnaces or an ordinary roasting kiln.

The Weight of Stamps in Quartz Batteries.

Of later years we see a growing tendency to increase the weight of stamps for reducing ores of gold, silver and copper. What is the weight that gives the greatest result for power exerted, is, with the mass of quartz men at this time, an unsettled question. We find some advocating stamps ranging from 750 to 1000 pounds, while others, and these are the older and more experienced quartz men, are more favorable to the lighter stamps and quicker blow, rather than the heavier, which necessitates a less drop and fewer blows per minute. In conversation a few days ago with an old Grass Valley miner, we were informed that in 1851 this same question which we now bring up was the matter of careful and expensive experiment by the Grass Valley and Nevada quartz miners, stamps being used ranging from 400 pounds each up to 1400, varying 100 pounds as the weight was advanced. After careful, practical tests, it was considered that stamps ranging between 500 and 600 pounds, according to one making 80 drops per minute, gave the best result for power exerted, and as all will, remember, for 25 years or more, 600 pounds was the weight of stamps in all first-class batteries. It is only in the past few years that there has been a tendency to increase the weight. Experienced men are of the opinion that our quartz millers are drifting into an expense in this increase of weight, that is not justified by careful investigation as to results, when power is considered. Nearly every mill nowadays has a rock breaker, which first reduces the ore to, say, three-fourths of an inch in size, and thus it is passed to the batteries. A 750 or 1000-pound stamp reduces this—there is no question about that—but the question comes, will not 500 or 600-pound stamps do the same work? Another point: the lighter the stamp the more drops can be had. Then comes the question is there not more to be gained by lighter stamps and more drops per minute? We call the attention of quartz men to the subject that there may be some expression as to what weight gives the best results for horse power. We should be glad to receive communications from millmen on this subject, as to what their experience has been.

A Strong Cable Combination.

We understand that a combination has been formed between the Hallidie and Root cable railway patents in favor of the National Cable Railway Company. This company, the headquarters of which is in New York City, will have these patents for all territory east of the Rocky mountains. These patents, over 60 in number, cover all successful devices that have been used in the construction of all the cable railways of this city, and as A. S. Hallidie and associates put in operation the first street cable railway in the world, it appears to us that it will be rather a difficult matter for any road of this character to be run without the use of the patents owned by the National Cable Railway Company and Mr. Root. The latter gentleman is a practical engineer, and, having superintended the construction of two of the best cable roads in this city—the California street and the Market street—has devised and patented many improvements in the cable railway system, so that the roads here are about as near perfection as it is possible to make them. It was only a few days ago that a party of gentlemen who were here on a visit from New York were making an examination of the Sutter Street cable road, when, after passing over the road and examining the machinery at the station, one of them exclaimed: "Why, in the name of heaven, are we so far behind in this splendid street service in New York? It is perfection, and ought to be worth millions there."

CANES made from California woods, especially of orange, lemon and manzanita, are in heavy demand in the East, and the local manufacturers are doing a very profitable business. The demand comes more generally for light walking sticks, which are sold to small dealers at from \$4 to \$6 a dozen.

THE steamship *Idaho* brought \$70,000 in gold dust from Douglas Island, Alaska, the product of the big mill.

Feeding Ore to Rolls.

A short time since we gave a description of a machine for crushing ore, consisting of cylinders or rolls which rotate toward each other, which was invented by Wm. E. Wild, of this city. Mr. Wild has now obtained another patent through the MINING AND SCIENTIFIC PRESS Patent Agency for a means of feeding ore to the cylinders and preventing waste.

In the present invention the cylinders or rolls are made in the usual way, with gears to rotate them. Around the outside of these rolls, are fitted cylindrical sheets of steel, which serve as shoes to crush the ore passing between them, their faces rotating as nearly together as may be required for the purpose. In order to feed the material to be crushed to these cylinders, a hopper is employed which is composed of two ends, properly supported from the framework of the machine so as to stand vertically at the ends of the cylinders and extend down with their concave lower edges approaching the curves of the exteriors of the cylinders where they run together. These two ends are held together by a strong transverse bar or brace, which extends between them and above the point where the rollers approach each other.

In order to prevent the material escaping between the ends of the rollers and the ends of the hopper, adjustable plates are fitted in openings which are formed on the lower parts of these ends, and these plates may be moved inward, so as to fit closely against the moving ends of the rolls near their peripheries. These plates are shaped with the edges which fit against the rolls made concave, or with curves having the same radius as that of the rolls. These plates are cored out in the center, so that only the outer edges approach the ends of the rolls, and this reduces the amount of wear to a minimum. These plates are set up from time to time, to prevent the material which is to be crushed from sifting out and escaping at the ends.

The November Rain.

The November rains of 1885 being so exceptional in amount, and therefore of great interest, we have obtained from Sergt. Gorum, of the U. S. Signal Office in S. F., a table giving the temperature and rainfall at all the Pacific Coast stations for the month. In the table the temperature is given at the nearest whole degree, and the rainfall is in inches and the nearest tenth of an inch:

Mean Temperature and Rainfall, Nov. 1885.

Station.	Mean Temperature	Rainfall.
Tatoosh Island.....	48	19.2
Olympia.....	46	10.2
Pt. Cauby.....	49	13.7
Portland.....	47	8.5
Spokane Falls.....	41	4.2
Boise City.....	46	2.1
Winnemucca.....	42	3.8
Red Bluff.....	53	17.0
Sacramento.....	54	11.3
San Francisco.....	57	11.8
San Luis Obispo.....	57	12.0
Los Angeles.....	59	5.5
San Diego.....	58	1.6
Keeler.....	52	0.6
Yuma.....	63	1.7
Salt Lake City.....	44	3.1

MINERS AND PROSPECTORS who do not care to go to the expense of purchasing air compressors and rock drills, but who wish to do rapid work, will do well to examine into the merits of the California Hand Rock Drill. The machine is light and durable, and at the same time effective. The advertisement in another column gives some particulars concerning the machine.

MEMORIAL.—We shall publish next week the memorial delivered by Rev. J. C. Eastman, on the late A. C. Knox, who was for upwards of 20 years connected with the firm of Dewey & Co., publishers of the PRESS.

THE Hecla Consolidated Mining Company of Montana paid a dividend of \$15,000 on the 1st, making \$165,000 for this year to date, or \$912,500 since the start. The stockholders appear to be satisfied.

SIX-TENTHS of the gold product is yielded along with silver, and the demonetization of the white metal would not only discourage the industry of its mining, but that of the yellow metal as well.

NEWS from the Cassiar gold fields say the hill diggings struck on Dease creek give \$14 to a pan of earth.

Lead Smelting—No. 1.

Although a very large amount of technical data on the various smelting works of the West was collected by the census experts, they were not found sufficiently complete to serve as the sole basis for a detailed description of the processes employed. At Leadville, however, where numerous smelting establishments produce annually about \$15,000,000 worth of argentiferous lead bullion, metallurgists have necessarily acquired an unusual amount of practical experience in lead smelting. A succinct account of the natural and economical conditions of smelting at this point, of the character of the plant, and of the processes employed, will be found of general interest. For this purpose recourse has been had to a report by Mr. A. Gnyard, on the lead smelting of Leadville, which is to appear in the census reports as an appendix to a monograph on the geology and mining industry of that district. An abstract of that report has been made by Mr. W. F. Hillebrand, and is supplemented by data obtained from census material by himself and Mr. S. F. Emmons, which appear in the following descriptions. An important condition in the disposition of smelting works, as well as of other reduction works, is that the force of gravity may be used as an aid in handling the material to be treated, which is usually of a bulky nature. To such a disposition the surface character of the Leadville region is admirably suited by nature.

Disposition of the Plant.

No less than sixteen smelting works have been built at Leadville in the few years that have elapsed since its mines were opened. Of these, however, a number have been closed, some temporarily, others permanently. The general plan in these works is that adopted elsewhere, and involves the occupation of two principal floors. The lower of these floors is at such a height above the adjoining valley bottom as to afford a convenient opportunity for dumping slag and other waste. On this floor the furnaces are built, and room is also commonly provided for the blower and the engine by which it is actuated. The furnaces are usually placed in a row within a single inclosure, but sometimes they have a wall intervening between them. The upper floor is on a level with the feeding-door of the furnaces, from 12 to 14 feet above the lower, and affords space for ore-bins, fluxes, mixing-beds, and the operations connected with charging the furnaces, such as crushing and sampling. When the slope of the ground is great, however, the storage bins for ore and fuel are sometimes placed at a still higher level, with passages for wagons between. One roof generally covers the whole establishment, with the exception of the offices, laboratory, and scales, which commonly occupy detached buildings.

Furnaces.

Shaft furnaces only are employed in Leadville. Of these two varieties were in use during the census year, the one presenting

circular horizontal cross-section, sometimes called the Piltz furnace, while the other is rectangular; but in 1882 the latter had entirely replaced the former. While the circular section presents advantages in the regularity of the descent of the charges, it is more expensive in construction, and the diameter of the hearth is limited by the strength of the blast; indeed, with any ordinary blowing-engine a round furnace can be successfully worked only when it is of very moderate dimensions. The rectangular or Raschette furnace, on the other hand, may be constructed with a width at the tuyeres corresponding to the strength of the blast-engines,

ity being from 15 to 40 tons in twenty-four hours.

Fig. 1, represents a rectangular furnace in elevation drawn to a scale of 6 feet to the inch, and Fig. 2, the same furnace in horizontal section at the tuyere level. Fig. 3 shows a vertical section of the same furnace on its longer diameter, and Fig. 4 a horizontal section at the charging-doors. The masonry shaft *C* rests upon a cast-iron plate *O*, supported by pillars *P*, in order that there may be no unnecessary weight on the lower portion of the furnace. The walls for some distance above and below the tuyeres are formed of sectional water-jackets *B*, con-

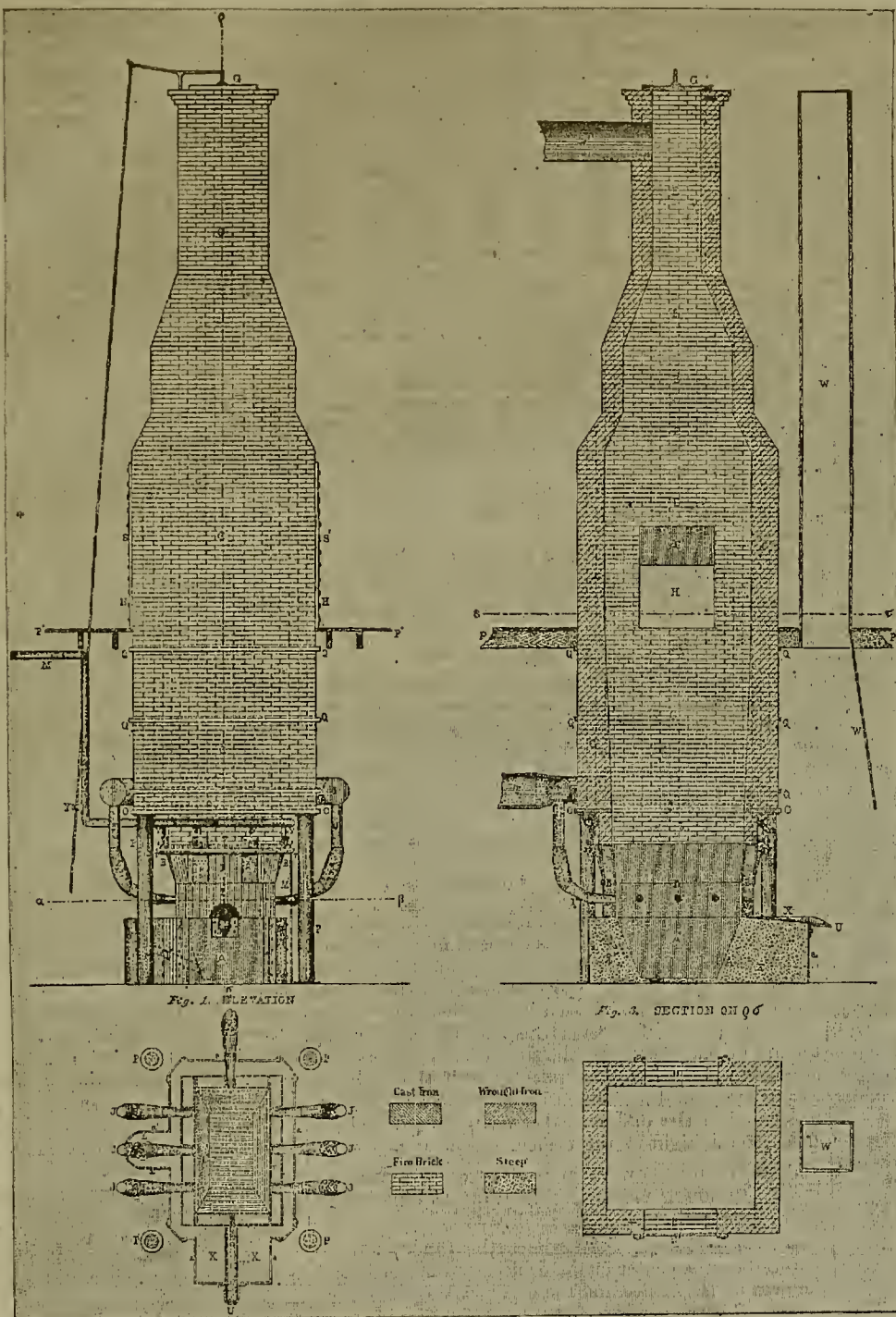
detail, according to the working of the furnace and the judgment of the manager or smelter, changes in it involving no modification of the iron plates.

The hearth plates include also the lead well *L* and the so-called "siphon tap". A similar device was long ago applied to the small charcoal-iron blast-furnaces of Silesia, to permit of the manufacture of castings without tapping the furnaces; it was not successful, however, the iron chilling too rapidly for the object in view, owing to its high melting point. This arrangement was introduced into lead smelting in Eureka, Nevada, by Mr. Albert Arents with great success, and has since been widely adopted both in this country and abroad. The lead rises through the oblique tap-hole *L* shown in Fig. 1 to the same level in the well which it occupied in the furnace, and can be bled into the molds at leisure, and without the disturbance of the furnace-working incident to the old method of tapping at long intervals.

At the end of the furnace just above the hearth an opening *V* is left in the water-jacket to facilitate the tapping of slag. This opening is filled with clay, in which a hole can be pierced when required, allowing the slag to pass through an inclined gutter *U*, shown in the illustrations, into a slag-buggy. A hood *W* is generally placed over the tapping-hole to draw off the fumes emitted during the tapping. The number of tuyeres varies with the size of the furnace, depending mainly on the length of the cross-section. A tuyere is always placed at the end of the furnace opposite the slag-tap and sometimes also above it; this last, however, is somewhat in the way, and is often omitted. A sliding valve *l* at the elbow of the nozzle admits of the inspection of the interior of the furnace. The tuyeres are connected with the main blast-pipe *I* by canvas hose *K*, the flexibility of which permits their withdrawal from the furnace when necessary. This convenient device is, of course, applicable only when cold air is supplied to the furnace, as is almost invariably the case in lead smelting. Feed-openings *H* on the upper floor are closed by sliding doors *S*. The furnace terminates upward in a short chimney *E* and may, in case of need, be run without the dust-chambers, with which it is connected by a flume *F*, indicated in the illustration.

As an example of recent construction, the furnaces in the works of Eddy, James & Grant, at Denver, may be cited. There are eight of these furnaces of the same pattern, all built in the spring of 1882. The height to the charging-door is 18 feet; the dimensions 3 feet below the charging-door are 60 by 102 inches; at the top of the jackets, 48 by 92½ inches, and at the tuyere level, 36 by 80½ inches. Each furnace has ten tuyeres, four on each side and one at each end. The capacity of each is about 30 tons. The waste gases and fumes are drawn from all these furnaces at a point below the charging-doors into large dust-chambers connecting with a single stack—a very convenient arrangement so far as the comfort of the workmen is concerned; whether it is accompanied by any ill effect upon the working of the ore is regarded as uncertain, but each furnace is provided with an independent stack, to be used in the event of its proving desirable to return to the ordinary practice.

CABLE RAILROAD SYSTEMS.—We see by the Philadelphia papers that A. H. Lighthall, of this city, is organizing there a new street cable company, to run in opposition to the Philadelphia Traction Company. According to the Philadelphia Times, Mr. Lighthall is "patentee of the San Francisco system, and owns and controls a complete system of patents for the traction of street tram-cars by means of one endless cable." Part of this is news to San Francisco people, for the gentleman is not the patentee of any system in use here. He has several patents of his own on a system of cable roads, but as far as we know they have not been practically tried. At all events the Lighthall system is not in use in this city. The Philadelphia people have already paid dearly for trying new experiments in cable roads, and it would perhaps be just as well, in case they build new ones, to adopt the system which has stood the test of experience for years. Mr. Lighthall's only connection with cable roads here, as far as we are informed, was when he was engineer for a short time on a block and half extension of the Larkin street branch of the Sutter street railroad. Some of his devices may have been applied here, but as to a complete system, it is a mistake,



RECTANGULAR FURNACES FOR LEAD SMELTING IN USE AT LEADVILLE, COL.

and the production may be increased by increasing the length of the cross-section. The horizontal elongation of the furnace has its limits, indeed, as has been proved by the history of the rectangular Raschette furnaces in Europe, but the capacity may nevertheless be increased considerably above that of a circular furnace of similar construction without deleterious effects upon the working. In lead smelting, and especially in smelting argentiferous lead ores, it is very undesirable to employ the high-pressure blasts required by a circular furnace of large diameter, since the higher temperatures which result promote the production of fumes which are only imperfectly recovered and are always difficult of treatment.

The rectangular and the round furnaces of Leadville are constructed on the same general plan so far as height, method of support, water-jackets, tuyeres, etc., are concerned, but the sizes adopted vary greatly, the limits of capac-

ity being from 15 to 40 tons in twenty-four hours. The furnace illustrated the water-jackets are twelve in number, firmly bolted together and provided with openings for the insertion of the tuyeres *N*. A cold water pipe *M* runs around the furnace above the water-jackets, and water is admitted to each of them by a faucet *Y*. Outlets *M'* for the hot water and gutters *T* for its removal are also shown in the illustrations. The interval *b* between the water-jackets and the plate on which the shaft of the furnace rests is filled with fire-brick, which can be readily removed in case of necessity. The lower ends of the water-jacket rest upon the hearth *X*. This consists of cast-iron plates *a* bolted together and lined with a thick coating of fire-brick, or of "steep" (brasque), a mixture of fire-clay and coke-dust, either in equal parts, or in the proportion of two of the former to one of the latter. The usual form of the hearth is shown in the illustrations; this, however, is modified in

PRACTICAL HYDRAULICS.

NUMBER 8.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]

[COPYRIGHTED.]

FLOW OF WATER THROUGH VERTICAL, RECTANGULAR ORIFICES IN THIN PARTITIONS.

The assumption that the mean velocity of a stream of water flowing through a vertical rectangular orifice is at the middle of the opening, has been shown by equation (22) to be not strictly true. But, owing to its simplicity of application, and its close approximation to the truth, hydraulicians, for the most part, are wont to adopt it, and to correct the error involved by coefficients obtained by experiment.

Table 7, derived from Fanning's Hydraulic Engineering, embraces a wide range of coefficients so determined. Thus, it is suited to heads of water from two-tenths (.2) of a foot to fifty (50) feet, and to orifices one foot wide, whose heights vary from four (4) feet to one and one-half (1½) inches.

TABLE 7.

Flow of water per second through rectangular orifices in thin vertical partitions, and the coefficients employed in the computation.

Head on Center.	Coefficient.	4 feet high; 1 ft. wide.	Coefficient.	2 feet high; 1 ft. wide.	Coefficient.	1½ feet high; 1 ft. wide.	Coefficient.	1 foot high; 1 ft. wide.
0.6	.....	.....	.....	.....	.....	.....	.598	3.72
0.7	.....	.....	.....	.....	.....	.....	.599	4.02
0.8	.....	.....	.....	.....	.613	6.60	.600	4.31
0.9	.....	.....	.....	.....	.613	7.01	.601	4.57
1.0	.....	.....	.....	.....	.614	7.39	.601	4.87
1.25	.....	.619	11.11	.614	8.26	.602	5.29	
1.50	.....	.619	12.16	.614	9.06	.603	5.92	
1.75	.....	.619	13.13	.615	9.79	.603	6.40	
2.00	.....	.618	14.04	.614	10.45	.604	6.85	
2.25	.....	.618	14.89	.614	10.96	.604	7.27	
2.50	.629	31.92	.618	15.67	.614	11.66	.604	7.67
2.75	.628	33.43	.617	16.43	.614	12.24	.605	8.05
3.00	.627	34.75	.617	17.15	.613	12.78	.605	8.41
3.25	.625	37.54	.616	18.49	.612	13.79	.605	9.08
4.00	.625	40.09	.615	19.74	.611	14.71	.605	9.97
4.50	.623	42.39	.614	20.90	.610	15.58	.604	10.29
5.00	.621	44.55	.612	21.98	.609	16.48	.604	10.84
6.00	.616	48.42	.609	23.96	.606	17.88	.602	11.84
7.00	.612	52.23	.606	25.75	.604	19.23	.601	12.76
8.00	.609	55.29	.604	27.39	.602	20.50	.601	13.64
9.00	.606	58.35	.602	28.98	.601	21.72	.601	14.47
10.00	.604	61.26	.602	30.53	.601	22.88	.601	15.25
15.00	.604	75.09	.602	37.42	.601	28.02	.601	18.68
20.00	.605	86.78	.602	43.24	.601	32.37	.601	21.50
25.00	.605	99.06	.603	48.39	.601	36.19	.601	24.12
30.00	.605	106.46	.603	53.34	.602	39.68	.601	26.43
35.00	.606	115.08	.604	57.35	.602	42.88	.601	28.55
40.00	.607	123.13	.605	61.36	.603	45.86	.602	30.53
45.00	.606	130.39	.605	65.14	.603	48.68	.602	32.39
50.00	.609	138.12	.606	67.21	.603	51.36	.602	34.15
Mean.	.614	.....	Mean.	.610	.....	Mean.	.608	.....

TABLE 7.

Flow of water per second through rectangular orifices in thin vertical partitions, and the coefficients employed in the computation.

Head on Center.	Coefficient.	9 feet high; 1 ft. wide.	Coefficient.	6 feet high; 1 ft. wide.	Coefficient.	3 feet high; 1 ft. wide.	Coefficient.	1½ feet high; 1 ft. wide.
0.2	.....	.....	.....	.....	.....	.....	.633	.28
0.3	.....	.....	.....	.....	.....	.....	.633	.35
0.4	.....	.....	.614	1.56	.631	.80	.633	.40
0.5	.605	2.57	.615	1.74	.631	.89	.633	.45
0.6	.606	2.83	.616	1.91	.632	.98	.633	.49
0.7	.607	3.06	.616	2.07	.632	1.06	.633	.53
0.8	.608	3.27	.617	2.21	.632	1.14	.633	.59
0.9	.609	3.48	.617	2.35	.632	1.20	.632	.60
1.0	.609	3.67	.617	2.48	.632	1.26	.632	.63
1.25	.610	4.02	.617	2.71	.632	1.39	.631	.69
1.50	.610	4.50	.617	3.03	.631	1.55	.630	.77
1.75	.610	4.86	.617	3.27	.631	1.67	.630	.83
2.00	.610	5.20	.617	3.50	.630	1.79	.629	.89
2.25	.610	5.51	.616	3.71	.629	1.89	.629	.95
2.50	.610	5.81	.616	3.91	.628	1.99	.628	1.00
2.75	.610	6.09	.616	4.10	.627	2.09	.627	1.04
3.00	.610	6.36	.615	4.27	.627	2.18	.627	1.09
3.5	.609	6.86	.615	4.61	.625	2.35	.625	1.17
4.00	.609	7.32	.614	4.92	.624	2.50	.624	1.25
4.5	.607	7.75	.613	5.21	.622	2.65	.622	1.32
5.00	.606	8.16	.611	5.49	.620	2.78	.620	1.39
6.00	.604	8.91	.609	5.98	.615	3.03	.615	1.51
7.00	.603	9.61	.606	6.43	.611	3.24	.611	1.62
8.00	.602	10.25	.603	6.84	.607	3.45	.609	1.71
9.00	.602	10.86	.602	7.25	.605	3.64	.607	1.83
10.00	.601	11.44	.601	7.62	.603	3.83	.606	1.92
15.00	.601	14.01	.601	9.34	.603	4.69	.607	2.36
20.00	.601	16.18	.602	10.80	.604	5.42	.607	2.72
25.00	.602	18.10	.602	12.08	.604	6.06	.608	3.05
30.00	.602	19.84	.603	13.47	.604	6.64	.609	3.35
35.00	.602	21.44	.603	14.31	.605	7.18	.610	3.62
40.00	.603	22.94	.604	15.32	.606	7.68	.611	3.79
45.00	.603	24.35	.604	16.26	.606	8.16	.613	4.12
50.00	.604	25.68	.605	17.16	.607	8.61	.614	4.35
Mean.	.606	.....	Mean.	.611	.....	Mean.	.620	.....

An inspection of Table 7 discloses that the coefficient of flow is variable, both with respect to the head of water and form of orifice.

Thus, the orifice being "four feet high," the maximum coefficient .629, is due a head of 2.50 feet; thence the coefficient gradually diminishes to .604, as the head increases to 10 feet; thence is constant to 15 feet; thence gradually increases to .609, with the increase of the head to 50 feet.

In the other given orifices, variations obtain, but to a less extent.

With respect to the variation of coefficients arising from the form of orifice, it will be seen, by running the eye horizontally to the right, from and for any given head, that the values of the coefficients diminish as the heights of the orifices decrease from four feet to one foot, and increase as the heights of the orifice decrease from one foot to one and one-half (1½) inches. In illustration take several heads, as 3, 10, 25, 50 feet, and the coefficients due the several forms of orifice.

Head, Feet.	4' x 1' Coef.	2' x 1' Coef.	1½' x 1' Coef.	1' x 1' Coef.	9" x 1' Coef.	6" x 1' Coef.	3" x 1' Coef.	1½" x 1' Coef.
3	.627	.617	.613	.605	.610	.615	.627	.627
10	.604	.602	.601	.601	.601	.601	.603	.606
25	.605	.603	.601	.601	.602	.602	.604	.608
50	.609	.606	.603	.602	.604	.605	.607	.614

TO FIND THE FLOW OF WATER IN CUBIC FEET PER SECOND THROUGH VERTICAL RECTANGULAR ORIFICES IN THIN VERTICAL PARTITIONS BY TABLE 7, THE HEAD ON CENTER AND SIZE OF OPENING BEING MADE.

Rule 26.—In "head on center" column, Table 7, find the given head, opposite which, in column headed by the given height of orifice, will be found the flow for an orifice one foot wide, which multiply by the given width in feet.

Ex. 40.—The head being ten feet, and orifice four feet wide and nine inches high, what is the flow per second?

Cal.—In column "9" high 1 foot wide," opposite 10 feet in "head on center" column, will be found 11.44 cubic feet, which, multiplied by four feet, the given width, gives:

$$11.44 \times 4 = 45.76 \text{ cubic feet.} \text{—Ans.}$$

The heads, sizes of orifices, and the computed flow of water given in Table 7, will be found highly convenient for ready reference in a great number of cases, but are seen to be too limited to fully meet the requirements of practice. Indeed, a table sufficiently ample for that purpose would be too unwieldy for use.

The general formula for the flow of water per second through vertical rectangular orifices in thin partitions, is:

$$Q = 8.025ca\sqrt{h} \quad (92)$$

In which Q denotes the flow in cubic feet; c , coefficient of discharge; a , the area of the orifice in square feet; and h , the head on the center of the orifice; h' is equal to the half sum of the respective heads on the bottom and top of the orifice, as seen in equation (21).

In case the height of the orifice and the head on its top are given, then h' to the sum of the given head and half the height of the opening; or if the height of the opening and the head on its bottom are given, then h' is equal to the difference between the given head and half the height of the orifice.

TO FIND THE FLOW OF WATER IN CUBIC FEET PER SECOND, THROUGH VERTICAL RECTANGULAR ORIFICES IN THIN PARTITIONS.

Rule 27.—Multiply 8.025 times the square root of the head on the center of the orifice, by the product of the area of the orifice and the coefficient of discharge.

Rule 27 corresponds to formula (92).

With respect to the "square root of the head," and "the coefficient of discharge," contemplated in Rule 27, it will be remembered that Table 6 gives the square roots of numbers likely to be required, and Table 7, the coefficients of discharge. In finding a proper coefficient of discharge: in case the given height of orifice is found in Table 7, the coefficient corresponding to that height and to the given head is to be employed; but in case the given height of orifice is an intermediate, or lies between the heights contained in the table, its coefficient will need be computed. The tabulated coefficients are, in fact, ordinates of curves, determined by experiment.

In determining these intermediate ordinates or coefficients between any two adjacent heights in Table 7, as 4 feet and 2 feet, 1.5 feet and 1 foot, no appreciable error will occur by substituting a right line for a curve. The determination of the intermediate coefficients will then be effected by arithmetical differences. In illustration, let it be required to find the coefficient due a head of 2.5 feet, and orifice 3.5 feet high.

Now 3.5 is between the adjacent heights, 4 and 2 feet, in Table 7. The respective coefficients due a head of 2.5 feet are .629 in "4 feet high" column, and .618 in "2 feet high" column.

Difference of heights, $4 - 2 = 2$ feet.
Difference of greater and given heights, $4 - 3.5 = .5$ feet.
Quotient of these differences, $.5 \div 2 = .25 = 4$ divisor.
Difference of coefficients, $.629 - .618 = .011$
Arithmetical difference sought, $.011 \div 4 = .003$ nearly.
Coefficient due 3.5 feet, $.629 - .003 = .626$

The intermediate coefficients corresponding to 3 feet and 2.5 feet are now readily found. Thus:

Coefficient due 3 feet, $.626 - .003 = .623$
Coefficient due 2.5 feet, $.623 - .003 = .620$

EXAMPLES AND CALCULATIONS.

Ex. 41.—An orifice is 3.5 feet wide, 1.25 feet high, and the head on its center is 7 feet. What is the flow in cubic feet per second?

Cal.—By Table 6, square root of 7 feet = 2.646.
By Table 7, coefficient due 7 feet; for orifice, 1.5 feet high = .604; for orifice, 1 foot high = .601.

Difference of tabulated heights, $1.5 - 1 = .5$
Difference of greater and given heights, $1.5 - 1.25 = .25$
Quotient of these differences, $.25 \div .5 = .5 = 2$ divisor.
Difference of coefficients, $.604 - .601 = .003$
Arithmetical difference, $.003 \div 2 = .0015$
Coefficient due 1.25 feet, $.604 - .0015 = .6025$

Area of orifice, $3.5 \times 1.25 = 4.375$ square feet.

Flow = $8.025 \times .6025 \times 4.375 \times 2.646 = 55.97$ cubic feet.—Ans.

Ex. 42.—Given the head on the bottom of a rectangular orifice 12 feet, the head on its top 11 feet, and the width of orifice 4 feet, what is the flow in cubic feet per second?

Cal.—Head on center = $\frac{12+11}{2} = 11.5$ feet.

By Table 6, square root of head on center = 3.391 feet.

Height of orifice = $12 - 11 = 1$ foot.

By Table 7, coefficient due head of 11.5 feet, and orifice 1 foot high = .601.

It will be observed that the coefficient is constant for head from 10 to 15 feet, inclusive.

Area of orifice = $4 \times 1 = 4$ square feet.

Flow = $8.025 \times .601 \times 4 \times 3.391 = 65.42$ cubic feet.—Ans.

Ex. 43.—The head on the top of a rectangular orifice 6 inches high and 6 feet wide, being 7.25 feet, what is the flow in cubic feet per second?

Cal.—Half the height of orifice $6'' \div 2 = 3'' = .25$ feet.

Head on center = $7.25 + .25 = 7.5$ feet.

By Table 7, coefficient due head of 7 feet = .606.

Coefficient due head of 8 feet = .603.

Mean coefficient on that due 7.5 feet = .6045.

By Table 6, square root, 7.5 feet = 2.739.

Area of orifice, $6 \times .5 = 3$ square feet.

Flow = $8.025 \times .6045 \times 3 \times 2.739 = 29.89$ cubic feet.—Ans.

Ex. 44.—The head on the bottom of a rectangular orifice 9 inches high and 3 feet wide, being 15.875 feet, what is the flow in cubic feet per second?

Cal.—Half the height of orifice, $9'' \div 2 = 4.5'' = .375$ feet.

Head on center = $15.875 - .375 = 15.5$ feet.

By Table 7, coefficient due head of 15.875 feet, and orifice 9" high = .601.

Observe that the coefficient is constant from 10 feet to 20 feet, inclusive.

By Table 6, square root of 15.6 = 3.95 feet.

Area of orifice = $3 \times .75 = 2.25$ square feet.

Flow = $8.025 \times .601 \times 2.25 \times 3.95 = 42.86$ cubic feet.—Ans.

The preferable unit for measuring the flow of water is 1 cubic foot, but so widely is the "miner's inch," employed in California as a unit of measure, that we cannot well pass it in silence.

"MINER'S INCH."

The term "miner's inch" is employed to express that quantity of water which, under a given head or pressure, as 4, 7, 9, etc., inches, will flow through each square inch of a discharge opening; or, in other words, which will flow through each square inch of cross section of a stream of water.

The quantity of water so flowing in a minute, an hour, 24 hours, etc., is designated *minute inch*, *hour inch*, *24-hour inch*, etc., according to the length of time specified.

STATUTORY MINER'S INCH.

Under the head, "Water Rights," the Civil Code of the State of California, Sec. 1415, provides in these words, "That he (the locator) claims the water there flowing to the extent of (giving the number) inches, measured under a four-inch pressure."

Death of a Notable Pioneer.

Colonel Peter Donahue, who died in this city last week, was a man who lived a very useful life, and whose work contributed largely to industrial progress on this coast. He was a mechanic who, by his own exertions, became a millionaire. The first manual labor which he performed in the United States was in a cotton factory at Matteawan, where he worked for two years. He then entered the great locomotive manufacturing establishment of Rogers, Ketchum & Grosvenor, in Paterson, N. J., as an apprentice to the millwright and engineering business. At the age of 22 years he entered the foundry of Hugh Biggs, at Paterson, N. J., as a journeyman, and worked there for a year, at the end of which time he returned to the banks of the Hudson and entered the employ of Gouverneur Kimball, whose foundry was situated at Cold Springs, Putnam county, and labored there for two years. New York City was the next scene of his labors, and here he became connected with the Novelty Iron Works, which at that time was the largest establishment of the kind in the United States. Here he most energetically pursued his business until 1847. In December of that year he was appointed assistant engineer on the Peruvian war steamer Rimac. He was also engineer of the first steamship ever owned by the Peruvian Government, and of the first American steamer that ever went through the straits of Magellan. Mr. Donahue arrived in San Francisco on the second trip of the steamship Oregon, in June, 1849. He went to the mine and remained eight months at Auburn, and then went to Kelly's Bar, on the north fork of the American river, where the diggings were then very rich.

After a while, with his bearskin and blanket on his back, he tramped back to Sacramento. Shortly after arriving at the future capital, Mr. Donahue erected a saw-mill on a seow for the Phoenix Company. While erecting the mill he was paid at the rate of \$10 a day and his board.

When his brothers came from the East he joined them in this city, and in connection with his brother James, opened a blacksmith shop and boiler-making establishment on Montgomery street, just above Jackson. Here they did business for about a year and a half, afterwards removing to First street, between Market and Mission, where the Union Iron Works were erected. The Donahues can truly claim that they melted the first cast-iron in California. They also erected the first quartz mill ever built on this coast. Credit is due to the three brothers for having melted and molded the first cast-iron in the State, which was done by means of an antiquated blacksmith bellows.

The first printing press ever manufactured in California, and the one upon which was printed the paper which announced the tidings of the admission of the State into the Union, was manufactured at their foundry.

In 1852 the firm obtained a franchise from the city for the erection of gas works, laying gas pipes and lighting the city. Peter Donahue also started an opposition line of steamers on the Sacramento river, at the same time having two steamships engaged in the coasting trade. In addition to his other works, in 1861 he obtained a franchise for the Omnibus Street Railroad, which is yet in operation. The same year he obtained the contract for the construction of the monitor Comanche for the defense of the Pacific Coast.

In 1862, with a few associates, Mr. Donahue built a railroad from San Francisco to Gilroy, a distance of eighty miles. This road was afterwards sold to Leland Stanford. A broad-gauge road was also built from Donahue, at the mouth of Petaluma creek, to Cloverdale, a distance of fifty miles. All the rolling stock used on this road was built at Donahue's foundry. A branch road was also built from Fulton to Russian river, a distance of eighteen miles, and from Petaluma to San Rafael, twenty-two miles. On the latter road there is a tunnel 1400 feet long through the solid rock. With the approaches the tunnel is 2200 feet long. This latter branch has also been extended from San Rafael to Point Tiburon, on Raccoon straits, connecting with San Francisco by a ferry-boat, this branch of the system costing nearly a million of dollars.

In 1879, the corporation of which Mr. Donahue was the President bought the unfinished narrow-gauge road from Sonoma to Sonoma creek, and finished the road to the mouth of the creek, and then made connection with San Francisco by the steamer James M. Donahue.

From the above brief sketch of his business career on this coast it becomes apparent that Mr. Donahue was eminently entitled to the appellation of Founder. Not content with deriving benefit from and enlarging upon the ideas of others, he has himself given birth to extensive schemes, which his energy coupled with his extraordinary executive ability, has invariably brought to a successful culmination. The first to engineer a steamer through the straits of Magellan; the first to establish an iron foundry and machine shop in San Francisco; the first to introduce gas illumination in this city; the man whose skill and perseverance liberated the San Jose railroad from its enthrallments; the first to construct a street railroad in San Francisco, and the only man in California who ever ventured to build a railroad without the aid of a land grant.

USEFUL INFORMATION.

The Hook of a Chain.

Here is another place where the working mechanic, in trying to forge out a hook for a chain, weakens the material, distorts the fiber, and abuses the strength of the iron by the strains left within the hook when finished. It is the only portion of a chain that must endure the breaking, bending, and stretching tendency of a load in an off-hand disadvantage; every strain must be taken to one side to allow the chain to be unhooked from the other, and has every tendency to disturb the curvature of that graceful reversing curve that forms the back of a hook of a chain. If a hook could be so proportioned that even an expert would find it difficult to decide where it would break first, it might answer for many purposes, but there are places where this theoretical hook would be treacherous. A flattened hook is the stiffest, and where it is left the thinnest in the back edge, gives the most strength for a given amount of material, but it breaks without warning. What a workman needs, where life is in danger, is a hook that will give some indication of being overloaded before it breaks. It is a desirable feature in every structure to have some of the working parts so constructed as to give the workmen notice of an impending break down. The foundrymen with their glowing material, would prefer to see the opening in the hook of their chain spread out a little, for enough to attract attention, than to create a disturbance that would be detrimental to their own welfare by the breaking of a chain. A hook with circular cross-sections can be partially straightened by overloading when the flat hook would show no inclination to spread, and both be on the point of breaking. The difference in their strength is not shown by the opening of their jaws. The only advantage in making the hook flat is to resist the bending and breaking across as if it were a bar loaded at both ends and supported in the middle. But the strain of a hook is in the direction of the length of the chain and the very force that is bending the back and drawing the hook out in a straight line is the very one that is being supported by it, and a round bar is just as well prepared to support a load in the direction of its length as the same amount in cross sections in any other form. It is surprising what a slight difference there is to be seen in round and flat bars when used for a hook than when used for direct bending. Even the flat hook fails when it is made to grasp two links at once with a heavy load on both of them and the second one with no room to spare. The hook is broken where a direct pull had been provided for by the forger. A hook that has the privilege of spreading before it breaks would make room for the links to lie more comfortably. Where the strength in design is but little affected by the form that is given, the very important feature of "bending before it breaks," should not be lost sight of, though a trace of it is found in the hook of a chain.—*Boston Journal of Commerce.*

A NEW ARTICLE OF MANUFACTURE.—The *Denver Journal of Commerce* reports that the slag resulting from the smelting of copper, gold and silver ores at Argo is now being returned in the shape of a beautiful table-ware. The colors are a sort of spray of onyx and opal flushed in waves throughout the ware. The glass works where it is made say they have direct control over these colors, the slag containing a larger per cent of material necessary than can be found in slag elsewhere. It is melted at an intense heat, then poured into vats of agitated water, then remelted and poured into molds after or together with an acid mixture, which causes the metal to flux pretty generally with added materials. The result is a metallic glass with the strength of light cast-iron, and in any form of tableware, bowls, cups, tumblers, etc., with the most beautiful spray of onyx stone colors upon a general background of opal.

TO REMOVE DRY ROT.—A Russian professor has been experimenting on the best way to remove dry rot. He says that a thorough draught will destroy the parasite which produces it in 24 hours. If the action of draught be assisted by sunlight a few hours will often be sufficient to put a stop to further damage. A concentrated solution of common salt is very efficacious, and the stronger it is used the more rapid its action. The action of a concentrated solution of "blue stone" is still more energetic and complete than that of common salt. Crude carbolic acid is rapid in its action and cheap, but inconvenient to use. He considers the best, cheapest and most convenient material to employ is the tar obtained when birch wood is distilled for acetic acid; the under surface of the flooring should be painted with this tar.

A NEW REPEATING RIFLE.—A French officer of infantry has invented a repeating rifle, which is believed to excel everything of the kind hitherto devised. The weapon can be loaded with its seven cartridges in ten seconds and completely discharged in four. A great merit of the arm is that it can be fired until the magazine is exhausted without being removed from the shoulder.

INDIAN SECRETS.—Actual analyses of the secrets of Indians reveal the fact that their mixtures for attracting game to their traps is

easy to make and apply. For foxes and other large game, mix together muskrat and skunk muck in equal parts, smear the trap and bait with this, and the animals will soon "get a foot in." For minks, etc., take unslaked lime, one-half pound; sal ammoniac, three ounces; mix and pulverize, and place in a covered vessel a few days until thoroughly mixed, then sprinkle on the bait and around the place where the traps are set.

WHEATENA is the name given to a new manufactured product from wheat, intended as a breakfast food. It is said to combine all the good qualities claimed for the various cereal preparations of similar character, and some others peculiar to itself. It is manufactured from peeled or hulled wheat, of the best varieties, and so prepared that it can be so perfectly cooked in two minutes, that no additional amount of cooking will in any way improve it. It is said to be digestible, palatable and nutritious.

OPPOSED TO BOYCOTTING.—Manufacturers and others who are being "boycotted" in New York City, are quietly arranging to have a bill presented and pressed for passage at the next session of the New York Legislature, making boycotting a misdemeanor, punishable with heavy penalties. The trades union people have an inkling of the movement, and will make extra exertions to see that only men who will give their interests consideration shall be sent to the Legislature.

ANTIQUITY OF TRADE-MARKS.—The antiquity of trade-marks has been traced by a contemporary to be almost coeval with the industry of the human race. It has been found that ancient Babylon had property symbols, and the Chinese claim that they had trade-marks 1000 years before Christ. Gutenberg, the inventor of printing, won a lawsuit about a trade-mark, and the use of a distinguishing stamp was recognized by the English Parliament in 1300.

GREASE-ERADICATOR.—The constitution of a celebrated grease eradicator, the right to make which has made four millionaires, is as follows: Ammonia, two ounces; soft water, one quart; saltpetre, one teaspoonful; fine soap, in shavings, one ounce; mix thoroughly and keep in covered vessels.

RAT EXTERMINATORS.—The best rat-exteriorator ever examined in a laboratory is simply chlorido of lime. This is thrown liberally about their holes and runways, and they will never sniff it but once.

GOOD HEALTH.

THE PAIN OF BEING HUNG.—Dr. Taylor states that death from hanging appears to take place very rapidly, and without causing any suffering to the person. Prof. Tidy also speaks of the painless nature of death from hanging; while Prof. Houghton, in his paper read before the Surgical Society of Dublin, says that the old system of taking a convict's life by suffocation is inhumanly painful, unnecessarily prolonged, and revolting to those whose duty it is to be present. Those who speak of the painless nature of death by strangulation arrive at this conclusion from the fact that many cases of suicide are not completely suspended, and that if they wished they could easily relieve the constriction by assuming the erect posture; and in other cases of recovery from attempted suicide by hanging there is no recollection of any suffering. It should be remembered, however, that there is a great difference between the mental attitude of the suicide and one who is about to suffer the extreme penalty of the law. In the former case he is regardless and perhaps also not very sensitive of a little suffering, while in the latter every nerve is braced up to resist the inevitable result. Moreover, in those cases of recovery the loss of recollection of suffering does not prove there was none. It might almost as well be said that, because in many cases of recovery from meningitis there was no remembrance of any suffering, therefore there was none. No doubt the pain in hanging can under no circumstances be very acute, yet when we see a culprit heaving his chest and almost raising the whole body in his struggles for breath, we must conclude that there is at least a considerable amount of mental torture.

REMOVING HAIR AND FRECKLES BY ELECTRICITY.—The American Dermatological Association lately held its ninth annual meeting at Greenwich, Conn. Among the proceedings were remarks by various doctors who gave their experience in removing hair from the face by electricity. Quite a large and important business is done in this line, especially among ladies. The only remedy is to kill the root of each hair, which must be done separately, by means of an electrical needle and battery. Dr. Fox said: In the case of a young woman with a heavy beard, he had removed, by actual count, 8000 hairs. This process had required two or three years. Since then it had been necessary to remove only a few dozen hairs. The president, Dr. Hardey, had performed the operation of electrolysis for 10 or 12 years—probably longer than any other member of the association. He used the Iridogalvanic needle, which had the advantage of being bent, and was not likely to pass

through the follicle wall. The moment the follicle was entered there was an escape of serum. One case, that of a woman with a heavy black beard, had been entirely relieved. It is said that electrolysis, with a fine needle, also affords a method of getting rid of freckles. The plan is to dot the surface covered by the freckle with the needle.

HOW CAN TYPHOID FEVER BE PREVENTED?—The reply to the above question may be stated in four words: stop drinking contaminated water. This might not prevent all typhoid fever, but it would by far the greater proportion of it. How to prevent the contamination of the various water supplies cannot be briefly stated, but if people care enough about it to take the necessary trouble to do this, sanitarians can tell them how. So far as it relates to typhoid fever, it may be that all that is necessary is to destroy and keep out of the water all discharges from persons suffering from typhoid fever; but the difficulty of recognizing the disease early enough in its course is so great, that in order to do this it will be necessary to keep all human excreta, and perhaps the excreta of some animals, out of the water supply. Most people think they do this now, or probably we would not have a thousand deaths a year in one State from that cause; but I think we have reason to believe that their confidence in the purity of the water they drink is misplaced. The numerous instances where typhoid fever has apparently been caused by drinking water contaminated by decomposing vegetable matter indicate that even if the cause of the disease is specific, until such time as the specific cause shall be so restricted as not to find access to water supplies, it is important to preserve the water from contamination by vegetable as well as by animal matter.—*Henry B. Baker, M. D.*

FILTERS.—Many people pin their faith to filters, and think that so long as they pass their drinking-water through an earthenware jar with some mysterious filtering medium inside, the source of the water or the condition of the cisterns does not in the least matter. This is a similar delusion to the belief, which passes freely current, that if you add spirits to unwholesome water you rob it of its noxious qualities, or at least diminish them. We do not deny the usefulness of filters, but we desire to point out that they must not be exclusively relied upon. Water filtration has in its way had as much nonsense written about it as water analysis. The great point is to keep the water itself as pure as possible. Where pollution is suspected, let the water be well boiled for a considerable period. It may afterwards be aerated by pouring it several times from a height of two or three feet from one vessel to another, or by artificial means. If a filter be used it should be of the simplest possible construction, and the filtering medium should be readily removable for cleansing purposes. If a filter be not very frequently and very thoroughly cleaned it pollutes rather than purifies the water.—*Herald of Health.*

THE REMEDY FOR OBESITY.—The London *Lancet* does not believe in the propriety, on physiological grounds, of a limitation to a specific class of foods to the exclusion of such as are known to be fat forming. It holds that it is the quantity rather than the quality of food that should be limited, on the ground that the health of the entire system absolutely demands a mixed diet, and that any considerable diminution in the supply of any one of the important forms of nutriment will be likely to produce much more serious consequences than the obesity which it is designed to relieve. As the *Lancet* puts it, "if the requisition of mixed food for the whole body be rudely interfered with, some other function may suffer and become deranged. While, therefore, we are ready to admit that stout persons should be content with a less rich diet than the spare bodied, its mixed character should be carefully preserved. Its quantity should, however, be limited, and we should rely for the disposal of the products of digestion mainly upon regular and methodical physical exertion."

THE TIME TO WEAR GLASSES.—When persons find their eyes becoming dry and itching in reading, as well as those who find it necessary to place an object more than 14 inches from their face to read, they need spectacles. Spectacles sold by peddlers and jewelers generally are hurtful to the eyes of those who read much, as the lenses are made of inferior glass, and are not symmetrically ground. Unless the lenses are mounted in a suitable frame and properly placed before the eye, discomfort will arise from their prolonged use. The proper time to begin wearing glasses is just as soon as the eye tire on being subjected to prolonged use.—*Medical Herald.*

MOUTH-WASHES.—The following mouth-washes are recommended for sick persons, whose teeth and gums often become unhealthy through insufficient nourishment, medicine, or want of cleansing.—One part permanganate of potash to from one hundred and fifty parts of water, to which can be added some camphor, as the metallic taste is disagreeable; or a solution of boracic acid one in twenty or thirty; or the following:—Tincture of benzoin, ten parts; tannic acid, twenty parts; alcohol, thirty parts; oil of peppermint, a sufficiency. Put ten or twenty drops into a glass of water.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ST. JULIAN.—Amador Ledger, Nov. 28: This mine at Middle Bar is being energetically prospected, considering the limited means at the command of the owners. Four men are kept busy running the tunnel on contract at \$3.40 per foot. This tunnel has been advanced 200 feet under the existing contract, making a total length of 300 feet under cover, and 400 including the open cut. It is advancing at the rate of from 12 to 18 feet per week, according to the nature of the rock. Less than 50 feet more, it is believed, will bring it to the point where the heavy gold bearing metal is known to exist. The past record of this claim justifies a thorough prospecting. In one pocket discovered early the present year, the sum of \$6000 was realized. A week's run of a one-stamp mill has panned out \$1500.

MISCELLANEOUS.—James Gleason has charge of the Moore and Mammoth mines in the absence of W. A. Nevills, who is compelled to be away a considerable portion of his time to look after his interests elsewhere. Mr. Rose has charge of the Bechtel mine at Angels. The new air-compressor at the big tunnel at Middle Bar was started this week. It is said to be a splendid piece of machinery, and works to perfection. Reports are current that another bunch of rich black metal was encountered early this week. A small box full of the ore was taken out. This is chiefly encouraging, not so much on account of the amount of gold obtained, but because it disproves the theory that the pockets exist only near the surface, and shows that, like the ordinary gold-bearing quartz of the mother lode, they extend down to unknown depths. It must be remembered that this tunnel enterprise is the only experiment that has yet been made to solve the problem of whether the peculiar ores met with in the Middle Bar group of mines are merely superficial deposits or otherwise. So far the result is sufficiently encouraging.

SUTTER CREEK.—The repairing of the Eureka shaft is being pushed ahead with all possible speed. The largest kind of timbers are being put in, and everything pertaining to the work is of the most substantial and lasting character. As the shaft is nearly 1300 feet deep, it will take all winter to complete the job. T. L. Culbert, of Amador City, has two large teams at work, hauling timbers to complete a contract, but they are coming in very slowly, owing to the terrible condition of the roads. The Mahoney and Lincoln mills are running steadily; also the five stamps of the Iowa. On account of the heavy rains, the miners have been unable to work on the surface ledge at the Mahoney, consequently the mill has almost exhausted the ore on the dump. On visiting the old shaft of the Lincoln, recently, it was discovered that it had caved badly. The cave extends from the surface to probably below the 200-foot level; beyond that the shaft was in good condition. There are two or three pumps in the shaft, which are likely to stay there, as it is not probable that the shaft will ever be used again.

Calaveras.

GREEN MOUNTAIN MINE.—Calaveras Chronicle, Nov. 28: One of the most substantial gravel mines in this district is the Green Mountain mine, located on Tunnel Ridge, and owned by McSorley, Son & Co. The gravel in this mine, it may be said, is almost inexhaustible. The main lead is 600 feet wide and 80 feet high. The company are now, and have for the past eight years been working on the northern extension, which is only an iota of the vast amount yet to be worked. The mine is worked by means of two tunnels, about 300 feet apart, and connected on the inside by drifts which afford ventilation, and insure safety to the men employed therein. The tunnels are run to a distance of 900 feet, first through lava and bedrock, then through a stratum of cemented sand, and cutting through the main lead or channel until the eastern wall or edge is reached. From this point drifts radiate at distances of 60 or 70 feet running north and south; north as far as the Brackett & Boucher line, and south as far as the grade of the channel will permit it to be worked advantageously. The gravel is then breasted or blocked out to a height of 6 feet between these drifts in a skillful and systematic manner, beginning at the further edge so that no gravel is left behind. The rocks encountered are walled up in pillars to prevent caving, and answer the purpose of timbers, but notwithstanding a large amount of the latter are used. The southern extension of the channel, which is about 2000 feet in length, is yet untouched, but in order to be worked with advantage a tunnel will have to be opened to tap the lead at the southern end. This the company intend commencing in the spring, and when completed it will insure years of profitable labor. The gravel is hard and cemented, which requires milling to extract the gold. For this purpose an 8-stamp mill was erected and propelled by water power with a hydraulic pressure of 260 feet, thus requiring but a small amount of water. Twenty men are employed in the mine getting out an average of 70 carloads of gravel daily. For the first three years this mine was worked on the old plan and at least one-third of the gold was lost. But since the erection of the mill, the dividends derived thereby have been more than doubled. No hoisting works or water pumps are required. The tunnels being on a slight grade, the water flows out, and the ears are easily pushed in and out by hand, by which great saving of water and machinery is effected. This mine, like most others, was worked in former years, but the gravel being of such a nature as to require milling to extract the gold, and this process being but little used on those days, it was abandoned after working a strip of 150 feet, which was soft, and easily worked on the east edge of the channel.

Del Norte.

HAPPY CAMP.—Del Norte Record, Nov. 28: Mr. Wilson, who has just returned from Happy Camp, informs us that the mines at that place are all in full blast, except that of Camp & Co., and a successful mining season is expected. Everyone has put their mines in the best possible condition, and now that the rainy season has set in, they have nothing to do but to work and take out the needful. The Waldo

mines are all in operation, and will, in all probability continue to be so all winter. Wimer & Sons are jubilant over the prospect of a good winter's run and a big cleanup in the spring.

El Dorado.

PAYING.—Georgetown Gazette, Nov. 28: Supt. Dixon of the Revenge mine and mill, Greenwood district, was up on a business trip last Monday. We are pleased to learn that the Revenge continues to yield its golden treasure in paying quantities. We are pleased to learn that Henry Jones and A. E. Brass who have been prospecting for the past few months on the Slate Mountain lode to the north of the Slate Mountain mine have developed a fine body of gold bearing quartz which they believe will equal in richness the now famous Slate Mountain mine.

Inyo.

WILL HANG UP.—Register, Nov. 28: For lack of sufficient ore to keep the mill supplied to a paying standard on custom work, John Alexander will soon give up his lease of the Maxim mill. He has run it successfully as regards making the many different lots of ore pay that he has worked, but the different lots have been small for the most part, and the supply too irregular to justify himself.

UNOVELOPEO RESOURCES.—Independent, Nov. 28: In the low range of hills that runs across the valley fifteen miles north of Independence, is a large bed of kaolin. This is the material of which the finest porcelain wares are made. Parties have been making investigation lately to determine the quantity and extent of the deposit. Very large establishments have grown up in France and Germany where similar material is found. At Chrysopolis, across the river east from the above, is a large bed of soapstone. This has been tried to a limited extent and found far superior to the best imported English fire brick for use in furnaces. Near Cerro Gordo are other beds of soapstone from which blocks have been taken for furnace use, and were found to answer the purpose perfectly.

LEAD CANYON.—John T. Erwin, W. Fuller (alias Tamarack) and W. Bray came over the Inyos from Saline Valley last Wednesday. They found twenty inches of snow on the summit. The party opened a prospect on the east side of the Inyos, nearly due east from Independence, about three months ago. A body of ore was soon found that looked very promising, but how to get it to the railroad was an all important matter. A teamster was asked to examine the route, and after doing so said he would haul the ore to Big Pine Station for \$200 a ton. The ore is worth about \$150 a ton, and the miners were not willing to pay a bonus to the teamster of \$50 a ton, just for the fun of getting out the ore. They examined the mountain above their mine, found a feasible route for a road, worked on it two months, and now have a good way out to Independence Station a distance less than twenty-two miles. A contract has been let to Charley Mates to pack the ore for twenty dollars per ton. Charley will begin packing in a few days. The miners are confident that with a little more work on their road the cost of packing can be reduced to fifteen dollars per ton. These parties report having four first-rate prospects, yielding ore right from the surface. They say that right in their neighborhood is the most promising country for prospectors any of them has ever seen.

DEFIANCE.—As work progresses in the Defiance mine the recent strike develops into greater importance. The ledge is reported to be fully five feet wide, of solid ore. The most convincing proof of the extent of the ore body, and the facility with which ore can be got is found in the fact that Mr. Reddy has arranged with J. S. Gorman to start up the furnace and make a run on the ore between now and the holidays.

MARBLE SHIPMENT.—The first shipment of marble from Owens Lake has been made. The blocks shipped were as large as could be banded, or carried on the cars. The marble is pure white, and of very fine grain. Mr. Luce has explored the ledge farther up the mountain, and finds that it is very extensive. Another shipment of marble was made from Swansea last Thursday. Part will be delivered at Sacramento and part at San Francisco. Mr. Luce went along to dispose of the marble. Soon after January 1st the Swansea furnace will be started up on ore from Cerro Gordo. Teams are now hauling ore to the furnace, and already there is a good deal on the ground. A large quantity of slag at the furnace will be worked over; assays show that this slag will pay well for working.

Mariposa.

A GOOD PROSPECT.—Gazette, Nov. 28: The old pioneer, David Hays, is engaged in sluicing the dirt and vein matter of a large dump at the Mexican mine, belonging to Captain Diltz, and that said dump which was created by the Mexicans is yielding some most beautiful quartz specimens besides coarse and fine gold in quantities sufficient, which proves conclusively that all that has been said about the Mexican mine is not fabulous. It has borne the reputation of being a very rich mine and will no doubt whenever opened, show as good rock as any quartz vein in that neighborhood. Dave worked at the sluice all night one night this week in order to take advantage of the falling rain.

Mono.

THE GORILLA MINE.—Bodie Free Press, Nov. 26: Mr. Winterhalter, of the Gorilla mine at Lundy, arrived in town last Friday and left Saturday morning for San Francisco. He has let a contract to sink an incline 50 feet, nearly at the face of their main tunnel, which is in about 785 feet, then run an extension of 75 feet besides advancing the main tunnel, about 75 feet. The Gorilla has done better this year than at any time previous, and the stopes look well, the ledge being nearly three feet wide, the ore averaging \$200 milling process. Mr. Winterhalter will return early in the spring.

Nevada.

TO DRIFT.—North San Juan Times, Nov. 28: The English Company at Badger Hill near Cherokee, this county, will hereafter work their mine by the drifting process. No more hydraulic lifting for them. For several months past they have been engaged in making a bedrock cut from the mouth of their tunnel to the breast of their diggings. The bedrock cut is about seven feet in width and 200 feet long. Their pay gravel is about 300 feet in length and from 12 to 15 feet in height. It is blue gravel. The bank above the gravel is from 75 to 150 feet in depth. It was the intention of the company to commence their drifting Thursday of this week, but

whether they did so or not we are not informed. They will enter the mountain by a drift eight feet in width and the same in height. They will start straight for the dividing line that separates their mine from the mine of the Milton Company about 350 feet distant from the starting point. From thence they will work their mine in all directions, and will prospect the ground of the Milton Company adjoining the English Company's ground. Mr. John Quick, the very able foreman of the English mine is of the opinion that the mine will pay \$20 per day to each man, worked by the drift process, from the start, and if our wishes will be of any avail it will pay more than that.

A POCKET WORTH HAVING.—Nevada Transcript, Nov. 26: D. R. McKillican & Co., owners of the Gold Run quartz mine (formerly known as the Copper Hill ledge) on the Middle Yuba river just opposite Orleans Flat, have been working the claim for six or eight months past at a small profit, the ore deposit growing better in regularity of formation and quality as the development of it progressed. A few days ago they opened a "pocket" that has yielded them according to our informant about \$10,000 worth of bullion, and this together with the improvements in the regular ledge matter causes the stockholders to feel the utmost satisfaction over their investment.

Shasta.

PAY ORE.—Shasta Democrat, Nov. 28: Clark & Co., at Quartz Hill, struck fine pay ore in a vein they cross-cutted in a drift from the main shaft. The ore in Tom Greene's new mine at Deadwood assays from \$60 to \$150 a ton. The sulphurets are very rich. Hon. Reuben Clark intends to make some improvements on his quartz mill at Quartz Hill. Vet Hull, Jones and Dufur recently struck a rich prospect a short distance west of Shasta that promises to be good. When the ore is roasted it yields lots of the "yaller" truck. Lowery, the boss pocket hunter, a few days ago struck something new near Centerville. It is an ore that is very heavy, and besides being very rich in corroded free gold, carries a metallic substance that greatly resembles black sulphurets of silver. It is the first ore of the kind found in the county. At any rate the ore is very rich in fine gold. The Winthrop Co., at Copper City has shut down the mill temporarily on account of the inclement weather preventing the extraction of ore. The company is running a tunnel which, when completed, will allow the extraction of ore in all kinds of weather. Since smelting was commenced the company has shipped nearly \$10,000 in bullion and not more than five tons of ore have been reduced per day. We are told that it is the intention of the company to enlarge its works next summer. Ollie Whitton came down from his Squaw creek mine last Sunday and reported striking a wonderfully rich gold quartz vein about four miles from the Lillian Maude. He says the vein is three feet wide and prospects in free gold \$1000 to the ton. Besides this three other new strikes were made recently in that camp that are said to be as good as any that have heretofore been struck on Squaw creek. If the many prospects are half as good as reported, Squaw creek is destined to be a famous mining district.

Siskiyou.

PICK AND PAN.—Yreka Union, Nov. 26: The Campbell hydraulic mine at Mugginsville is running full time with a large force. At Hamburg Bar all the river miners have pulled out except Martin Andrews who is still working and realizing big pay. J. W. Pierpoint writes that the Black Bear mine is showing up well and that the mill is running by water power, 16 stamps in motion. Mr. Daggett has a large quantity of ore ready for crushing and a force of men are engaged underground taking out more. Schroeder and Werner on the East Fork of Deadwood have struck richer quartz than ever and have made several new locations which are also said to be extremely rich. The San Francisco parties who were here a few days ago for the purpose of bonding the claim, failed, the terms not being satisfactory to the owners. An offer was made to sell the claim for \$100,000 if taken before the 1st of January next, which offer will no doubt be accepted as the price is more than reasonable.

Trinity.

MACHINERY FOR NEW RIVER.—Journal, Nov. 28: Mr. G. V. Healy recently arrived at Eureka with a one-stamp mill, a concentrator and steam engine, en route for New River where it will be put in operation on rock from his Modoc mine. The New River district is not "played out" by any means. It will yet prove a prosperous district.

Tuolumne.

DITCHES.—Tuolumne Independent, Nov. 28: The current of business life is now running through the veins of the county, and better times may henceforth be expected. At noon, on Thursday, the water which was turned into the ditches of the water company reached the places where it will do the most good, and there is now an abundance for mining, milling and all other purposes. The company has been at large expense in repairs and improvements, and the people will soon begin to reap the benefits of this necessary element to prosperity. The long season of inactivity in mining has been depressing to every business man. The late rain of last season falling on a light snow harvest in the mountains caused a rapid disappearance of the reserves of ice and snow which supply the miners in the summer and fall seasons. The consequence was that the water in the ditches failed at an unusual early date, and the continued clear skies of the first fall months caused depression throughout the county and gave rise to gloomy forebodings. The mining interest being prominent in this section, and thus paralyzed for want of the necessary element to give it vitality, every one was in the dumps and business suffered. Now all this will be speedily changed, it is hoped, and soon good times may come again.

WORK ON THE MOTHER LODE.—Union Democrat, Nov. 28: There is promise of great activity in mining operations along the mother lode at Whiskey Hill and Quartz Mountain during the coming year. The outlook for that section has not been so hopeful for some years, and the prospects are based upon actual development. From a gentleman well acquainted with the locality we learn that there is a number of mine-owners have fine showings in their properties and are preparing for a busy season. John Collins, who is working the property under a lease, is breasting out ore from a four-foot vein in the Alabama and will shortly start the mill up on it. Good judges estimate that the rock being extracted

will mill from \$10 to \$15 per ton. W. N. Harris is running the Little Gem 10-stamp mill on ore from the Juaniata. Three men working in a six foot breast take out sufficient ore to keep the mill running 12 hours out of the 24. Mr. Harris says his rock will pay from \$10 to \$15 per ton. The Crystalline mill has started up for a long run. A breast about 20 feet wide is being taken down. All of the rock, which averages about \$8 per ton, is run through the mill. All the stamps of the Hespeler mine are going in good average rock, and Capt. Bowman reports the mine in splendid shape. The App mine is also looking well, and the mill will considerably swell the bullion shipments.

NEVADA.

Washoe District.

HALE & NORCROSS.—Enterprise, Nov. 28: The main south lateral drift on the 3100 level is being pushed steadily ahead, skirting along the eastern side of the ore vein, running in very favorable vein matter, quartz, porphyry, and clay. The drift is west of north, following the main trend of the ore body and keeping in good working ground, where any trouble from water is avoided. When the proper point is reached, one, two or three crosscuts will be made westward into the ore vein. Good prospects are found on the 3100 level, but the principal work of the mine is confined to the 3100 level.

CHOLLAR.—On the 3100 level the main lateral drift south was in 500 feet last evening, still following along the west side of the heavy quartz ore vein and keeping in the black dyke formation bordering the west country rock or diorite of Mount Davidson. The formation has become a little harder since last report, but is of the same general character, the air is good and excellent progress continues to be made.

SIERRA NEVADA.—Work in the face of the main north lateral drift on the 520 level has been resumed since last report. It has attained a length of 100 feet north from the shaft, and it has been advanced 84 feet further, making a total of 1085 feet. The face is in clay and quartz, with a little water coming in. All other drifts or crosscuts on this level are suspended at present, and work concentrated in the advancement of this main lateral drift northward.

CON. CALIFORNIA & VIRGINIA.—About 125 tons per day continues to be the average daily yield from the 1750 level, worked on company account, reduced at the Morgan mill, battery samples assaying \$22. The northwest drift on the 1650 level is in 318 feet, going after the old California ore stopes and leavings. The ore yield from the Jones lease section, between the 1200 and 1400 levels, has been increased to 120 tons per day, which is reduced at the Eureka mill.

CROWN POINT.—Quite an increase of excellent ore has been coming during the last week or so from the new stopes of the 1700 and 1750 levels which added to the large amount of lower grade ore from above the 1400, keeps all the mills running on it well supplied. The Belcher 1700 level is also turning out some tolerably high-grade ore. The two mines give a daily yield of nearly 500 tons.

YELLOW JACKET.—One hundred and seventy-five tons per day continues to be the regular yield from the old upper workings down as far as the 1350 level. The main lateral drift on the 1700 level from the Crown Point through the Kentuck has not yet reached the ore body expected to be developed by it in the northern section of the mine at that depth.

OPHIR.—On the 400 level the south lateral drift is now in 235 feet from the main west crosscut from the Mexican shaft. This drift is all the way in low-grade ore, showing better as it advances to the south. A crosscut west, started from it 180 feet south from the main west crosscut, has been advanced 47 feet, showing, however, no improvement of material thus far.

ALTA.—Some quartz of very fair quality is being found in the explorations of the 700 level, near the connection recently made with the upraise from the 950 level, and a good air circulation being established, working facilities are much improved, and a good ore body may be encountered at any time.

MEXICAN.—The two lateral drifts north and south recently started 200 feet east from the main lateral drift, in a strongly mineralized point of the ore vein, are in respectively 90 and 98 feet, and making good progress.

GOULD & CURRY.—West crosscut No. 2, 170 feet south of the north line, or opposite the shaft, has been extended 52 feet, making a total of 152 feet. The matter continues the same as at last report—hard, dry vein matter.

UNION CONSOLIDATED.—The crosscut east on the 500 level, 100 feet south of the Sierra Nevada line, is in 277 feet from the main lateral drift, having been extended 32 feet. Material, very promising vein matter.

BEST & BELCHER.—West crosscut No. 3 on the 1000 level has been extended 46 feet, making a total of 183 feet. Material, vein porphyry, clay and a little quartz, with a slight seepage of water.

KENTUCK.—Sufficient ore is being extracted from the mine in the old workings, above the 1300 level, to keep the Rock Point and Douglass mills steadily running.

Columbus District.

HOLMES.—True Fissure, Nov. 29: The ledge is very strong and produces well. During the present week we will commence work above the 5th. I think this ore body will extend up to the surface in front of the ore bodies that were worked by the Northern Bell Co. This section will produce a large amount of fine milling ore. We have not worked this ground above the old 6th level. The drift that we now call the Creer drift has been called the 2d level west. We have developed a fine body of ore in this drift. This ore is on the same ledge that the hot spote is on. The ore looks the same and the yellow chlorides are very rich. The 5th level crosscut has attained a total height of 94 feet, with no change in its general appearance. Everything at the mill and mine is in good order and working well.

MOUNT DIABLO.—We will finish cutting out the chute for the 7th level in a few days. The west drift on the 6th level is in 476 feet, and there is a small streak of low-grade ore showing. The east drift on this level is in 215 feet, and the face shows favorable ground for ore.

COLUMBUS CON.—Work was resumed in this

mine some time since, but up to date no material development has been made. Two prospecting drifts are being run, one east and the other west, but so far nothing of any consequence has been encountered. A raise has been started from the 200 level which presents a favorable appearance. Since the resumption of work no ore has been extracted.

CLIMAX.—The tunnel has been driven 185 feet in extremely hard ground. It will tap the ledge at a depth of 200 feet and will open up the mine in good shape, so that the boys will be able to take out considerable ore.

VICTOR.—Martin & Baker, as a result of twenty days' work, shipped eight tons of ore to Selby & Co. They received the returns the other day and find themselves \$300 clear ahead.

GENERAL GRANT.—William Dunlap and partner will start operations in a few days.

SILVER STAR.—J. L. Callison is doing his assessment work.

Eureka District.

ANOTHER \$1,000 DIVIDEND.—Eureka *Sentinel*, Nov. 28: The Silver Connor mine on Prospect Mountain continues to yield well, and during the past month there were shipped from the property to the Richmond reduction works 107 tons of ore, which netted a sufficient amount to allow its four owners to divide among themselves yesterday about \$1,000. These dividends have been monthly now for some time past, and judging from the limited amount of work done in the mine it is probable they will continue for years to come. The property is so located on Prospect Mountain that it is difficult to park ore down from it in the winter, when roads are bad, and heretofore the mine has been closed down during the season. It is probable work will be continued this year until Christmas, when each of the owners will doubtless again pocket out of the net profits \$250 each.

ORE SHIPMENTS.—During the week ending yesterday ore shipments were made from the mines of the district to the two reduction works in town, as follows: To the Richmond works—Water Jacket mine, 4 tons; Matamoros, 2; Continental, 2½; Frazier & Molino, 29; Excelsior, 53; Republic, 14; Fairplay, 17; Silver Connor, 107; Lone Pine, 22; Broy, 12; and Fourth of July 7. To the Eureka Con. works—Dunderberg mine, 54 tons; Gila, 1; Queen Elizabeth, 1; Florence Osgood, ½; Bloomington, 1; Perseco, ¼; Taylor, 1; Estor, 1, and Alexandria 9.

THE JACKSON MINE.—Excellent progress is being made in freeing the 600-foot level of the Jackson mine of the 12 feet of water that accumulated there during the past three years. The work was commenced on Wednesday last, and yesterday afternoon we were informed by Superintendent Shaw that it had been lowered six feet, and that by Tuesday next he expects to have the level entirely freed so that the miners can enter it and prepare for prospecting work.

Ophir Canyon District.

HIGH GRADE.—Belmont *Courier*, Nov. 24: Work goes bravely on in the Twin River Company's mine in Ophir Canyon under the able management of L. J. Hanchett. It is expected that the mill will soon make a run on ore from the mine. The ore which is extracted is generally of a high grade and therefore the run may be expected to prove a profitable one.

Peavine District.

MILL AND FURNACE.—Virginia *Chronicle*, Nov. 28: A mill has been built at Peavine, near Reno, with a furnace and both attached for working refractory ores, by Messrs. Halleck and Griffin. By their process it is claimed that the \$10 refractory ore now on the dumps at the mine in that district can be reduced to bullion, and leave a margin for the owner. The ore is crushed, roasted and subjected to a chemical bath, the secret of which has not been made public.

Rebel Creek District.

OHIO ORE.—Silver *State*, Nov. 26: E. O. Conner's team arrived here yesterday with 12,000 pounds of ore from the Ohio mine at Rebel Creek. The roads are so bad that the team did not bring much over half its usual load.

ALASKA.

PANNING OUT.—Alaskan, Nov. 7: From reliable sources we learn that quite a number of miners will winter on the White and Stewart rivers, where they are panning out from \$25 to \$30 each per day. Thomas Boswell, Jeremiah Berthold, Frank Moffat, Richard Paplin, Peter Weiberg and Francis Fraser are located about 60 miles above the mouth of the Stewart, and are making the amount stated above with rockers. Hugh and Albert Day, Isaac Powers and Stephen Custer are at work on a bar 16 miles up the Stewart. J. P. Chapman, Chas. Powell, Hen. Matteson and Franklin will winter on the White some distance above the mouth, where they will trap and hunt until the weather is again favorable for prospecting and mining. Joseph Ladau, Michael Hess and Thomas Williams are at the mouth of the White, where they will also hunt and trap during the winter. The White river takes its name from the color, or rather lack of color, of its water. The New Racket, a small steamer plying on the Yukon, was up the Stewart river the latter part of August, and landed \$1500 worth of provisions for the party of six first mentioned above. Another steamer called the Yukon came up as far as Fort Reliance. It is sincerely to be hoped that these hardy miners who have penetrated so far into an unexplored wilderness may find gold enough to enrich themselves to almost any extent within the limit of a reasonable wish. They well deserve all they can find, even though the same total mounts way up into the millions.

COLORADO.

JOE REYNOLDS.—Georgetown *Courier*, Nov. 24: A shipment of one carload of ore was made from the property this week. The mineral came from the Kavanagh & Daily lease on the tunnel level No. 2, lode.

COLORADO CENTRAL.—According to the annual report, the Colorado Central has netted its stockholders about \$120,000.

PAY ROCK.—The Pay Rock tunnel level, Silver Bank, and 90-foot levels are being pushed ahead very vigorously, and although this causes a great deal of dead work, the policy is one of true mining, namely, to keep plenty of ground opened up ahead.

During the past week large shipments of ore have been made from this mine, both by company and lessees.

SNOWDRIFT.—During the last year's operations of this property considerable work has been done. The work done has been principally in development, although one party of lessees took out in seven months \$2800 worth of ore, over hauling and milling charges. The average net value of all the ore mined was \$160 per ton, and mill-runs were had of 649, 679, 779 and 864 ounces silver per ton. On the Daniel Peters lode some stoping was done, and ore as high as 454 ozs. mined in the upper level. The lower level was cleaned out and 250 feet of double track laid. The property is in good shape, and ought to yield largely the coming year.

IDAHO.

LAVA DISTRICT.—Wood River *Times*, Nov. 28: All the mining prospects that are being worked are showing exceedingly well, and many of the prospectors have outfitted themselves for the winter, and settled down to work on their claims. Several bonds have been taken on different properties on Lava creek, which will be worked all winter, besides two or three others which will be worked under leases.

THE DONOVAN GROUP.—The boiler for the Donovan group of mines (which is incorporated under the name of the Idaho Gold Mining Company of Utah) was hauled through town to-day, on a truck belonging to the Hailey Transfer Company. At the Donovan mines and mill-site, 26 men are kept busy mining or erecting the mill. The timbers are all framed, the machinery (excepting the boiler) is already on the ground; a man is on the way from Boston to see that the Wiswell electric machinery is properly placed, set and started, and to make the first trial run and cleanup.

PLACER MINING.—Cor. Helena *Independent*: The California Ditch Company, composed of W. J. Hawkins, now of Murray, James Steel, of Portland, Ore., and two others, have completed a water flume of 1000 inches capacity from near the head of Pritchard creek (taking in the waters of Bear and Butte gulches) running along the north side of Pritchard creek and on around on the hill side to the north, to the head of Daisy gulch, which is a south tributary to the east fork of Eagle creek. This flume is for the purpose of supplying water for hydraulic sluicing on the hill diggings north of Pritchard creek, and the placer grounds in Dream, Missoula, Dry Alder and a number of other gulches which come into Pritchard creek from the north. The Coulter Flume Co. are at work building a flume four feet wide and one and a half feet deep, still higher up the mountain side than the California Ditch Co.'s flume, which will be eleven miles long when completed. The Dry Gulch Co., under the management of W. J. Hawkins, who owns a large interest, are working their placer grounds a quarter of a mile northwest of Murray, in Dry gulch. They keep two hydraulic pipes running night and day. Bedrock is from three to fifteen feet deep. The gold is fine, coarse, and nugget gold. W. J. Hawkins showed me a part of a tin cupful of the gold—over \$200 worth—the cleanup of a twenty-four hours' run; also, a \$36 nugget, which one of his men had picked up out of the gravel in the claim that day. A Louisville, Ky., Co. is working the Golden Chest lead, two miles northeast of Murray in Reeder gulch. They pay out \$6000 monthly for wages and supplies. They have ten 140-pound stamps dropping ninety times a minute, day and night on the \$130 per ton free milling gold quartz, taken from an eight foot ledge just back of the mill upon the mountain side. The ledge is tunnelled to the depth of 350 feet, and it still holds its width and richness. About two miles down Pritchard creek the Golden King Mining Co., composed also of Louisville capitalists, own a number of leads known as the Skookum Group, two of which are being opened up under the immediate supervision of Richard A. Pomeroy, late of Colorado. This company have completed 250 feet of flume from the bed of Pritchard creek, up along the hillside, to a point above a site on which they are preparing to erect a 40-stamp mill. They now have men at work on a large boarding house for the men they will employ. The company, Colonel Pomeroy said, did not wish as yet to mention the extent and quality of the veins in their numerous mines. In the Beaver creek country, the Potiso Ditch Co., composed of Denver, Colorado, men, have two ditches, one higher up on the mountain side than the other, taking the water out of the upper end of Beaver creek, running down (west) along the north side of the creek to Potiso gulch, another tributary of Beaver creek. Two placer claims are being worked in Potiso gulch. In American gulch, a small side gulch putting into Potiso, Coy & Parks have been taking out twenty to thirty dollars a day to the man for the last six months. On Trail creek, another north tributary putting into Beaver creek at the town of Delta, the Myrtle Mining Co. are working placer ground which is twelve feet to bedrock. Half a mile above the town of Myrtle, on Trail creek, another large piece of placer ground is being worked by Bosse & Co. On these two claims the surface gravel is removed by mule teams and scrapers, the dirt next to the bedrock is then washed in sluice boxes. Three other placer claims, which are said to be paying well, are being worked in Placer gulch, which puts into Trail creek from the east, just above the town of Myrtle.

WILLIAMS' FORK.—The veteran prospector, Mr. E. S. Streeter, returned from Williams' Fork last week, bringing with him some excellent specimens of silver "sulphurets," showing the quality of surface ore in that locality. These specimens assay as high as 3000 ozs. silver to the ton. Mr. S., together with others, has been prospecting in that district for the past three years, and has met with good results. During this time he has been operating principally on Candler mountain, where he has located a number of valuable claims. The district shows well for surface work. No deep operations have yet been made, the deepest workings so far not exceeding 150 feet; but indications at this depth and at surface show flatteringly for a good mining camp in the future. What is wanted now is capital to develop the resources of the section. Among the prominent mining operators of the Forks may be mentioned Wilson & Co., W. Cozens & Co., Webb & Sanders, Mitchell Bros., and Katt & Co., who are working properties with good showing. They have large dumps, which they think will run from 20 to 40 ozs. in silver to the ton, and there will be an

effort made to build a furnace for the purpose of utilizing these low grade ores. It is supposed and earnestly hoped that the B. & M. railroad will be built down the Grand, and give an outlet and boom to the mines of Williams' Fork. In 1880 the country was widely prospected, and hundreds of claims were located upon which no work has since been done. Their abandonment leaves them free to be relocated by any prospector that wishes to. Very few patents have been obtained on properties in the district. The country will one day undoubtedly be a great mining camp.

CONCENTRATOR.—Idaho Springs *Gazette*, Nov. 28: The concentrator is running steadily on concentrating ore. A large quantity of nice smelting ore is purchased by Gleim & Co., Charley Roberts, a denizen of Cascade district, is doing much towards opening up the resources of that camp. He has control of some valuable property in that district, and has lately started up an enterprise which, with but a small outlay of money and muscle, is certain of success. Commodore Beazy has done a great deal toward opening up our mineral resources. Some years ago he started a tunnel up Virginia canyon, on what was supposed to be the extension of the France. The tunnel was driven a long distance and no pay was struck. A few days ago Vic Beazy, in doing the Chaffee work on the surface just over the tunnel, uncovered a small streak of ore. A sack-full sampled nearly \$2000 a ton. The tunnel is not upon the right vein. How many mistakes are made just like this, then the property condemned? The Union Smelting and Refining Works, which used the Campbell patents for roasting, will not be started up again. Not for any reason of the smelting or roasting process, but because the works were not erected to handle the ore economically as far as labor was concerned. The works were originally the old Star, and then the Wilson smelter, and were fixed over and over. It took too many men to handle the product.

LEADVILLE.—Tribune *Republican*, Nov. 28: The Tenderfoot mine at Leadville is now demonstrating what nerve will accomplish when rightly applied to mining. Good mining work, however, is being done in all parts of the carbonate camp in both old and new properties, and the prodigal waste and lack of judgment so characteristic in the past are no longer striking features. Properties on Fryer Hill that were left as abandoned prospects several years ago are becoming productive under the thorough workings of the present time. Played out mines are also producing, and of this class the Chrysolite continues shipping considerable high-grade ore from the body opened up four weeks ago. The ore is holding out nicely to the south and east, and the possibilities of the body still remain undetermined. It is reported that the lessees working in the northern portion of the Little Chief mine have disclosed the extension of this ore body 65 feet distant from the nearest workings in the Chrysolite. The production of ore from other portions of the Chrysolite mine is about up to the average of the past few months. The Chrysolite mill is running regularly on low-grade free-milling ore, not adapted to the smelting process.

MONTANA.

MOULTON.—Butte *Miner*, Nov. 28: The stopes show the average quantity of good ore, and all the machinery is in first-class running order.

SILVER SAFE.—Considerable second grade ore is being taken from the mine and sent to the mill. No first-class rock is being taken out at the present time.

ALICE.—The bullion output has been fully as large as usual. All the machinery is in full blast.

ELM ORLU.—In the north cross-cut to the ore body the drift is in vein matter all the way, showing some streaks of splendor ore, but the main body has not yet been reached.

BLACK ROCK.—All of the ore stowed away on the 65-foot level has been hoisted out of the way, and most of it has been delivered at the Colusa smelter. The ore streak fills the shaft, and assays 57 ounces per ton, and there is no waste to hoist. The company has made a contract with the Colorado smelter to ship to the latter 10,000 tons, more or less, of its ore, of a grade from 20 ounces per ton upwards. It will, on account of the manganese it contains, be used as a flux.

NORTH STAR.—The drifts east and west in the 160-foot level show very large bodies of ore, and some handsome assays are returned. No ore is being taken out for the present, although there is plenty of it in sight in both east and west drifts on both levels, and all work is being concentrated in the drift for the Salisbury lode.

GENERAL NOTES.—The Wild Bill continues to look as well as ever, French & Co. are pushing work rapidly on their lease of the Ophir. There will soon be a new shaft house built over the North Star shaft. The Butte smelter between the depot and the Colorado has shut down again. The Amy Silversmith shows very well, and the vein is said to be large and regular. Clark's Fraction keeps the teams going, and is sending some splendid ore to the mill. The Little Darling has some very rich quartz, and the vein shows exceedingly well. The Poser folks are pushing work as fast as they can, and are taking some very good ore from the bottom of the incline. The lessees of the Minnie Irvine are happy as they progress with their work, and it is said that the ledge is improving all the time. Yesterday the Lexington hung up thirty stamps, some repairs having become necessary. In a day or two they will be hammering away again. The Neptune still sends a quota of good ore to the mill, and from present indications can continue to do so as long as the management wants to. At the three Unions the work of opening up continues, and it is reported to be the intention of the management to keep the vertical shafts going down as rapidly as possible. The Clear Grit has a good sized pile of ore on the dump, upon which the teams now hauling make a small impression. Their ore dump is small, and just enough ore is being extracted to keep it filled up.

NEW MEXICO.

WATER CANYON.—Socorro *Bullion*, Nov. 28: McLeish & Leddy have done some excellent work, with good results, on the Maggie Merchant. Wm. Mahan owns a very promising claim near the Jane Bowman. He is now sinking a shaft upon it. The L. V. & St. L. Mining and Smelting Company are placing more capital in the Spotted Prince. It looks well.

MAGDALENA DISTRICT.—Jose Robles is working the Aztec and Montezuma. Charles Carleson and Frank Staup are delving in their valuable claim. Dr. Abernethy is working the Little Luella and Hermosilla for Colonel Eaton. Hollenbeck & Hasty have inaugurated work in their promising properties. Percival Henderson is now superintending operations in the Juanita mine.

PUEBLO DISTRICT.—Shep. Lewis is dumping pay dirt out of his claim. Shipment of Gutierrez ore to the B. M. & M. Co.'s mill continues. Huston & Holmes are working the Copper Button, McKay and Plain View. Night and day shifts are working constantly in the Pajaro and Parnerio mines. W. H. McGehee and W. H. Patterson are developing their Meramac mine successfully. The Metzger mine, owned by Brittenstene & O'Rear, is dumping pay mineral daily. Developments of the Golden Queen commenced this week, and it is furnishing a good-grade milling ore. Shipments of rich silver ore are now reaching the Billing works from the Sophia, which is exploited by R. N. Sniffen.

LEACHING.—The Sierra Grande lixiviation works, are expected to be in operation sometime in the month of January. Mr. Russell has made an engagement to spend six weeks at Lake Valley for the purpose of putting the plant in good working order. No mining work will be done before the 1st of January. There are 6000 tons of ore ready for the mill now. It is probable that some custom work will be done. Frank Bell, who, with Mr. Skillicorn, is working the Pacific No. 2 mine, at Pinos Altos, was in town a few days ago, and had with him some remarkably fine specimens of gold rock. Several pieces showed the cleavage planes to be filled with a perfect mat of wire gold. Owing to the late hour last week which the *Enterprise* received definite and reliable information concerning the transfer of the McGregor mines, at Georgetown, the account of that important sale was necessarily brief, although the chief facts were given. The purchasers took possession on Wednesday of last week, and on Friday following, the deeds of transfer were recorded. The McGregor and the Grampian are the mines which have been worked principally and out of which the larger part of the ore produced has come. The books of the company show a product since 1873 of \$280,000, and in addition to that sum it is estimated upon a reliable basis that upwards of \$25,000 worth of ore has been extracted which is not accounted for on the books.

OREGON.

THE VIRTUE MINE.—Bedrock *Democrat*, Nov. 24: Mr. Terry, the new superintendent under whose directions work will be resumed at the Virtue mine, east of this city, returned Sunday from San Francisco. Yesterday he left for the mine, taking with him supplies for the few men who are already at work there. As yet we are unable to state how many men will be engaged this winter, but we understand there will not be a very large force engaged, as the work is of such a character that a large number of men cannot work to any advantage. The first work will be the cleaning out of the old tunnel and main shaft and putting in timbers where the old ones are considered unsafe. Parties having contracts to deliver wood and lumber have fulfilled the terms thereof and everything is in readiness to commence operations. The output of the Virtue a few years ago, when properly managed was enormous, and there is no doubt but what it will pay as well in the future. With the Virtue, Mammoth and several other well known mines in the vicinity in full blast in the spring, and Pine creek booming, Baker City's interests will receive an impetus that will crown her the Queen City of Eastern Oregon.

PINE CREEK.—A friend writes us from Pine creek as follows: Joseph Luce, general superintendent of the O. G. M. Co. has forty-two men engaged in building bridges on the road to the mine, cutting timber for tunneling the tunnels and shafts, etc. He expects to be in full running order, boasting by the first of December. The company have also put up an office in town and one at the mine, and are building a boarding house 16x50 and a shaft-house 16x40. Many persons acquainted with Mr. Luce have informed us that he is pushing matters expeditiously and making a good showing on the Whitman, where these works are being erected. By spring he will have everything in shape to ascertain the value of the ledge and everything requisite for the successful working of the ore. Other discoveries are being developed with commendable energy, all interested having the utmost confidence in the permanency and wealth of the camp. There is considerable snow in that district which ends the prospecting season for this year, but men who spent the summer the camp/claim that there will be as many and as in rich discoveries made next season as were made in the one just ended.

UTAH.

REVIEW.—Salt Lake *Tribune*, Nov. 28: The week has been prolific of storms, alternating with sunshine. The movement of the metals has been brisk, though no great event has marked the seven days. It has been a good week for dividends, however, the Ontario giving notice of its eleventh dividend of 50 cents a share, aggregating \$75,000, and making the total dividends of the year \$900,000, or \$6 per share; it will be paid on the 30th. The Honerine paid its fifth dividend on the 25th in Boston, five cents a share, aggregating \$12,500; total of five dividends, \$62,500. The shipments out from this city for the week ending Saturday, November 21st, inclusive were 1,279,256 pounds. The receipts of bullion and ore in this city for the week ending Nov. 25th, inclusive, were—of bullion, \$127,734.99; of ore, \$26,049.18; a total of \$153,784.17. The week before the receipts were \$109,267.57, of which \$86,657.57 was bullion and \$22,610 was ore. The output of the Ontario for the week was \$35,482 of bullion, raising its total for the year to \$1,476,945.21, from which \$900,000 in dividends has been paid, as noted above. The property is in first-class shape in every respect. The Stormont sent up two bars of silver on the 20th, \$2800. The product of the Hanauer smelter for the week was nine cars of bullion, \$27,520; of the Germania, six cars, \$12,859.34. The Alice sent down during the week 46 bars of bullion, \$48,273.65. Ore receipts were as follows: From the Honerine, \$13,231.18; Merwin, \$1406; Lead Mine, \$1200, Utah. From the Queen of the Hills, \$7965; Bannock, 8½ tons, \$2247, Idaho.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Prest and Treas.

GEO. W. DICKIN, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.



GOLD QUARTZ and PLACER MINERS'

SILVER PLATED AMALGAMATING PLATES
FOR SAVING GOLD.

Have been Awarded the First Premium at Mechanics' Fair for the Last Thirteen Years.

Every description of plates for Quartz Mills and Wet or Dry Placer Amalgamator Machines made to order, corrugated or plain.

OVER 3,000 ORDERS FILLED!

References from every purchaser. Full weight of Silver guaranteed on every order.

The most extensive and successful manufacturer of these plates in the United States. Will fill orders for delivery in Rocky Mountain and Pacific Coast Mining States at lower prices than any other manufacturer.

Old Mining Plates Replated. Old Plates bought gold separated for low percentage of result.

SEND FOR PRICE LIST.

SAN FRANCISCO GOLD, SILVER, AND
NICKEL PLATING WORKS,
653 & 655 Mission St., San Francisco, Cal.
E. G. DENNISTON, Prop'r.

JAS. LEFFEL'S TURBINE WATER WHEEL

The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

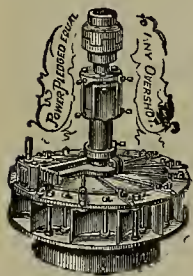
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

THE JENKINS STANDARD PACKING



IS ACKNOWLEDGED BY USERS AS THE BEST in the world. Unlike all other Packings, the Jenkins Standard Packing can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint, it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal), and will last for years, as it does not rot or burn out. Avoid all imitations, as a good article is always subject to cheap imitations. The genuine has stamped on every sheet "Jenkins Standard Packing," and is for sale by the Trade generally.

Manufactured only by

For Sale by DUNHAM, CARRIGAN & CO., San Francisco, Cal. | JENKINS BROS., 71 John St., New York.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL

222 & 224 FREMONT STREET, SAN FRANCISCO.

THE PACIFIC COAST

ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

THE CALIFORNIA POWDER WORKS.

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and

HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE.

ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. LOHSE, SEC'Y.

Office, No. 230 California Street

San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

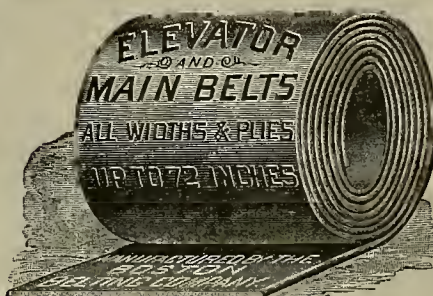
JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting,
Abendroth & Root's Spiral Pipe, Iron Wheel-barrows,
Ore Cars, and Buckets,
Hoisting Engines,
Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Ohiuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers,
Blake Steam Pumps, Hazard Wire Rope, Allison
Artesian Well Casing,
Eclipse Blowers,
Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

Metallurgy and Ores.

SELBY
SMELTING and LEAD CO.,
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,
LEAD PIPE,

SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL

Location of Works: Melrose, Alameda Co., Cal.

OFFICE: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 upward per ton; Jewellers' sweepings and scrapings bought or worked for the owners at a fixed rate per ton. Rebellious ores especially solicited. Ores worked and practical working tests made by any process, to wit: Amalgamation in battery and copperplates for free gold ores. Amalgamation in pans for silver and gold ores, with or without roasting. Leaching of silver ores. Chlorination of gold sulphurets. Assaying, Chemical Analyses of Ores, Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

624 SACRAMENTO STREET,

SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,
MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL

METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on. Practical instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.

118 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.

Personal attention insures Correct Returns.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

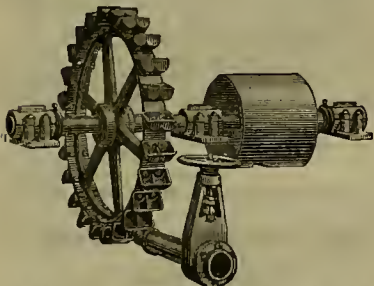
Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street
San Francisco, Cal.

MECHANICS' MILLS.



Water Tanks. Wine Tanks.

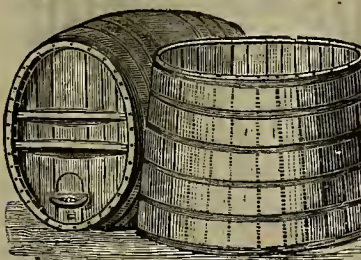
Our well-known TANKS are made by machinery, from the best of materials, and shipped to all parts of the country. Each piece numbered. No skill required in setting up.

WELLS, RUSSELL & CO.,

Proprietors Mechanics' Mills

Cor. Mission & Fremont Sts., San Francisco

WATER TANKS! WINE TANKS!
CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors,

30 to 40 Spear St., - San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven M'fg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matchers Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

Lane and Bodley Saw mills.

H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of **MILL SUPPLIES AND LUBRICATING OILS.**

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, San Francisco, Cal.

IRON CASTINGS OF ALL DESCRIPTIONS.

A. T. DEWEY, } Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED
W. B. EWER, } 1860.
GEO. H. STRONG, }

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department to, San Francisco.

YOSEMITE G. & S. M. Co.—Nov. 28th. Location, Fresno Co. Capital stock, \$15,000,000, in 150,000 shares. The Directors are Robert Ray, M. San Pedro, E. Derbec, L. Dutertize and P. G. Somps.

CALIFORNIA SCHOOL OF MECHANICAL ART.—Nov. 1st. The school was founded by a bequest from James Lick, and is provided for the teaching of arts of life, workers in wood, iron and stone, and the institution is to be open to youths born in California. Directors, Horace Davis, John Earl, A. S. Hallidie, Lorenzo Sawyer and J. D. B. Stillman.

McCUE CARRIAGE FACTORY.—Nov. 1st. Object, carriage manufacture. Capital stock, \$25,000. Directors, Louis T. Haggin, William Willis, John Nolan, Julius C. Green and Irwin C. Stump.

SIERRA-PHENIX M. Co.—Nov. 1st. Capital stock, \$500,000. Directors, Arthur F. Price, J. F. Evans, H. J. Owen, J. R. Hall and A. B. Paul.

HOME MUTUAL LOAN AND BUILDING ASSOCIATION.—Nov. 1st. Object, to make loans for acquiring real estate. Capital stock, \$2,000,000, in 10,000 shares. Directors, Charles Macabe, Charles K. Clark, Geo. M. Mitchell, Edward N. Harmon, Edward C. Hughes, Henry G. Phillips, Monroe Greenwood, George Mearns and Wm. M. De Wolf.

ROUND VALLEY MINING CO., Nov. 1.—Location, Plumas Co.; capital stock, \$1,500,000, in 150,000 shares. Directors, A. D. McIntyre, J. L. Bransford, George W. Handy, John Lloyd, N. W. Griswold, Levi Jenks, Henry C. Hyde.

COSMOPOLIS MILL AND TRADING CO.—Nov. 1. Object, to trade in lumber in Washington Territory; capital stock, \$100,000. Directors—C. F. Leavenworth, J. M. Riley, M. G. Toenfen, J. J. Scrivner and John L. Boome.

SPANISH GRAVEL MINING CO.—Nov. 1. Capital stock, \$1,000,000. Directors—Charles E. Shattuck, Thomas H. Henderson, John W. Stewart, Fred E. Shearer and George E. McConnell.

EMERALD MINING CO.—Nov. 2. Capital stock, \$5,000,000. Directors—A. Perutez, James Salfsfohn, William Adelsdorfer, Bende Leon and S. Bergmann.

TYROLESE MINING CO.—Nov. 2. Capital stock, \$100,000 in 10,000 shares. Directors—A. Perutez, James Salfsfohn, Wm. Adelsdorfer, Bende Leon and S. Bergmann.

Mining Share Market.

Stocks seem to remain at about the same figures, there being little fluctuation apparent. Active development work is going ahead, as usual, in the mines of the middle section of the Comstock. The good ore veins and streaks heretofore developed in the Hale and Norcross assay finely. The main south lateral drift in Chollar, on the 3100 level, is now 500 feet long and rapidly nearing the north line of the Potosi mine. No crosscutting or sinking deeper is talked of at present. A full force of miners are employed in the Gold Hill section, including the Yellow Jacket, Kentucky, Crown Point and Belcher, and also in the old bonanza mines of the north end—the Consolidated California and Virginia. The Ophir bids fair to skin out some good ore resources before long. Over 1000 tons per day is the regular product of the Comstock at present, with a prospect of an increase. Meanwhile a large amount of prospecting work is being done with a judicious view to further ore development and supply. The Carson river is booming full of water, giving every mill along its course its full requisite of motive power, with a plentiful surplus flowing away toward the Sink. Every mill in the section is now running to its full capacity on ore of some kind.

Bullion Shipments.

Argus, November 26, \$11,831; Banner District, 26, \$4500; Lexington, 24, \$25,760; Moulton, 25, \$37,480; Dexter, 25, \$4944; Alice, 25, \$31,580; Silver Bow, 25, \$10,226; Barber's Mill, 29, \$5000; Calico Mill, 24, \$8400; Hanauer, 25, \$10,600; Ontario, 25, \$35,482; Meridian, 26, \$1406; Alice, 26, \$9496; Hanauer, 26, \$3300; Queen of the Hills, 26, \$1500; Germania, 23, \$5941; Hanauer, 28, \$9500; Crescent, 28, \$2700; Queen of the Hills, 26, \$2500; Hanauer, 29, \$3100; Germania, 29, \$1953. The hanks of Salt Lake City report the receipt for the week ending November 25th, inclusive, of \$127,734.99 in bullion and \$26,049.18 in ore, a total of \$153,784.17.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Baker Divide M Co.	California.	10.	25.	Oct 29.	Dec 1.	Dec 21.	D M Kent.	330 Pine St
Buchanan M Co.	California.	14.	15.	Oct 30.	Dec 5.	Dec 21.	J P Sullivan.	121 Post St
Brookman M Co.	California.	8.	5.	Oct 27.	Dec 17.	Dec 17.	C W Sessom.	308 Montgomery St
Bulwer Cou M Co.	California.	2.	20.	Oct 21.	Dec 10.	Jan 20.	W Willis.	309 Montgomery St
Chollar M Co.	Nevada.	15.	50.	Oct 21.	Nov 24.	Dec 16.	C E Elliott.	309 Montgomery St
Com Anador M Co.	California.	10.	50.	Nov 2.	Dec 2.	Dec 18.	F B Labam.	327 Pine St
Daisy Cement M Co.	California.	5.	20.	Nov 8.	Dec 12.	Jan 12.	C J Collins.	512 Montgomery St
Del Norte M Co.	California.	5.	30.	Nov 8.	Dec 14.	Dec 7.	J B Cronan.	230 Montgomery St
General L & M Co.	Arizona.	1.	01.	Nov 28.	Jan 9.	Feb 8.	C E Gillet.	628 Montgomery St
Gudulupe M Co.	California.	1.	05.	Oct 22.	Nov 16.	Dec 14.	R Elliot.	310 Pine St
Golden Jacket M Co.	Nevada.	1.	05.	Oct 27.	Dec 3.	Dec 26.	M McCallan.	331 Montgomery St
Justice M Co.	Nevada.	43.	10.	Nov 23.	Dec 30.	Jan 19.	R E Kelley.	419 California St
Julia Con M Co.	Nevada.	21.	10.	Nov 4.	Dec 9.	Dec 30.	J Steedfield.	419 California St
North Gould & Curry M Co.	Nevada.	9.	20.	Nov 23.	Dec 24.	Jan 11.	O H Mason.	331 Montgomery St
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Jan 4.	H Deas.	309 Montgomery St
New York Hill M Co.	California.	9.	15.	Oct 20.	Dec 3.	Dec 24.	B Leighton.	313 Montgomery St
Nevada M Co.	Nevada.	13.	02.	Nov 2.	Dec 2.	Dec 23.	J W Pew.	310 Pine St
Potosi M Co.	Nevada.	21.	30.	Dec 1.	Jan 7.	Jan 23.	C E Elliott.	628 Montgomery St
Russell Reduction & M Co.	California.	1.	25.	Oct 15.	Dec 29.	Jan 19.	J Morizio.	328 Montgomery St
Summit M Co.	California.	8.	05.	Oct 23.	Nov 30.	Dec 21.	G W Sessions.	309 Montgomery St
Talcott M Co.	California.	1.	10.	Nov 2.	Dec 2.	Dec 24.	G W Pearson.	417 Kearny St
Tuolumne Co.	California.	1.	05.	Sept 15.	Nov 13.	Dec 15.	H J Hyland.	309 Monte nery St
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Jan 4.	H Deas.	309 Montgomery St
Willow Creek M Co.	Nevada.	2.	1.	Oct 12.	Nov 16.	Dec 14.	R Elton.	310 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Gould & Curry S M Co.	Nevada.	A K Durbow.	309 Montgomery St.	Annual.	Dec 21
Head Center & Tranquillity M Co.	Arizona.	J W Pew.	310 Pine St.	Annual.	Dec 8
Mt Diablo M Co.	Nevada.	R W Heath.	318 Pine St.	Annual.	Dec 8
Selby Smelting Co.	California.	Cahed by Directors.	610 Montgomery St.	Special.	Jan 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Caladonia M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Nov 25
Jackson M Co.	California.	J B Bate.	10.	Oct 5	
Euhatan S M Co.	Nevada.	John Crocker.	419 California St.	25.	Sept 1
Silver King M Co.	Arizona.	J Nash.	328 Montgomery st.	25.	Dec 15
Syndicate M Co.	Nevada.	J Stadfeld Jr.	419 California st.	10.	Sept 8

PACIFIC COAST WEATHER FOR THE WEEK.

(Furnished for publication in this paper by NELSON GORUM, Sergeant Signal Service Corps, U. S. A.)

DATE.	Portland.				Red Bluff.				Sacramento.				S. Francisco.				Los Angeles.				San Diego.			
	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.	Rain.	Temp.	Wind.	Weather.
Dec. 1.	Rain.....				Rain.....				Rain.....				Rain.....				Rain.....				Rain.....			
Thursday50	51 S	S	Cy.	.00	52 S	S	Cy.	.00	51 SE	Cy.	.00	56 SE	Cl.	.00	62 SE	Cl.	.00	62 W	Cl.				
Friday .....	.04	52 S	S	Cy.	.00	56 N	Cy.	.00	50 NW	Fr.	.00	58 NE	Fr.	.00	68 SE	Cl.	.00	65 NW	Cl.				
Saturday .....	.42	46 NW	Cy.	.96	53 SE	LR.	.00	56 SE	Cy.	.00	61 SE	Cy.	.00	70 NW	Fr.	.00	69 NW	Cl.					
Sunday .....	.03	48 NW	LR.	.77	58 S	LR.	.20	60 SE	Cy.	.39	62 W	Cy.	.00	71 SE	Cl.	.00	69 NW	Cl.					
Monday .....	.08	57 SE	Cl.	.02	65 N	Cl.	.01	50 S	Cy.	—	61 N	Cl.	.00	79 W	Cl.	.00	74 NW	Cl.					
Tuesday .....	.00	48 S	Cl.	.00	62 NE	Cl.	.00	52 NW	F.	.00	64 SE	Cl.	.00	78 W	Cl.	.00	76 NW	Cl.					
Wednesday .....	.00	46 SE	Cy.	.00	60 N	Cl.	.00	51 NW	F.	.00	64 NW	Cl.	.00	79 NE	Cl.	.00	76 NW	Cl.					
Totals.....	1.05				1.78			.21			.39			.00			.00							

EXPLANATION.—Cl. for clear; Cy. cloudy; Fr. fair; Fy., foggy; — indicates too small to measure. Temperature wind and weather at 12 noon. (Pacific Standard time, with amount of rainfall in the preceding 24 hours.)

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 12.	WEEK ENDING Nov. 19.	WEEK ENDING Nov. 26.	WEEK ENDING Dec. 3.				
Alpha.....	.70	.65	.60	.70	.60			
Alta.....	.25	.30	.25	.25	.20			
Andes.....	.35	.40	.30	.35	.25			
Argenta.....	.35	.40	.30	.30	.25			
Belding.....	1.30	1.75	1.30	1.35	1.30	1.45		
Best & Belcher.....	1.45	1.50	1.25	1.80	1.15	1.25	1.05	1.30
Bullion.....	.35	.35	.35	.35	.30	.35	.30	
Bonanza King.....	.35	.35	.35	.35	.35	.35	.35	
Bodie Isle.....	2.75	3.00	2.35	2.60	1.90	2.2	1.75	2.10
Benton.....	.10	.10	.10	.10	.10	.10	.10	
Boile Tunnel.....	.15	.15	.15	.15	.15	.15	.15	.05
Bulwer.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	.80
California.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	.80
Challenge.....	.75	.85	.65	.75	.50	1.10	.90	1.05
Champion.....	.75	.85	.65	.75	.50	1.10	.90	1.05
Chollar.....	.75	.85	.65	.75	.50	1.10	.90	1.05
Confidence.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	1.40
Con. Imperial.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	1.40
Con. Virginia.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	1.40
Con. Pacific.....	1.20	1.25	1.20	1.60	1.70	1.15	1.25	1.60
Crown Point.....	1.20	1.25	1.20	1.60	1.70	1.15	1.25	1.60
Crown Point.....	1.20	1.25	1.20	1.60	1.70	1.15	1.25	1.60
Eureka Con.....	2.50	3.00	3.10	2.50	2.75	2.00	2.50	2.50
Eureka Tunnel.....	.25	.25	.25	.25	.25	.25	.25	.25
Exchequer.....	.75	.85	.65	.75	.50	1.10	.90	1.05
Grand Prize.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	1.40
Gould & Curry.....	1.50	1.65	1.45	1.60	1.30	1.40	1.25	1.40
Goodshaw.....	3.00	4.25	3.37	4.05	3.60	3.90	3.05	3.70
Hale & Norcross.....	3.00	4.25	3.37	4.05	3.60	3.90	3.05	3.70
Holmes.....	4.00	4.25	4.00	4.00	4.00	5.00	7.50	7.50
Independence.....	4.00	4.25	4.00	4.00	4.00	5.00	7.50	7.50
Julia.....	4.00	4.25	4.00	4.00	4.00	5.00	7.50	7.50
Justice.....	4.00	4.25	4.00	4.00	4.00	5.00	7.50	7.50
Martin White.....	4.00	4.25	4.00	4.00	4.00	5.00	7.50	7.50
Mono.....	7.50	9.75	8.25	10.00	7.00	6.00	8.25	5.75
Mt. Diablo.....	2.50	3.00	3.10	2.50	2.75	2.00	2.50	2.50
Northern Belle.....	.30	.40	.30	.40	.25	.35	.10	.50
Nevada.....	.30	.40	.30	.40	.25	.35	.10	.50
North Belle Isle.....	.30	.40	.30	.40	.25	.35	.10	.50
Occidental.....	1.30	1.50	1.05	1.35	1.00	1.05	.90	1.05
Ophir.....	.30	.40	.30	.40	.25	.35	.10	.50
Overman.....	.30	.40	.30	.40	.25	.35	.10	.50
Potosi.....	.55	.60	.45	.60	.45	.50	.25	.45
Final Con.....	1.60	1.80	1.75	1.85	1.60	1.80	1.50	1.70
Santa Fe.....	1.60	1.80	1.75	1.85	1.60	1.80	1.50	1.70
Seg. Belcher.....	1.05	1.20	.90	1.10	.70	.90	.60	.75
Sierra Nevada.....	1.05	1.20	.90	1.10	.70	.90	.60	.75
Silver Hill.....	1.05	1.20	.90	1.10	.70	.90	.60	.75
Star King.....	1.05	1.20	.90	1.10	.70	.90	.60	.75
Scorpion.....	.20	.25	.20	.20	.20	.20	.20	.25
Syndicate.....	.20	.25	.20	.20	.20	.20	.20	.25
Tiegan.....	.20	.25	.20	.20	.20	.20	.20	.25
Union Con.....	.60	.85	.60	.30	.45	.60	.45	.50
Ute.....	.60	.75	.60	.70	.65	.65	.65	.50
Yellow Jacket.....	1.45	1.80	1.50	1.60	1.30	1.60	1.30	1.60

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Dec. 3.	100	Gould & Curry.....	70c
50 Alta.....	30c	100 Hale & Nor.....	6.40
20 Alpha.....	40c	300 Holmes.....	7.75
60 B. & Belcher.....	2.35	200 Mexican.....	7.0c
125 Bodie Con.....	3.45	200 Nevada.....	4.70
400 Bulwer.....	65c	200 Nevada.....	4.70
200 Con Va & Cal.....	1.35	100 Overman.....	25c
10 Chollar.....	.95	420 Ophir.....	1.00
100 Crown Point.....	1.30	500 Potosi.....	55c
300 Con. Pacific.....	1.45	300 Savage.....	1.15
400 Exchequer.....	.25	500 Sierra Nevada.....	70c
200 Goodshaw.....	10c	100 Yellow Jacket.....	1.50

AARON'S TESTING AND WORKING SILVER ORES.—Illustrated with 14 pages. 1876. A useful and practical work, free from technicalities and extremely serviceable to miners' use. Post-paid, \$2. Published and sold by Dewey & Co., S. F.

"FOUND!"—the place to get Xmas gifts; Muller's optical depot, 135 Montgomery street, near Bush.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in DEWEY & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING NOVEMBER 17, 1885.

330,454.—PROCESS—Chas. H. Aaron, Nogales, A. T.
330,546.—CLAMP FOR ROOF SCAFFOLDS, ETC.—A. T. Barlow, Marshfield, Or.
330,547.—BROODER FOR CHICKENS—G. B. Bayley, Oakland, Cal.
330,559.—VEHICLE SEAT—C. W. Burgdorf, Petaluma, Cal.
330,587.—VALVE GEAR FOR COMPOUND STEAM ENGINES—Geo. E. Dow, S. F.
330,588.—COMPOUND STEAM ENGINES—Geo. E. Dow, S. F.
330,590.—KNIT SHIRT—John Lee, S. F.
330,807.—CABLE GRIP—David Stout, Logan City, A. T.

330,753.—WATER WHEEL GATE—D. L. Trullinger, Union Mills, Or.
330,754.—LOADING PLATFORM FOR STREET USE—J. H. L. Tuck, S. F.

330,535.—HAIR CLIPPING MACHINE—Whittier & Doulan, S. F.

330,452.—ROTARY PLOW—F. Wittram, S. F.
330,538.—PIPE VISE—J. S. Woolsey, Gilroy, Cal.
330,541.—HARVESTER—David Young, Stockton, Cal.

FOR WEEK ENDING NOVEMBER 24, 1885.

330,961.—METALLURGICAL APPARATUS—Clayton & Mackie, Salt Lake, U. T.
330,976.—TRAMWAY FOR CURVES AND CABLE GRIPS—A. S. Hallidie, S. F.
330,978.—HARVESTER—John Hay, Tracy, Cal.
331,244.—FEED CASE FOR MAGAZINE GUNS—J. G. Edson, S. F.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE A Specialty. Note.—Have just completed order for 35 miles of 41-inch

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve, Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube);

60,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

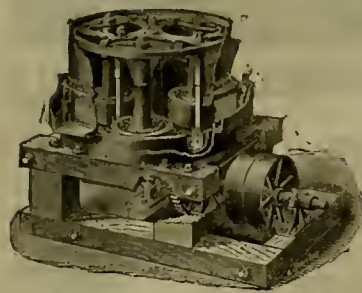
STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship

Pumps, Steam Capstans, Cargo Winches, etc.

27 Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain

Mining Company.

Send for Circular and Price Lists.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

MANUFACTURER OF

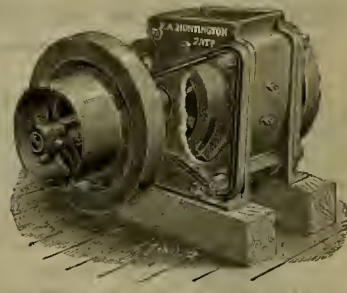
Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

W. E. CHAMBERLAIN, JR.

T. A. ROBINSON.



Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75.

Ladies admitted into all departments. Day and Evening Sessions during the entire year.

Call, or send for CIRCULAR to

CHAMBERLAIN & ROBINSON, Prop'rs.

American Exchange Hotel, SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

AN EXTRAORDINARY RAZOR

HAS BEEN INVENTED BY THE QUEEN'S OWN COMPANY, of England. The edge and body is so THIN and FLEXIBLE AS NEVER TO REQUIRE GRINDING and hardly ever setting. It glides over the face like a piece of velvet, making shaving quite a luxury. It is CREATING A GREAT EXCITEMENT in Europe among the experts, who pronounce it PERFECTION. Two dollars in buffalo handle, \$3 in ivory. Every razor to be genuine, must bear on the reverse side the name of NATHAN JOSEPH, 641 Clay street, San Francisco, the only place in the United States where they are obtained. Trade supplied; sent by mail 10c. extra, or C. O. D.

WANTED.

Situation by a Competent Chemist,

Graduate of the Imperial Polytechnic Institute at Graz, Austria. Expert analyst, assayer, technologist and metallurgist. Would also go to Spanish America. Address care of F. SUSTERSIC, Big Spring, Howard County, Texas.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

HEALD'S BUSINESS COLLEGE, 24 Post St. S. F.

Send for Circular.

INVENTORS, TAKE NOTICE!

L. PETERSON, MODEL MAKER,
258 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of models, Tin, Copper, and Brasswork.

Badges for All Societies,

Police, firemen, etc., presentation prizes or charms, in gold, silver, or metal, sold at society prices by the agents of the Universal Badge Manufacturing Co., NATHAN JOSEPH & CO., 641 Clay St., Workmen and K. of P. badges in gold, \$1 each, sent C. O. D. Trade supplied.

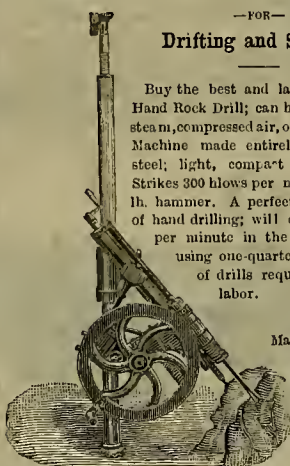
PATENTS. Thousands of inventors throughout the Pacific Coast can and will willingly attest to the promptness, reliability and success of Dewey & Co.'s U. S. and Foreign Patent Agency, No. 252 Market St. Elevator, 12 Front St., S. F.

CALIFORNIA HAND ROCK DRILL

—FOR—

Drifting and Sinking.

Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 300 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.



Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

C. O. BARLOW, General Manager.

THE CELEBRATED Woodbury Oils.

Pure, Perfect, Uniform!

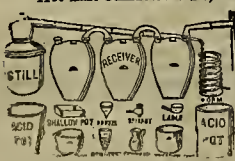
The WOODBURY OILS are in use on the Central and Southern Pacific Railways, and on nearly every railroad and steamship line on the coast. We are not agents for other manufacturers, but have our own works, and adapt here all our Oils to the requirements of home machinery and our climate. We can show recommendations and records of tests, showing a saving to our customers of 50 per cent on their lubrication last year. Address

CHARLES J. WOODBURY,
123 California St., San Francisco.

WORKS: Cor. Fifth and Townsend Sts

RICHARD C. REMMEY, Agent, Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemicals Brick for Glover Tower.

A COLOSSAL WORK COMPLETED.

A Book for all Persons who Make, Buy, Sell, Use, or Want to Know anything about Tools or Machines, or are curious as to the History and Development of Mechanic Art.

KNIGHT'S

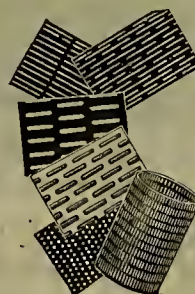
American Mechanical Dictionary.

THE RIVERSIDE PRESS, CAMBRIDGE, MASS.

For particulars apply to WM. S. DUNCOMBE, Agent or the Pacific Coast, 211 Post St., San Francisco.

A CHANGE OF POSITION DESIRED.

A first-class Chemist and Mineralogist, at present Superintendent of a mining and milling company in California, wants to change his position. Besides being expert in assaying, as well as analytical chemistry, he has great experience in mining and reducing silver and gold ores. He would prefer a position in a refinery or reduction works. He can give first-class references. Address this office under A. L., 1700.



Chicago Prices Beaten!

ESTABLISHED 1800.

S. F. PIONEER SCREEN WORKS,
221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Churns, Cement and Sump Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.

The most Complete Compound manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid and Alkali-Proof.



Property Owners are interested personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.

The California Perforating Screen Company.

All kinds of Quartz Screens, slot or round holes; zinc, copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.] The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

CATARRH

HOLBROOK'S
ELECTRIC
CATARRH AND
ASTHMA CURE

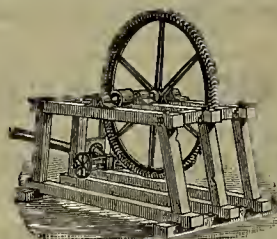
A wonderful medicine. Instantaneous and lasting in its effects. Convenient of application. One bottle will cure any case. Ask your druggist for it, and if he does not keep it, order from the undersigned, who will forward it, post-paid, to any address, on receipt of \$1.00. If not found as represented the money will be refunded.

Pacific Electric Co.
Sole Proprietors
330 Sutter Street
San Francisco, Cal.

CURED

SITUATION WANTED—AS ENGINEER OF A QUARTZ mill. Address Engineer, 339 Eighteenth St., S. F.

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

N. W. SPAULDING SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY
Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

RUPTURE!

A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort night and day. Gives universal satisfaction. Price, from \$3 to \$6. Call or send for descriptive circular. Address, J. H. WIDESS, (Druggist) 701 Market Street, cor. Third, San Francisco.

Iron and Machine Works.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, Ets

California Brass Foundry,

No. 125 First Street, Opposite Minna
SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Belts and Gongs of superior tone. All kinds of Cores and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco

BUILDER OF

Steam Engines, Flour Mill, Mining, Saw Mill and Dredging Machines

Brodie Rock Crushers, Steam Power, Hydraulic, Side Walk and Hand-Power

ELEVATORS.

Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

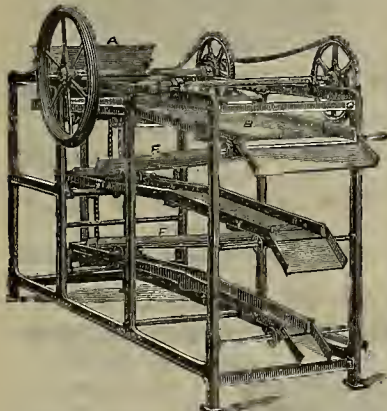
Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

DRY WASHER for PLACERS

THE HITCHCOCK & HERSHEY
NEW DRY GOLD CONCENTRATOR.



This Machine weighs only 325 pounds; readily taken apart; packs in small compass, may be run by hand or horse power. Capacity, two tons an hour. No blowers or 6x1 fans, or quicksilver used. Frame all malleable iron. Will save a higher percentage of gold than other machines. **TATUM & BOWEN, San Francisco and Portland, Agents.** Now on exhibition at Mechanics' Fair, San Francisco, where it may be seen in operation.

San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco

PATENTS. Thousands of Inventors throughout the Pacific Coast can and will willingly attend to the promptness, reliability and success of Dewey & Co's U. S. and Foreign Patent Agency. No. 252 Market St. Elevator, 12 Front St., S. F.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

FULTON IRON WORKS,

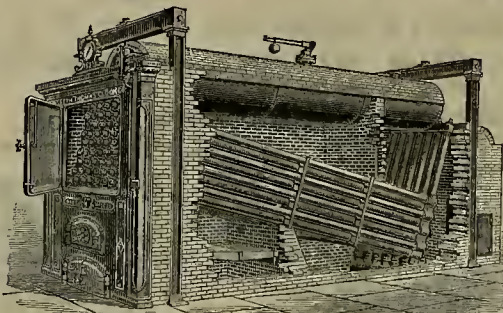
HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

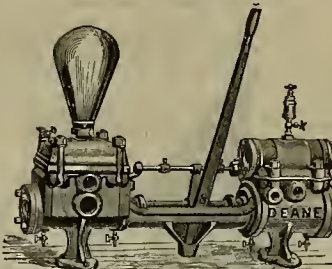
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers, Tustin Ore Pulverizers.



DEANE STEAM PUMP.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel, Machinery and Special Shape Steel to size and lengths. **STEEL RAILS** from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

FRASER & CHALMERS.

CHICAGO, ILL.
U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,
ROOM 43,
NO. 2 WALL ST.

PERFORATED METALS FOR
REVOLVING and SHAKING-SCREENS,
JIGS & STAMP-BATTERIES.

Denver Office: 9th St., No. 243
18th Street, Denver, Colo.

Mexico Office: No. 11 Calle de Huasteca, de Mexico



INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

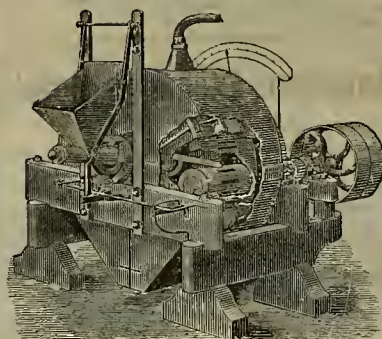
BERRY & PLACE MACHINE CO.,

PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

Tustin's Pulverizer WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

.....MANUFACTURER OF.....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.
Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.
SILVER MEDAL AWARDED
For Best Slide Valve Engine
and Boiler Combined.

W. H. OHMEN,

WORKS:
22 Fremont Street,
SAN FRANCISCO.

AUTOMATIC

ENGINES

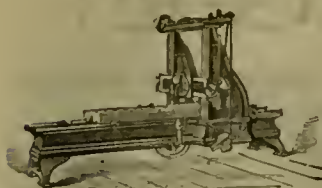
A Specialty.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



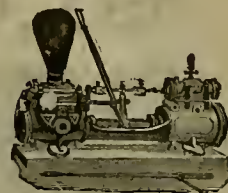
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery

ENGINES and BOILERS.

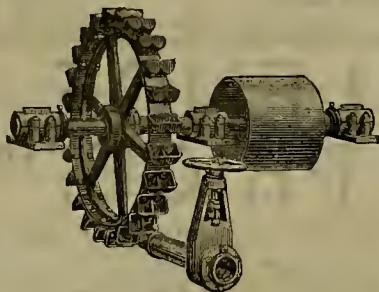
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Leffel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licenses on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

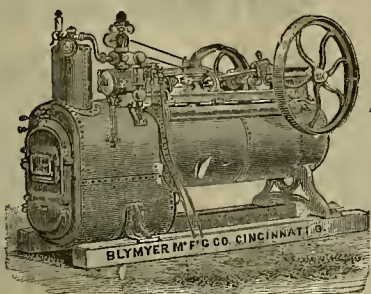
JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont Street, San Francisco.

Manufacturers of NEW and Dealers in SECOND-HAND

Boilers, Engines and Machinery of Every Description.

PORTABLE ENGINES AND BOILERS
On Skids.



Each engine is fitted with a governor, steam and water gauges, heater, flue
brush, waste, blow-off cocks, brass whistle, smoke stack with spark arrester,
oil cups, gauge cocks, combination check and stop valve, and pump.
Both boiler and engine are fitted in complete running order, and are sold
either mounted on strong wheels with wide tires, or on skids.

STEAM PUMPS

OF ALL MAKES.

Mining Pumps.

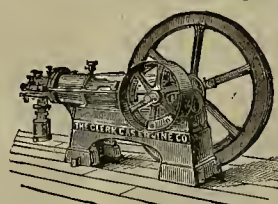
Quartz and Sawmill Machinery.

AGENTS FOR THE SALE OF

"Cummer" Automatic Engines,
Porter Man'g Co.'s Engines and Boilers,
Blaisdell & Co.'s Machinists' Tools,
a Hot Polished Shafting,
Baker Rotary Pressure Blowers.

CLERK GAS ENGINES.

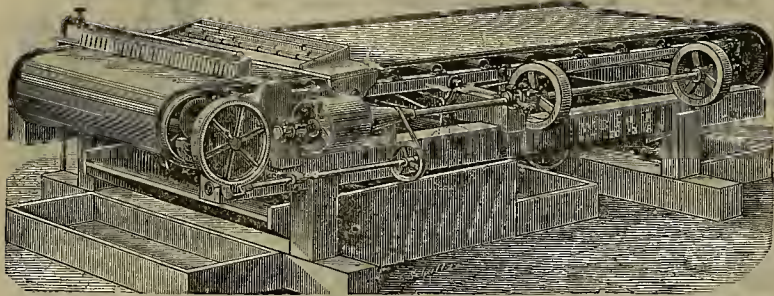
RELIABLE,
ECONOMICAL,
SAFE,
STEADY,
COMPACT.



NO BOILER,
NO ENGINEER,
NO COAL,
NO ASHES,
NO DANGER.

These Engines are eminently serviceable for use as motors for Printing
offices, Workshops, Laundries, Factories where sewing and bag machines are
operated, and in Hotels, Public Institutions, and Private Buildings where pumps,
elevators, or electric lighting machines are in use; and generally in Cities and
Towns (where gas is obtainable) for all mechanical purposes requiring small
driving powers.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS!
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

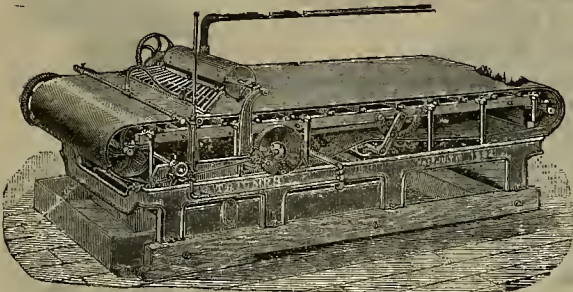
ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED.

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.



THE "TRIUMPH" TRIUMPHANT!

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$193.15, or \$3.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net bullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flaunted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

San Francisco, Cal.

**THE
"TRIUMPH" ORE CONCENTRATOR.**

TATUM & BOWEN,

25, 27, 29 and 31 MAIN STREET, SAN FRANCISCO.

91 and 93 FRONT ST., PORTLAND, OREGON.

Manufacturers of

MINING MACHINERY, ENGINES, BOILERS, Etc.

We are manufacturing from Special Designs of the most experienced and successful Practical and Scientific Experts, Complete Plants for all descriptions of Mining Operations, as follows:

CONCENTRATING MACHINERY—Best and Cheapest, Cornish Rolle, all Steel Wearing Parts, Most Practical Styles of Two, Three and Four Compartment Double and Single Jigs, Sizing Screens, Patent Hydraulic Separators, Tables and Concentrators.

STAMP MILLS for Reduction of Gold and Silver Ores, whether free milling or base. Most useful and substantial styles of Single and Double Discharge Mortars, Wet or Dry Crushing.

STEEL SHOES AND DIES, Tappets and Cams, cheapest and best Blake Improved Rock Crushers and Automatic Ore Feeders, Superior Amalgamating Pans with wood or iron sides.

PANS FOR TREATING GOLD ONLY, Settlers, Clean-Up Pans, Retorts, Furnaces, Dump Cars, Hoisting Machinery, Cages, Landing Dogs, etc.

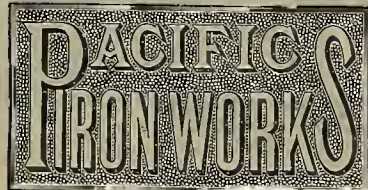
CORLISS, MEYER'S CUT-OFF AND BALL'S PATENT VALVE Engines of extra strength and durability.

STEEL BOILERS of Two Sheets only, Steel Economic Boilers, combining with the safety, durability and economy of the Stationary Boiler, the convenience and portability of the Portable. It occupies but little space, and is the best and cheapest boiler ever made.

WE ALSO MANUFACTURE SAW MILL MACHINERY.

We are also Sole Agents for the Gordon and Maxwell Steam Pumping Machinery, and carry a full stock of all kinds of Mill Supplies, including the

Albany Lubricating Compound and Oils.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

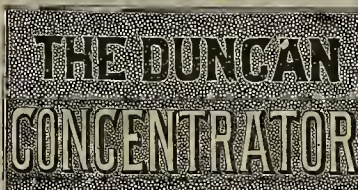
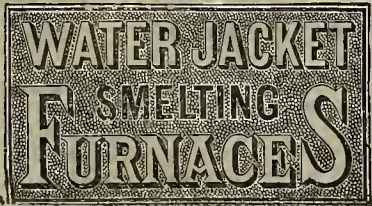
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

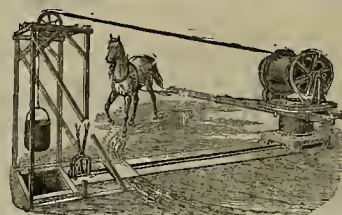
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves ALL THE AMALGAM GOLD AND SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 12, 1885.

VOLUME LI
Number 24.

A Kern County Mine.

A mine is being developed about five miles from Tehachapi station, Kern county, which bids fair to be one of the big mines of this State. The ledge is a peculiar one, lying very flat and the quartz being very soft. No blasting is needed, the ledge matter crumbling down easily under the pick. It was worked several years by its original owner in a desultory manner, he taking out some ore in the summer and crushing it with an arrastra. Last June it was purchased by some gentlemen of this city, who have since been working it.

An incline 120 feet long was first run in. The ledge at the mouth of this was seven feet wide, and at the inner end had widened to 13 feet. They then went 250 feet below and ran in a tunnel in the side of the mountain 350 feet, and when they struck the ledge it was 20 feet wide. They have drifted 100 feet from the tunnel on the vein and will drift 200 feet. If the ledge continues to look as well as it does at present a mill with a capacity of 100 tons a day will be put up.

While opening the mine considerable ore has, of course, been taken out, and 1200 tons have been milled, netting at the mill \$9.95 per ton. Some of the ore has run as high as \$15. But so large a ledge, and one so easily worked will pay handsomely with nine dollar rock. The ore is hauled a mile and a half to the Huntington mill, which the owners set up while prospecting the vein. A large percentage of the ore will go through the screens just as it comes from the vein, so soft and brittle is it. There are only occasional lumps of hard rock. The mine is owned by private parties and is being worked as a legitimate mining proposition. The latest reports from it are of a most encouraging character. It is called the Pine Tree.

Academy of Sciences.

Professor Davidson presided at the meeting of the California Academy of Sciences on Monday evening last.

Professor Edward S. Holden, the new President of the University, was nominated for membership, as was also Gen. L. H. Foote.

Horace Davis, William Norris, Leo Eloesser, W. A. Aldrich and J. Evans were declared to be the committee to nominate the regular ticket for officers for 1886.

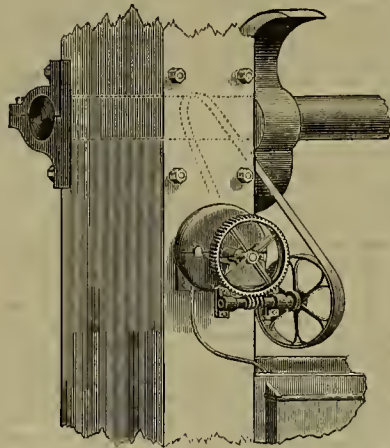
Mr. Charles Burckhalter, of Oakland, presented a memorandum of observation of Nova Andromeda, on December 5th, from seven to eight hours, with his ten and a half inch speculum. At 6:45 P. M. he turned the telescope upon the great nebula in Andromeda, and tried various powers without finding the new star. After putting out all light in the observatory and resting his eyes in the darkness, he again observed the nebula at 7 hours, and almost immediately he saw the new star, but only to lose it again. He saw it half a dozen times but could not hold it over one or two seconds. The twelfth magnitude star preceding the nova was easily and distinctly visible all the time.

The weather was exceptionally fine and the seeing perfect. Mr. Burckhalter was joined by Mr. Stanford, who saw the star with much difficulty, although he saw the thirteenth magnitude stars situate between epsilon and epsilon² Lyrae easily with seven and a half inch stop on ten and a half inch speculum. The star is growing fainter rapidly, and Mr. Burck-

halter believes he has seen it for the last time, the favorable conditions at the time of observation being rare.

Baker's Quicksilver-Feeding Machine.

The accompanying engraving illustrates a little machine devised by C. H. Baker for feed-



QUICKSILVER FEEDER FOR QUARTZ MILLS.

ing quicksilver into the batteries of gold quartz mills. When this is done by hand, poor work is done from want of proper feeding of the mercury.

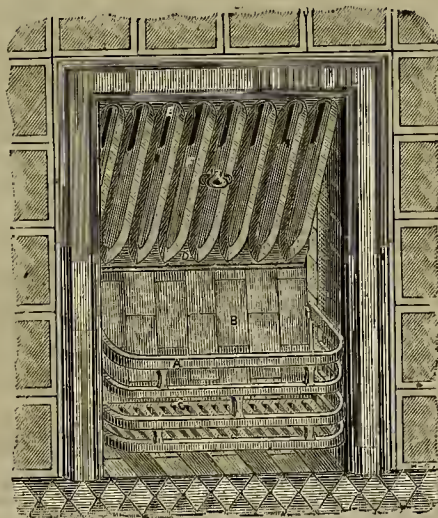
The machine will feed once in ten or fifteen minutes, or even once in thirty minutes, a large

A New Draft Regulator.

People who use open grates know very well that there is considerable waste of fuel in them, owing to the deficient means of regulating their draft. Even under the best of plans, a great amount of heat is drawn up the chimney with the product of combustion, the opening over

the grate having to be large to discharge the smoke.

A new device for regulating the draft in grates has been patented by W. Hunter, of this city. The plan is shown in the engraving. The cut shows the device as applied to fire-



IMPROVED DRAFT REGULATOR FOR GRATES.

or small quantity, as desired. The quantity is regulated in a moment by a screw without stopping. The machine is simple and ingenious. It is bolted to the upright post of a stamp-mill, and driven by a belt from the cam shaft, as shown by the illustration. One machine will answer for each battery of five stamps. It costs only \$35, with all the fittings necessary to put it at work. It weighs 70 pounds, and is sold by John Taylor & Co., of this city.

COAL from Eastern Arizona is sold in Los Angeles market.

It may be applied to brick-kilns, tubular boilers, etc. The regulator is readily put in fire-places already constructed. A test of the device can be seen at any time at the office of Hunter & Shackelford, 310 Pine St., in this city.

Trying a Debris Dam.

In the U. S. Circuit Court this week, when Judges Sawyer and Sahin were on the bench, the temporary injunction restraining the Liberty Hill Consolidated Mining and Water Company from working its hydraulic mines was modified, and it was allowed to carry on operations for fifteen days, between now and the first Monday in January, 1886, until which time the motions to dissolve the injunction or make it perpetual were continued. The complainant in this case, which is the second in importance among the slickens cases, is Peter Hardt. When Judge Sawyer enjoined hydraulic mining, he stated that if a successful method for impounding debris were discovered he would dissolve the injunction.

The Liberty Hill Company have constructed a dam which they aver will fill all requirements. The Court has therefore allowed the company to make the test for the brief time specified. The miners are perfectly satisfied as to the efficiency of these dams, but their opponents are not. If the miners are willing to risk their money on the result, they must have good reason for being sure they can impound the slickens. The result of this trial will be watched with interest.

Mechanics' Institute.

At the regular quarterly meeting of the Mechanics' Institute the Librarian's report showed a total membership of 2527, of whom 160 are life members. Library receipts for the two quarters, \$11,639.25; expenditures, \$9,242.63; books added, 1669. Total bound volumes in library, 39,293. Some 210 scientific books had been bought for \$783.52.

The Treasurer's report showed: Expended from Lick fund for scientific works, \$2,494.17; gross receipts from last fair, \$48,533.05; disbursements, \$27,349; net profits, \$21,174.05, which, added to \$1825.95 from other funds, permitted the payment of \$23,000 on the Pavilion mortgage, reducing it to \$110,000, on which \$550 monthly interest is now being paid.

President Cornwall, in commenting on the reports, states that the average annual rent receipts from the Pavilion, exclusive of the two months fair term, were about \$10,000. They were clearing, after paying mortgage interest, some \$450 monthly. The various branches of the Institute were in a very gratifying condition, and they relied on reducing the mortgage \$25,000 after the next fair. Attention was called to their indebtedness, incurred when the Pavilion was built in 1881, of \$240,000, since which the Institute had paid off the large amount of \$130,000.

The pay-rolls of the Comstock mines for the month of November foot up \$122,957.50. Says the Chronicle: The pay-rolls for December will foot up nearly \$190,000 (including the mills). This arises from the fact that a large increase was made in the force employed in the ore producing mines the latter part of November.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Debris Question.

EDITORS PRESS:—Perhaps no one thing has transpired within this State since the discovery of gold that has had so depressing an effect upon the interests and welfare of its people as the closing of the principal hydraulic mines by injunction.

Whether that judgment is right or not is not the object of this article. The fact exists that they are closed, to remain closed to some future time, but not for all time. There are too many hundred millions of dollars lying hidden within their bounds, and these millions are soon to be needed. Their want is now being too severely felt in the channels of trade to let them long remain where they are. Whoever can devise a way or means by which hydraulic mining can be again prosecuted as vigorously as it was before litigation commenced will certainly be considered a benefactor. The object of this article is

To Induce Discussion

Upon some proposition whereby all kinds of mining may continue without detriment to the country below, and I call upon all men, no matter whether farmers who are situated in the immediate line of danger, merchants who are interested in the business and prosperity of the whole country, mechanics and day laborers, all of whom are directly or indirectly interested—all that pertains to increase the field of labor.

I would like particularly to see the opinions of civil engineers advanced on the practicality of any plan that may be devised. To all I invite a liberal discussion of the whole matter and a criticism of the plan herein contained. I also call upon the PRESS to give the matter liberal publication, and all with a view that before we, the people of the State of California, decide that hydraulic mining must forever cease, every fair means will be discussed, so we may draw our conclusions intelligently.

If three-fourths of the people of this State could be convinced of the practicability of a plan, and then he satisfied that as a business proposition it would pay, there would be very little difficulty in carrying any such plan to a successful conclusion. What is wanted first is unanimity of action. But to proceed, which I will do in as brief a manner as possible.

To Exemplify My Plan,

I will take the Yuba river for example, and would proceed to erect a dam at a suitable place, where solid bottom could be easily obtained. State Engineer Hall, when acting in the capacity of a State officer, reported on this very proposition (I have not his report at hand). He says, "At a place on the main Yuba, about one-fourth mile below where the South Yuba joins it, there is a splendid site for such a dam, the cliffs on either side being the everlasting granite. That when a dam is raised to the height of between 250 and 300 feet, the waters would not flow over the dam, but would flow across a solid granite ridge into a ravine and pass into the river again at some distance below." He also estimates the cost of such a dam, but I have forgotten the figures. He says that the river above said site is graded at about 50 feet to the mile, and that if a dam were constructed it would grade at about ten feet to the mile above the dam. Thus, every 40 feet would grade up one mile. That the tailings would have the channels of both rivers to fill up, and some of the North fork, which comes in a few miles above. That the capacity of said dam would be equal to holding the tailings from the mines as they were then washing, for 32 years. Suppose that upon a critical examination the above statement was found to be correct. It certainly presents a very eligible site for such a work. Then as for the

Building of the Dam,

I would have the State undertake the work. I would by a unanimous effort of our people try to induce Congress to appropriate \$1,000,000 for the dam. I would place a tax of one per cent on the gross product of all mines whose debris flowed into any stream above said dam, which I believe would yield another million dollars. Then I would have the State locate a branch prison at the dam, and do all the work possible with prison labor, and thereby help to solve another knotty question wherein it is claimed that prison labor should be so used (or even not used at all) as not to come in conflict with other labor. This would be directing it in such a way as to enlarge the field for other labor. I ask that working-men's organizations make note of this, and deliver an expression in the matter.

This then would take us ahead thirty-two years when there will be no more, or so little hydraulic mining on the Yubas, that its tailings would be insignificant. I would provide that the

State Own the Water

Which thus elevated so near the valley, and in the foothills as it were, would be of inestimable value both for irrigating purposes and for power. We would have as it were, a Niagara at our door, whose power could be, and would be, converted into electric power to be transmitted by wire, and used to run our

quartz-mills, factories, and for lighting purposes. I am told that in the New England States a horse power, when caused by water, is estimated to be of the property value of \$1,000.

The Benefits to be Derived

From the starting up of mining and placing it on a permanent basis are manifold, and may well be inferred from the present condition and state of affairs. Since mining has been crippled the gold dollar has very much appreciated in value. It will buy more silver than it used to, and a silver dollar will now purchase more than a gold dollar used to. And the fact of closing the mines has had more to do with it than most people think.

The Gold Product

Of the world is not keeping pace with the increasing demand. Statistics show that it takes a ton of gold each year to fill the teeth of the people of the United States. A ton of gold is worth a fraction over \$6,000,000. No one by-draconic mine in the State ever produced enough in one year to supply the demand for that one purpose. And gold thus used is lost. There are various other uses to which gold is applied, in which the amount so used is lost. It therefore seems to me to be only a question of time when the gold mines must be opened anew to supply the necessary wants of the people, and it is a question whether we will undertake to devise such means or whether we will leave it for future generations.

My opinion is that we had better study the matter very carefully and look at it on all its sides before we come to the conclusion that it must cease.

I think it may be safely estimated that the gold product of the State would be \$5,000,000 more annually than it now is if mines had not been interfered with. That from the time the first trouble commenced has been equal to at least four years of such falling off, which would be equal to \$20,000,000. We will suppose that \$5,000,000 left the State; then we have a void of \$15,000,000.

Would not \$15,000,000 infused into the channels of trade make quite a difference with the people? And henceforth we are to have \$5,000,000 less per year than we otherwise would have, and this to go on for say 20 years. It cannot be said that there are any compensating circumstances to offset this deficiency. On the contrary the exact reverse is the case; during the next 20 years it would be safe to say that \$50,000,000 from outside of the State would come here for investment in our mines, which now will not come. And there will be no more increase in agriculture more than there otherwise would have been, there is or has been no scarcity of agricultural land, and although agriculture has assumed larger proportions and outgrown mining, it has done so in the face of all the damage and destruction caused by mining. The question therefore is not whether farming or mining must cease. Mining might go on indefinitely, and still farming would scarcely be effected. It is authoritatively stated that only one acre in 1000 is liable to damage. I hold to this proposition, that if this State was owned by one person or company,

Mining Would Not Be Discontinued

For the damage done to any or all other interests. To sum the whole matter up, it seems to me that in as much as the general Government by its legislation and encouragement has induced a great many of its people to make large investments in the construction of ditches, reservoirs and tunnels in good faith, that it would be but fair to appropriate a few million dollars to help them out of the difficulty which they are in.

That at this day and age, and in view of the falling off of the production of gold in the world, it is not good policy to shut our gold mines.

That if by an appropriation of \$1,000,000, \$100,000,000 could be liberated, it would be a judicious investment.

That a million from the Government and a million from the mines, with the labor furnished by the State, will construct a dam on the Yuba that will hold the debris for all time.

That the engineering skill of the country thus backed by labor and money, is equal to the building of a dam that will be absolutely safe and last for all time. That the immediate and future benefits to the people of this State will justify the expenditure of the before named units. That what can be done in the Yuba can be done on all the other streams with equally good results. That the whole matter should be thoroughly investigated with a view of how to do it, rather than with a view of how not to do it.

N. CADWALLADER.

San Jose, Cal., Dec. 5, 1885.

Rimini District.

Rimini and Helena Districts, Montana.

[Written for the PRESS by R. G. HUSTON.]

Rimini district is located on Ten Mile creek, some 20 miles west of Helena. It is reached by a stage line run by Messrs. Jurgens & Price who have also a store of general miners' supplies at each end of the road. The first property of note is the Lee Mountain mine, owned by the Consolidated Ten Mile Mining Company, who have three tunnels in on their property. The upper one is in 85 feet, the second one is in 355 feet and the lower one is in 455 feet, and taps the lead nearly 600 feet from the surface.

The width between wall rocks in the lower tunnel is 35 feet, which is, of course, mixed with county rock or it would be one of the largest things on record. They have a large quantity of ore that assays from \$50 to \$60 per ton, and have a concentrator nearly ready to run. With this ore concentrated three or four tons to one it will pay handsomely to ship to Yoston or Wickes for reduction.

The David Stanton is in Red Mountain, and is owned by the same company. They have two tunnels each in 200 feet. At the end of the upper tunnel they have a shaft sunk 70 feet which shows ore all the way down; width of lead four to five feet; character of ore quartz and galena and some zinc blende; average assay 75 ounces silver and 60 to 70 per cent lead.

A number of stock companies have been organized to run tunnels and prospect Red Mountain thoroughly and all have let contracts, and prospecting is being carried on vigorously at this time. Doubtless some of them will develop good mines. The companies are the Red Mountain Tunnel Company, Grand Central Tunnel Co., Narragansett Tunnel Co., Consolidated Company and the Katie Putnam Company. The millionaires in prospect are plenty here. The town of Rimini is located on Ten Mile at the mouth of Beaver creek and was the scene of an immense washout some years ago. Mr. Chessman, proprietor of the water works in Helena, had a large reservoir covering a flat of some 150 acres, with water from six feet to 30 feet in depth. The reservoir broke and precipitated this immense body of water down a narrow gulch and it carried everything before it for miles. Happily Rimini was not built, or many would have lost their lives. As it was, three parties were drowned in the lower gulch.

The Helena District.

On Seven Mile creek, some four miles from town, is attracting some attention just now, and it surely merits it. The Helena mine, now owned by Messrs. Hauser, Holter, Curtin and Forbin, is a promising prospect. The top of this lead was scratched over years ago, and worked in an arastra, but after the top was taken off the ore became hard and could not be worked and made to pay by the old primitive process, and it was abandoned and thought nothing of for years. Finally it fell into the present owners' hands and they put some men to work and have sunk to a depth of 150 feet. They are so well satisfied that they are now letting a contract to sink another 100 feet. If it shows as well as at that depth they will probably put a reduction plant on the mine. Their selected ore from the shaft sold for \$36 per ton. By putting up concentrating works they could make it pay handsome dividends to stockholders. The ledge is irregular, but shows in many places from six to seven feet of ore and one or two feet of pretty high-grade ore on the hanging wall. In the matter of convenience, this mine is unsurpassed, I think, in the world, as you can drive right to it without the usual formality of building a road. Mr. D. M. Sutton, the gentlemanly superintendent of this mine, chaperoned me down the ladder, and through the stoping on the 100 foot level. Then we encountered too much water to go any lower. The company is known as the Helena Silver Mining Company; President, W. B. Raleigh; Vice President, A. M. Hilter; Secretary and Treasurer, J. C. Curtin.

I shall look to hear from the Helena mine as one of the solid developments of the future. There are other mines being developed in this vicinity, one of which has a shaft down 50 feet, and these fortunate prospectors have sold ore enough from that shaft to pay all the expense they have been to, and wages for their time—\$5.00 per day. I am afraid this would induce me to desert the PRESS and go to work on a windlass, for which, no doubt I am more adapted, but all mines or prospects do not turn out so prosperous, yet I think it is a good showing for Helena district.

There is no reasonable doubt that there is a continued mineral belt of different character of ores running through this whole country; and that many fine properties will be developed here within the next decade, is a settled matter in my mind. The developments are many of them miles apart, and for miles there has been no prospecting done, and in some places what has been done was in a crude and unsatisfactory manner.

Spokane Falls.

EDITORS PRESS:—This place is located at the falls on Spokane river and is almost wholly dependent on its agriculture and stock raising for revenue. The farming community here is grumbling, as indeed they are everywhere, at the continued low prices of grain; yet by close economical farming some claim that they can here raise wheat at a profit of fifty cents a bushel, and that is all they can get for it. Oats are here bringing about twenty-five cents per bushel and everything else in proportion. The town claims a population of 1200 and has two large flouring mills. One, the C. & C. Mill, is just new with ten set of rolls and two run of stone, fitted with all the modern improvements. No expense has been spared to make it a first class merchant mill. It is owned and run by Messrs. Clark & Curtis and will no doubt be a success; capacity, 140 barrels per day.

The other, named the Echo Mill, is a very large building and has five set of rolls and one run of stone, and has a capacity of 75 barrels per day. It is the old mill of the place and

makes a fine article of flour. It is owned and run by S. G. Havermale & son.

There are two planing mills in town, both well appointed and seem to be doing a good business.

They are just on the eve of being lighted by electricity, a sixteen-arc light plant being placed there. The Brush dynamo is used and there are about eight hundred incandescent lamps subscribed for in the town. The town is well supplied in all the lines of trade. The California House is the only first-class hotel of the place; it contains seventy-five rooms and is presided over by W. C. Grey who thoroughly understands making his guests comfortable. Two banks are now looking after the financial interest of the community and another is just incorporated with \$75,000 capital.

Nearly all the different secret Orders are represented at this place, and five different churches are organized with buildings of their own. The Methodists and Catholics have each a college building of good size, ample for years to come; so the youth of that portion of Washington Territory need not fail in being "brought up in the way they should go." R. G. HUSTON.

On the Life of Absalom C. Knox.*

[By Rev. J. C. EASTMAN.]

According to the records of Hanover College, where Mr. Knox spent the flower of his life, he was born in Rowan county, North Carolina, April 17, 1820.

His Christian father, who in that day was a slave holder, became dissatisfied with the moral atmosphere of his surroundings and determined to take his family to a State where he could raise them in a spirit of independence. He removed his negroes to the North, and gave to each of them a plot of 10 acres of soil in the region about Cincinnati, while he himself settled with his family at Livonia, in Washington county, Indiana. Here he fell into the parish of that active consecrated minister, Rev. William L. Martyn, afterwards familiarly known over all Southern Indiana as Father Martyn. This minister, from 1818 till 1831, in addition to his ministerial and missionary labors, taught a select school in his own house in Livonia, and he some way inspired his pupils with such an educational and missionary spirit, that perhaps no congregation in Indiana (outside of college towns) furnished more school teachers and more ministers than that congregation in Livonia. The place was but a country village, that by the last census (1880) had a little over 200 people; but it would seem that almost every family in the congregation must have furnished the world with a minister, and many a village and city secured from that fountain its teachers.

The family of the father of Knox were part of this congregation and, doubtless the children were pupils in Mr. Martyn's school, and with their companions drank in the inspiration of the man. The next thing to being a scholar of Mr. Martyn's school was to be a student in Hanover College some 50 miles away.

Hanover had existed for some years as an academy, but about the period of Mr. Martyn's school, it received a charter as a college. And to this college, from its beginning, the Livonia boys were sent to pursue their education.

If there was anyone placed more fitted for kindling religious devotion, and for inspiring them with energy in the varied departments of learning, it was that young college in the then wilderness of Indiana, under the power of consecrated men like Dr. James Blythe, Dr. E. D. McMaster and Dr. Sylvester Scovel, and under the pastorate of Dr. Jno. Finley Crowe.

It was under such influences as these, that Absalom Knox, a lad of 15, fell when about 1835 he entered college at Hanover, and when after some five years be graduated from the classical department in 1840.

In 1840! 45 years ago! In 1840 Texas, New Mexico, Arizona and California formed no part of the territory of the Union. There was not a mile of telegraph in the world; nor an ocean steamer; nor a steam power printing press; nor a sewing machine, nor a telephone.

Since 1840 the world has made strides that we think little of unless we stop to see how fast these days of progress are sweeping us along. Education has much to do with our progress, and among the many worthy institutions Hanover has borne its share of influence, and even still to-day more than ever before, it is doing its noble work. From the address of General W. M. Dunn LL D. at the semi-centennial anniversary, in 1883, we quote this statement:

"Hanover, with her men at work in every field of useful employment, has touched the boundaries of this great land. Her sons are scattered from the shores of the northern lakes to the cotton fields and orange groves bordering the southern gulf. The first rays of the morning sun greet them in their toil among Atlantic cities, and the setting sun throws back her last beams through the Golden Gate on Hanover men."

She has done more than this. In fifty years she has sent her sons to every continent, and her work has girdled the world. Her foreign missionaries are at work in China and India and in Mexico and South America." And we may say that to day from San Diego to Seattle, on these our shores, the streams of Hanover's influence

*This memorial sermon was delivered before the late Mr. Knox's relatives and friends at the Larkin Street Presbyterian Church, Nov. 29, 1885.

ers being poured out to bless the minds and souls of this Pacific Coast. Here and there in city and country, in pulpit and office and professor's chair there are sons of that beloved *alma mater*.

And what has all her host wrought since 1840! As with young men equipped with an education, the next question with this young man of twenty years was—what next? True to the influences moulding his youth he found himself drawn towards teaching and preaching. But which of these to choose? The choice fell in favor of teaching, and for this he was now by nature and training fitted.

Doubtless the greatest influence on earth giving tone and cast to character is that of the mother. Sitting in her domestic sphere, she shapes the plastic forces of childhood, and first of all leads forth the powers of affection, and gives the bias to the moral nature. How to love, and to know right and wrong, are lessons taught in the first brief years of existence; and these first lessons have more to do in giving cast to character than any other ones. Let mothers be loving—let mothers be truthful and just, and the great question of making good men is largely solved.

After the mother, there are a variety of influences contributing towards the formation of character, and the greatest among these is that of the school teacher. The teacher lays his hand upon the growing powers of the intellect, and directs that process by which methods of thinking are formed. Education is not a scheme for examining, but the art of teaching minds how to use themselves. It is a process of training the man to direct the powers of his own mind. It has for its work to give a man an understanding of his mental forces, and to direct and exercise him in their varied movements. This includes, not only a care for the intellect and a culture of the powers of perception, reasoning, judgment, memory and so on, but also a care to train the emotional powers, giving the pupil some knowledge of his natural mental passions and desires, and some experience in self-government, and also a care to train the powers of the will. The education of the will has much to do with the effectiveness of men. It is a serious responsibility to have growing minds committed to one's charge, and the station of teacher is one that is not and cannot be filled by any one who has a spirit of indifference or carelessness. The teacher has so much to do, not only with the proficiency of pupils, but with their efficiency in all their after life. This task, therefore, of shaping so many destinies, is a serious and responsible work.

To this work Mr. Knox gave himself, when at 20 years of age he received his diploma. We find him in 1841-42 teaching at Paris, Illinois, and in 1843 teaching in Franklin county, Kentucky. He must have found himself peculiarly adapted to this pursuit, and must have, indeed, made his mark, for though he gave up this pursuit and entered the Theological Seminary at New Albany, in 1843, as a student for the gospel ministry, at the close of the first year he not only resumed teaching but was elected an instructor in Greek and Latin in the college where he had graduated but four years before. He was manifestly adapted to this high service, for he not only continued eight years in his chair, but with a peculiar power he drew about him and strongly influenced all the students. He lived here among youths who have subsequently become men of eminence in this and other lands. I notice that from the students in Hanover College, who were in his classes from the date of his entrance until he left the institution, 105 entered the gospel ministry, and of these 21 have borne the honorable title of "D. D." A great company have ranked high in medicine, law and literature. Different ones reached the honored seat of Governor in that State and in other States. Not a few have occupied seats in the National House of Representatives and in the Senate, and two have received the vote of the nation for Vice President of the United States. One of these, Thomas A. Hendricks, who graduated in 1841, the year following Mr. Knox, and an intimate college companion of three or four years, has also just finished a worthy career, and his body lies in state to-day in Indiana's capital.

The professors in Hanover College were grand Christian men—moral giants who exercised their powers so well that many generations to come must yet feel the force of their lives through those hundreds disciplined under their moulding hands.

One of the noblest of that number, one who was to Prof. Knox as a loving and generous older brother, was Rev. Prof. S. H. Thompson, Ph. D. L. D., who was for over one-third of a century Professor of Mathematics, and beloved of all the graduating classes. He came to our Golden State in the decline of his strength, and but three years ago—at his ripe three-score and ten—passed away to a joyous reward, and his body was laid to rest on these "sunset shores." With him, and other such men, Prof. Knox lived in that pure moral atmosphere and there showed the youth how they might be men worthy of the name. He had been but one year Professor of Greek when he was honored with the degree of "Master of Arts."

He was not merely a "book-worm," and he was not simply a "professor." In the trying scenes of 1849, when the scourge of Asiatic cholera swept through the land, the college did not escape, many young men died each day, and their instructors cared for them as if they were their own sons. In their visits among the dying boys, on one sad day, Prof. Knox,

going with the noble President, Sylvester Seovel, found his companion stricken with this awful disease, and upheld and almost carried him to his family, where soon he was still in death.

The toils of this season, the excitements of a succeeding religious revival, and the constant press of business were too great for one so sympathetic, and so diligent and earnest, to bear. Under this strain in 1850, both body and mind suffered distressingly. Prof. Knox was now, for the first time, overcome by that nervous disorder which has since annoyed him no little, and which so clouded his comfort and changed the current of his life.

Through this first attack he was kindly housed and nursed by the tender hands of Prof. Thomson and his good wife, and in the course of a few weeks was restored, and resumed his labors.

It was in this succeeding year, at 32 years of age, that he was married in the town of Livonia to Miss Sarah Dollarhide.

This change in his estate suggested new plans, and in 1852, much to the regret of the good people of Hanover, Prof. Knox took his leave of this college and removed to the vicinity of Louisville, Ky., where, with his wife as an assistant, he established a training school, where he might fit boys for college. He continued his teaching for three years longer, but his physical system was undermined, and at last, after 15 years of conscientious and arduous labor, he turned aside from his chosen vocation. He sought relief and health, as so many wisely do, by coming to California, and his life has been prolonged through these years since 1855. But how could he be in any other pursuit what he had been in the loved calling of his choice!

He entered into the cattle business and sought outdoor employment, but ere long a disaster befell him—a disease among cattle ruined his venture and he turned again to a new pursuit.

Back, nearer to his former work, he joined the ranks of the press. For a mind struggling to leave its best impress on its age and times, what was better fitted, after that calling which he could not longer follow than the directing of printing press! What an engine of power is the press!

And how a pure-minded, conscientious man can make it tell for good! In such a land as ours the press is the strongest pillar of our liberties. It is the most potent advocate of the rights of men.

"Here shall the press the people's cause maintain, Unawed by influence, and unbribed by gain—Here patriot truth her glorious precepts draw, Pledged to religion, liberty and law."

We read of a great bishop who, comparing the press among the forces of human potency, gave to it the crown over all, and called it king and it has been written:

"Mightiest of the mighty means
On which the arm of progress leans,
Man's noblest mission to advance
His woes assuage, his weak enhance,
His rights enforce, his wrongs redress,
Mightiest of the mighty is the press."

When, therefore, our brother sought a means of wielding his remaining power for the welfare of men, he chose this. And what it might have been under his management had not disaster overtaken his effort, who can tell?

When men were rushing to the mines, he went up to Virginia City, but he did not stay there very long. Disaster came in roaring flames, and his all was destroyed by fire in 1867. From this he returned to Sacramento. Here, in 1872, came a disaster more dreadful to him and his wife than any that had gone before. They had two sons, Chas. H., who is with us to-day, and Scott, so called for Dr. Scott, our lamented theologian, and one summer day the younger in his play fell into the Sacramento river and was drowned. From this sorrow it would seem the father was never able to recover his wonted spirits. He felt the earth was gloomy and cold. Home, with this jewel gone, could not be what it had been, and his great grief made him often melancholy. And who could help to hear his troubles? He would not share them; he could, or would not shake them off. And now, from the cholera days of 1849, trouble upon trouble had fallen upon him, and trying to hear it, who can wonder if sometimes he was overborne?

He finally entered the employ of Messrs. Dewey & Co. of this city as agent for their house. And in this, notwithstanding his burden of trouble, he has, up to this time of his sad death, done excellent work.

Mr. Dewey says:

"I have never in my business experience known a man who was more mathematically exact, and more scrupulously honest."

One of his associates says: "He was a man of peculiarly logical mind; he was a great reader, but read a class of books that few men care to read—books of philosophy, books of abstruse reasoning. And when he had read, his reception and digestion of the matter was such that in a few lucid sentences he could communicate the drift of the work."

He has done good service in the matters in which he was employed, and many citizens of California have realized solid benefits through his connection with the MINING AND SCIENTIFIC PRESS and *Pacific Rural Press*.

His death was sad, in that it occurred away from home during a business journey, such as he was accustomed to take. He had felt some apprehension when he went away, but he had not been long away when he became sick, and

when, without proper medical counsel he found his expedients unavailing he rapidly succumbed. His surviving son, now residing at San Luis Obispo, reached his bedside at Lone Pine, Inyo county, and was with him in the final hour. He died on Friday, the 20th inst., and although it was designed that the burial should take place in San Francisco, yet, through the inaccessibility of this place and lack of facilities at Lone Pine for the removal of the body, he was buried there.

Thus has lived and died a man, at whose departure many loving friends and many noble hearts throughout the world will mourn.

And we may well join to pay a just tribute of respect to one who here, through 65 years, such a heart, such an intellect, such a conscience. May we all direct our own energies as well.

Experiments in Roasting and Amalgamation.

(Continued from our last issue.)

No. 7.—This same ore as in No. 6 was treated in this experiment. But, in place of quicksilver pure silver amalgam was added (a piece the size of a pea) and the charge ground for two hours. Then quicksilver was added and amalgamated one-half hour longer, to collect the amalgam, before setting was commenced. Value of ore 0.800 oz. gold per ton. Extracted in F. M. 0.620 oz. gold, or 77.5 per cent. Extracted in C. M. 0.565 oz. gold, or 70.6 per cent. The silver-amalgam in the last experiment was moist. In using silver-sulphate was much drier, but by no means hard, the following results were obtained: Extracted in F. M. 0.676 oz. gold per ton, or 84.0 per cent. Extracted in C. M. 0.660 oz. gold per ton, or 82.5 per cent.

No. 8.—Muertos ore, roasted oxidizing. Contained 43 per cent magnetite before, and 19.5 per cent after roasting. This ore was discharged, by mistake, too soon. A considerable part of copper sulphate had remained undecomposed. Two charges were amalgamated, one in the iron mortar with flat bottom, and the other in the wedgewood mortar, both with silver amalgam. Time of amalgamation 2 1/2 hours; then quicksilver added and amalgamated one-half hour longer. Value of ore 0.380 oz. gold per ton. Extracted in F. M. 0.120 oz. gold, or 31.6 per cent. Extracted in W. M. 0.316 oz. gold, or 83.1 per cent. The amalgam from the iron mortar was very base, that from the wedgewood mortar very fine.

No. 9.—Muertos ore, roasted oxidizing. Contained 28 per cent magnetite after roasting. A well-roasted charge, showing not a trace of copper sulphate after discharging. After cooling a slight quantity of copper sulphate was, however, reformed. The amalgamation with silver amalgam was carried out as in previous experiments, but the amalgam squeezed very dry.

Value of ore 0.340 oz. gold per ton. Extracted in F. M. 0.296 oz. gold per ton, or 87.0 per cent; in C. M. 0.286 oz., or 84.1 per cent; in F. M. 0.270 oz., or 79.4 per cent; in W. M. 0.332 oz., or 97.6 per cent; in F. M. 0.292 oz., or 85.9 per cent; in W. M. 0.326 oz., or 95.9.

If the magnetite is ground sufficiently fine it does not interfere with good settler work. In all these experiments no flouing of quicksilver took place, in spite of the grinding, it united without difficulty, and a loss was hardly perceptible.

This amalgam from the charges worked in the iron mortars contained some copper, even if the ore was apparently free from copper sulphate, while the amalgam from the wedgewood mortar was always fine, no matter how much copper sulphate had been left undecomposed in this ore.

Summary of Results.

These results are of great interest and importance, and throw considerable light upon gold amalgamation generally. It has often been found extremely difficult to extract a high percentage of gold from roasted ores by pure amalgamation, and the theory of "rusty gold" has been extensively circulated in metallurgical literature to explain this fact. My experiments lead to the following conclusions:

First.—That the ore should be well roasted in as short a time as possible. The instantaneous roasting in a Stetefeldt furnace will, no doubt, leave the gold in a much more favorable condition for amalgamation than a long continued roasting in a reverberatory furnace. A complete change of the magnetite to ferric oxide is not necessary, and even a large percentage of this mineral may remain unaltered without producing an injurious effect.

Second.—That copper, if it enters the amalgam, even in small quantities, prevents in a great measure the amalgamation of the gold. Lead will, no doubt, act still more injuriously. Hence, the amalgamation in an arastra, where no iron is exposed, will give far superior results than if the process is conducted in an iron pan. Considerable copper sulphate may be present in the ore without materially depressing the result in an arastra.

Third.—The amalgamation of finely divided gold requires friction, and contact alone with quicksilver is not sufficient. But more than that: liquid quicksilver eludes in a great measure the contact with gold, and it is necessary to amalgamate with gold amalgam (for which silver amalgam was substituted in my experiments, and should be in starting works on a large scale). This amalgam should not be too soft, so that in the process of grinding, liquid quicksilver is not pressed out. I have repeatedly drawn attention to the fact that in amal-

gamation generally great fineness of the material treated is injurious, and need only to point out this difficulty experienced in working raw slimes, or the fine dust from roasted silver ores.

Fourth.—Other conditions being equal, the result of amalgamation depends upon the grinding efficiency of the apparatus used. The much better yield in the iron mortar with flat bottom, as compared with the iron mortar with concave bottom, demonstrates this clearly. In grinding effect the wedgewood mortar was about equal to the iron mortar with concave bottom; but in spite of this, it always yielded higher results than the best grinding iron mortar. Hence, the arastra is, under all circumstances, the best amalgamator. It is hardly necessary to state that the arastra must be so constructed that iron does not come in contact with this ore.

Fifth.—Experiment No. 5 gives exceptional results. They are, however, explained, if we take into consideration the character of the ore treated. This charge, being a product of concentration, contained most of the gold in comparatively coarse particles, which are readily taken up by quicksilver. In this case, too, grinding was essential, and mere mixing gave low results.

Sixth.—These facts throw some light upon the working of the Designollo process. The small quantity of quicksilver reduced from the mercuric chloride, by contact with iron under friction, produces at once solid gold amalgam, and the latter is really the effective reagent. That an arastra, the bottom of which is covered with gold amalgam, is the most effective apparatus for amalgamating gold, has been known to the Mexicans for more than 200 years. I may claim to have re-discovered this fact by scientific research. To my knowledge, no series of experiments has ever been carried out before like that recorded in this report. If the Las Minas ores are roasted in a Stetefeldt furnace, and amalgamated in arastras, there is not the slightest doubt in my mind that from 90 to 95 per cent of the gold can be extracted. Besides, the process is well suited to this country, and the Mexicans understand its manipulation thoroughly.

A Cheerful Outlook.

It is held by those who are close observers that this state of the iron trade affords a safe indicator by which to judge of the general business outlook of the country. This arises chiefly from the fact that iron enters so largely into the requirements of every department of industry. A steady or an increasing demand for iron may, therefore, be expected before any general improvement can be reasonably looked for.

From this point of view, then, we may safely announce that the country is already on the sure road to a return of prosperity. Hence, it was that several months since, Mr. Swank, at the head of the American Iron and Steel Association, expressed an official opinion that the country was then on the verge of a change for the better. Later events have fully confirmed that early expression. Moreover, in this improved condition of our iron interests, there is no appearance of any speculative manipulation.

The improvement was first felt in the increased prosperity of the railroad transportation business and in railroad construction as well. The carrying business of the railways reflects the trade movements generally, and is not confined to any one branch of business. It is, therefore, gratifying to note a decided improvement in this direction.

The revival of business is not confined to this country alone. Recent reports from England and the continental States indicate renewed and hopeful activity in commerce, manufactures and industries everywhere. In these days of rapid communication the people of all civilized countries are generally affected much alike by any given condition of things, and it is hardly possible for one nation to be favorably or unfavorably affected without finding a similar condition among all other nations.

Among the cheering signs of the times is the starting up of various manufactures which have long been partially or wholly at a standstill. Many new establishments are also in process of construction or contemplation. This starting up of factories and lighting of unused forge and furnace fires means employment for thousands of now idle men, and prosperity for the million everywhere.

Capitalists who for many months—years, in fact—have been dabbling in stocks and manipulating rings, for want of ought else to do, are now turning their attention to something more substantial—something permanent, and which will tend to utility instead of waste, and give employment to idle hands.

In our own State the late honteous rains will prove a bonanza, which will have a wide and most generous distribution. They have assured full harvests and a generous yield of the precious metal. They have proved the last factor needed to restore confidence throughout the entire Pacific Coast. There is now scarce room for a doubt of a prosperous season in mining, agriculture, trade, commerce and the industries generally. Peace, rest and prosperity are in store for all.

The new Alton gold and silver mining district on the east side of the south fork of the Salmon river is exciting some attention.



A. T. DEWEY. W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER..... SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.
DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 12, 1885.

TABLE OF CONTENTS.

EDITORIALS.—A Kern County Mine; Academy of Sciences; Baker's Quicksilver Feeding Machine; A New Draft Regulator; Trying a Debris Dam; Mechanics' Institute, 385. Passing Events; Extent of Hydraulic and Drift Mines; Revival of California Gold Mining; Trying New Plans for Cable Roads; Foundry Notes, 388. Lead Smelting, No. 2; The President's Message, 389.

ILLUSTRATIONS.—Improved Draft Regulator for Grates; Quicksilver Feeder for Quartz Mills, 384. Circular Furnace for Smelting Auriferous Lead Ores, 389.

CORRESPONDENCE.—The Debris Question; Rimini District; Spokane Falls, 386.

MECHANICAL PROGRESS.—Inventors Should Study Technicalities; Tool Dressing; English Sheet Makers Won't Have Steel; Superheated Steam; Steam Boilers Become Brittle by Use; Midget Locomotives; Keep Your Fire Surface Clean, 390.

SCIENTIFIC PROGRESS.—The Possibilities of Free Life; Artificial Winds; A New Illuminating Agent; Coating Iron with Aluminum; Two Liquids; The New Star in Andromeda; To Measure Belting in the Roll; Silicon and Temperature, 390.

ENGINEERING NOTES.—Extensive Gas Piping Proposition; How the Gauge of a Railway is Changed in a Day; A New Steering Device, 391.

USEFUL INFORMATION.—Protecting the Obelisk; Going Backwards; Wood Industries in Russia; A Valuable Substitute for Wool, 391.

GOOD HEALTH.—Comparative Longevity of Men and Women; Critical Periods of Life; How Artificial Teeth May do Damage; Cocaine a Cure for Sea-Sickness; To Prevent Bleeding at the Nose, 391.

MISCELLANEOUS.—On the Life of Absalom C. Knox, 386. Experiments in Roasting and Amalgamation; A Cheerful Outlook, 387.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 392-93.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 396.

Business Announcements.

Steam Engines—San Francisco Tool Co.
Assessment Notice—Gould & Curry S. M. Co.
Gold Mill—Brand & O'Keefe, Gloster Mine, Mont.
Gold Mine—G. W. Spawforth, Lang Station, Cal.
Silver Plating—E. G. Denniston.
Home School—Miss L. Tracy, Oakland.

See Advertising Columns.

Passing Events.

Congress has convened and the President's message has been submitted. What there is in the latter document that affects the mining interests is that portion which refers to the silver question, but it does not at all take the miners' view of the matter.

The Department of the Interior is about to take such action with regard to mineral and agricultural land as will restore to the public domain many tracts which have been taken up as agricultural, which, in the original surveys, were designated on the maps as mineral. A decision has recently been rendered by the Supreme Court on the subject of mineral lands, which is also of interest to miners in this connection.

Only a few weeks now remain in which miners may commence their annual assessment work required by the United States laws. Claim owners are at work in all directions doing this work, for those claims on which it is not done are liable to relocation on the 1st day of January.

A VEIN of rich green oil has been struck in the Puente Hills, Los Angeles, from which 150 barrels of oil were taken in two days.

Extent of Hydraulic and Drift Mines.

This river-har claims of this first years of placer mining, which were worked by single miners or small parties, were often but 20 feet in length and of the same width as the channel. This, in some districts where the virgin ground was very rich, was the recognized extent of a location, though in others the unit was somewhat greater, and in certain localities has reached 200 or 300 feet, measured on the length of the deposit. Occasionally the ground was located in square areas, as, for instance, in plots 100 by 100 feet. Great differences existed in the regulations of the various camps, though the tendency in all was to keep the size of individual claims within narrow limits, but the extensive equipment and development of a modern hydraulic mine of importance demands a large area of workable gravel in order to offset the preliminary expenses and give the mine any permanence. When it is considered that a single company may wash upward of 3,000,000 cubic yards of gravel in a single season, it will be seen that to insure continuity of work considerable extent is necessary. Even with deep banks the acre melt rapidly away before the hydraulic nozzles. The North Bloomfield Mining Company, in a run of 342 days, in 1876, washed 2,919,700 cubic yards. The bank was 260 feet deep.

Many of the more important claims in California comprise tracts of over 500 acres each. The Spring Valley, 1215 acres, and Morris Ravine, 1300 acres, in Butte county; Happy Camp, 507 acres, in Del Norte county; Liberty Hill, 554½ acres, and North Bloomfield, 1585 acres, in Nevada county; Gold Run, 500 acres, in Placer county; North Fork, 800 acres, and Plumas, 1355 acres, in Plumas county; Dry Creek, 1332 acres, in Shasta county; La Grange, 1200 acres, in Stanislaus county; Buckeye, 1700 acres, in Lewis and Clark county; Weaver Creek, 600 acres, in Trinity county; and the Golden Rock, 640 acres, in Tuolumne county, are all examples of this class cited by the census statisticians. A still larger number are between 200 and 500 acres in size. In Colorado, Idaho and Dakota the ground is held in large blocks. One mine, the Castle Creek, in Pennington county, Dakota, consists of 88 claims of 300 feet each in length, with a width equal to the deposit.

Some of the drift mines of Sierra county, in this State, are of great extent. The Bald Mountain mine embraces 7500 linear feet of the channel; the Union, 2400 feet; Hawkeye, 800 feet; Pittsburg, 860 feet; Monumental, 1040 feet; and Empire, 1560 feet. Mr. W. A. Skidmore states that the working life of a mine of this class has a duration of from 10 to 20 years according to length of its location on the channel.

Revival of California Gold Mining.

There has just issued from the press of Geo. Spaulding & Co., a book entitled "Gold Mines and Mining in California," and to which we have heretofore referred in the columns of the Press as being in course of preparation. It is a volume of 350 pages, printed in large type, on fine, white paper, and illustrated with cuts of mining scenes, operations and machinery. Containing a description of gold mining in this State, both past and present, with much information of a practical kind, this book, while useful to the millman and miner, cannot fail to be of interest to the general public. Taking up the subject of gold mining in California at the beginning, the writer traces it down through its entire history, each branch of the business being treated of in detail. While no sudden growth of this industry is predicted, it is shown that the increased hullion production that has already commenced in this State may be expected to continue for many years to come, adding to the population of the mining regions and stimulating all our other industries. The opinion is expressed that with proper encouragement the annual output of gold might be enlarged, until it amounts to several millions more than at present, a condition of things that would tend to restore to California much of her ancient *gloria* and bring to her people great prosperity. Without indulging in any extravagant statements, the author shows very clearly that gold mining in California has been too much neglected, and that our people would find it greatly to their interest to pay increased attention to the business hereafter. The spirit of the book is at the same time conservative; no extreme views find-

ing any where expression in it. A large circulation of this work could not fail to greatly benefit California.

Trying New Plans for Cable Roads.

It is somewhat amusing to see the eagerness with which a certain class of people in the East take hold of the cable railroad system which we have in use in this city, and which originated here, and evolve from it new plans which are to entirely set aside and displace the principles learned from experience. They come out here, learn what details they can, admire and praise our roads, and return home and tell their people that we do not know anything about cable roads, but that they have plans which will eclipse ours. Then they get up a company, sell stock, and perhaps build a section of road. It is for this reason that several roads have been failures, those entrusted with carrying out the details having put in untried plans of their own. The only thing accomplished is an evasion of the existing patents and a big bill of expense for trying experiments. And many times these experiments have before been tried by our engineers here and the plans abandoned. One of the first things that has to be done, however, is to convince the investors that the San Francisco cable roads are crude and dangerous, and that the new plans are great improvements. This is easily done where the people know nothing of these roads.

The latest case of this kind is that of the North Hudson County Railroad Company, who own the principal horse car lines in Hoboken and on the adjacent heights. They have built an *elevated* cable railroad from the ferry at Hoboken to the top of the Palisades. Mr. John J. Endres is the engineer, and he visited this city some time since to see our roads, at which time he had no idea at all of a cable road, and spoke in the highest terms of those he saw here, frilly making up his mind to use the California patents. Since his return, however, he has experienced a turn of mind. Now he says: "It is notorious that in San Francisco the numerous and excessively steep hills left no option. It was cable road or no road. But though the papers of the Pacific Slope have given long accounts of the successful features of the system inaugurated in San Francisco, nothing was said of the loss of life and the long delays owing to stranding of this cable which have marked the career of every cable road in that city. The cable roads of Chicago accomplish infinitely more than those of the Golden Gate city, but the same loss of life and the same delays, owing to the same cause, have also been noted there. An unpleasant feature in the San Francisco grip is that it gives a most terrible jerk at starting, and this is due to the manner in which the jaws of the grip seize upon the cable."

It will be new to most people here to learn that there have been long delays from stranding of cables. Cables have broken, and a few hours' delay have occurred, but this has been so seldom that it is of no moment. There is no doubt that in a single horse-car line in New York more people are killed or wounded than by all the cable roads in this city.

Mr. Endres adopts a cable grip which gradually compresses the cable, and he has some other plane which he has ingrafted on this road he has built. As to their success we can tell better after they have worked for awhile. The jerk at starting the cars is only the case when the gripmen are careless or inexperienced; and Mr. Endres' gradual compression idea will be apt to be "rough on the rope," and expensive. Mr. Endres thinks that even the Brooklyn bridge road is better than ours here; but that runs in a roadway of its own and under different circumstances from crowded streets. He is going to have on his new road a speed of 11 miles an hour, which would be against the law in this city, where the maximum is seven and a half to eight miles. Mr. Endres thinks he has overcome the difficulties attending cable roads in this city, but there is nothing new in this, for we overcame them years ago, and have had seven or eight cable roads running right along and doing work steadily, making money for their owners, and being of great convenience to the public. In this new road the brake and grip are operated together. This plan has invariably been found had and exceedingly dangerous, and was long since given up here for these reasons. It might be good for the owners

of the road to investigate this fact before any accident occurs.

After a few more experiences in equipping roads with untried appliances capitalists will realize that it is better to take the things we have proved to be practical here. As an indication that this feeling is growing it may be said that one of the Eastern roads now built will shortly extend its line, and its managers have written to one of our cable road engineers here to employ him to take charge of the construction of this extension; so that the work will be properly done by a man of experience, they having had enough of experimenting.

Foundry Notes.

The Fulton Iron Works.

The Fulton Iron Works, of this city, which some time since built a tug and passenger boat for the Wilmington Transportation Company, has a contract for building a similar one for the same company. The boat is to be used at San Pedro, Wilmington harbor, the seaport of Los Angeles. She has a length of 104 feet, 21 feet beam and 9 feet 6 inches depth. The engines are compound surface condensing, with high-pressure cylinder of 12 inches in diameter and low-pressure cylinder 22 inches, with 18 inches stroke. There is one cylindrical boiler of 8½ feet diameter, 9 feet 6 inches long. The vessel will be ready for sea by January 15th, and they will commence next week putting in the machinery.

The works have just been shipping considerable sugar machinery for the Sandwich Islands. Among this are two rolls 32 inches in diameter and 72 inches long, with steel shafts 16 inches in diameter. Also four sugar rolls 30 inches in diameter and 60 inches long. The shafts, gearing, etc., go with the rolls.

They are building refrigerating machinery for different orders; one plant is for the Philadelphia brewery, of Los Angeles, to be driven with a Corliss engine 14x24, and a boiler 54 inches by 16 feet. Another refrigerating plant is being made for Merry, Faull & Co.'s packing house, in this city. The boiler for this is 48 inches by 16 feet.

The Fulton Works have just put in six new boilers, 54 inches in diameter and 16 feet long, for the American Sugar Refinery, of this city. They have just shipped three boilers, 44 inches by 24 feet, for Dolbeer & Carson's saw-mill, on Humboldt bay. They are building a large boiler, 11 feet six inches in diameter and 10 feet six inches long, for a new tug-boat belonging to the Tacoma Steam Navigation Company, at Tacoma, W. T. A steel boiler, 48 inches in diameter and 16 feet long, is being built for the steamer Clara Crow owned by the San Joaquin Improvement Company, at Stockton.

They shipped this week to a mine in Mexico two large sized Huntington quartz mills. Mr. Shattuck, owner of the well-known Eagle Bird mine, in this State, owns the mine, and having four or five of the Huntington mills in use here, has ordered them for his mine in Mexico.

SUCCESSFUL.—The clean up of the Bald Mountain Extension Company, at Forest city, Sierra county, for six days, was 320 ounces, equal to \$6452, the gravel averaging five dollars per carload. This, with the yield of 326 ounces of gold for the previous week, and 183½ ounces for the first week of the month, makes a handsome gold yield for the month of November of 829½ ounces or 69 pounds 1½ ounces, equal to \$16,928.70. On November 30th the Board of Directors declared a dividend of 10 cents per share, aggregating \$6000. This is the first dividend, but after this they are expected to follow regularly every month. The Extension stock is steadily advancing in value, and the fortunate owners are heartily congratulated over their reward after years of patient waiting and heavy assessments. Most of the stockholders are pioneer residents of Downieville.

IN THE Piru district, Los Angeles county, the recent rainfall was enormous. The placer miners are jubilant. A large number of placers are being opened, and the copious rainfall will give ample water for washing the rich banks and bottoms of the gold-bearing canyons of Ventura and Los Angeles counties. A largely increased product of gold will be the result for the coming year. In addition to placer mining, there will be a mill put up on Lockwood creek, by Messrs. Woodson and Aram.

Lead Smelting—No. 2.

Last week we gave a detailed description of the rectangular furnaces used in smelting argentiferous lead at Leadville. The engraving on this page shows a furnace with a circular, horizontal section, on the same scale as the rectangular furnace given last week, and a comparison will show that the general principles governing the construction are the same in both. A main point of difference is in the anchoring, which in the square furnace is necessarily effected by bars *D, Q*, while the same object is more conveniently attained, when the section is circular, by a shell of sheet iron *J*, composed of plates about a quarter of an inch in thickness. The diameter of round furnaces at the tuyere level is from 33 to 48 inches, and the capacity varies with this dimension.

Dust Chambers.

The appliances for catching flue-dust in the Leadville smelting works are generally very imperfect, but the reproach does not apply to Leadville alone, for, however extensive the system employed elsewhere, it fails to accomplish its purpose completely. It is said that some English lead works have dust-chambers no less than 5 miles in length, and yet fail to recover all the dust carried from the furnaces; some of the Leadville works, however, make no attempt to collect the flue-dust, a practice unworthy of imitation. The ordinary provision consists of brick chambers on or below the charging-floor, either divided into sections by walls and curtains or not. One such chamber is 75 feet long, 25 feet wide, and 15 feet in height, and another of the same length is only 4 feet wide and six feet high. The dust-chambers are sometimes built of iron instead of brick, and the circuitous direction given to the current by the interposition of walls and curtains in brick chambers is then often obtained by the use of adjoining vertical cylinders, the air and fumes entering the bottom of one and the top of the next.

Blast-Engines.

The blowing engines employed are most commonly of the Baker rotary pattern, though at one establishment the Root blower is in use. The pressure of the blast furnished by these blowers varies from half an inch to $1\frac{1}{2}$ inches of mercury, or say from one-fourth to three-fourths of a pound per square inch, the most usual tension being 1 inch of mercury, or about half a pound per square inch. Where several blowers are employed in furnishing blasts to more than one furnace the pressure is equalized, and the probability of an interference with the work through the stoppage of a blower is decreased by connecting them all with the same main blast-pipe.

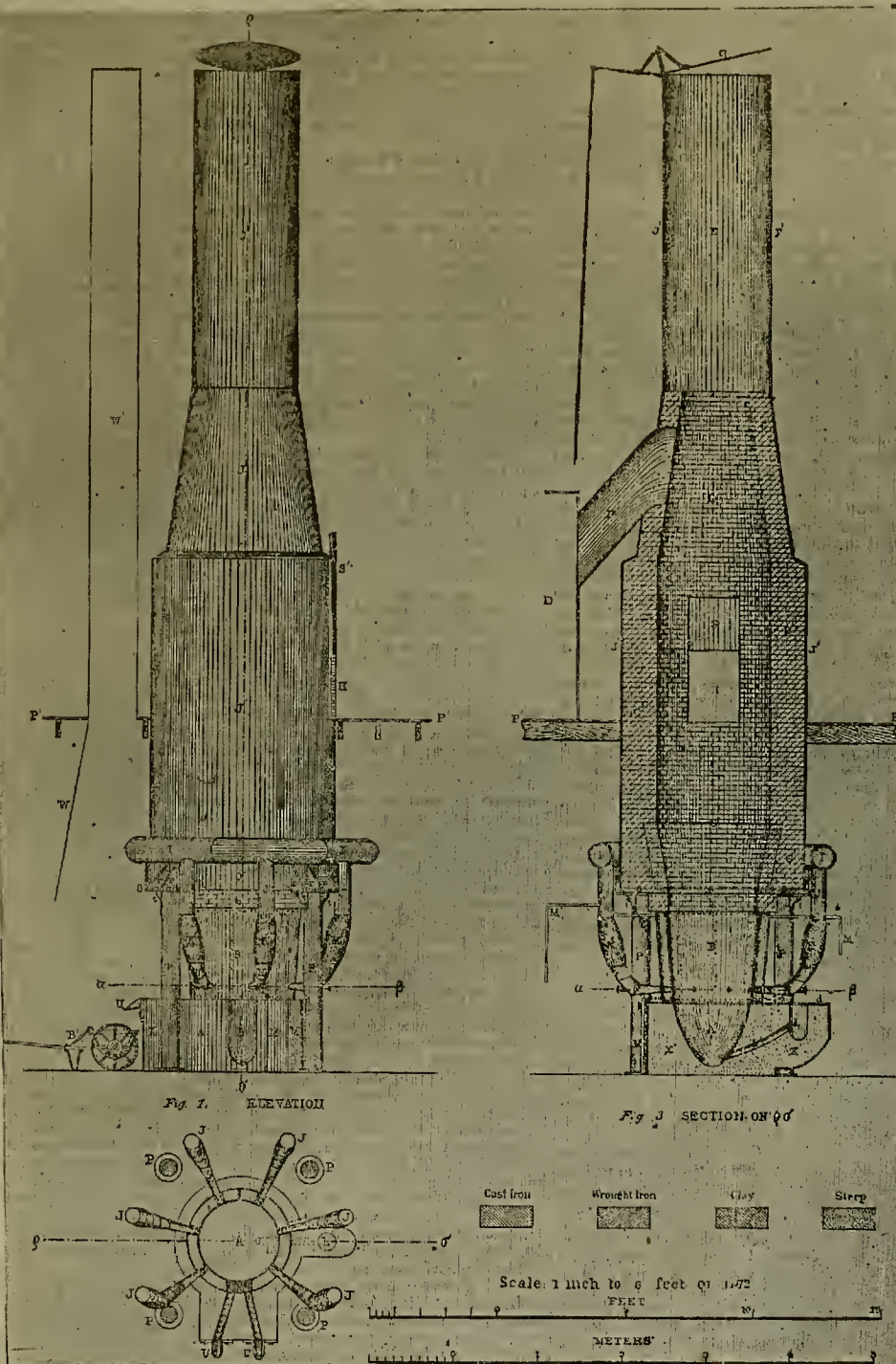
The iron work of the furnaces is sometimes made by Denver firms, but usually the entire plant is ordered from the East.

Bartlett Filter.

An experiment was made at one of the works with this arrangement for collecting flue-dust which gave some interesting results. The fol-

lowing is condensed from Mr. Guyard's description: The stack of one of the square furnaces was connected with a Sturtevant fan by means of a sheet-iron flue, through which the fumes were drawn from the furnace and blown through a sheet-iron pipe 150 feet in length which was connected, by means of two branch pipes, with two boxes of thin sheet-iron. The dust was collected in the sheet-iron pipe as in an ordinary flue. Each branch pipe was provided with a damper, or valve, similar to those used in stovepipes, so that the fumes could be distributed to one or both of the boxes at pleasure. Each box consisted of a dust-chamber and a

opened and a light wood fire is kindled. The soot soon catches fire and burns off, leaving the dust white. During a run of five days 3030 pounds of calcined dust were caught in a Bartlett filter from one furnace. The experiment was not entirely satisfactory, owing to defects in the manner in which it was carried out; but the defect was one of arrangement, and by no means inherent in the filter. The furnace was worked without closing the feed-hole, as with an ordinary dust-chamber. The Sturtevant fan consequently drew in as much air as smoke, so that the chamber of the furnace had to be left half open, and about half the smoke escaped



CIRCULAR FURNACE FOR SMELTING AURIFEROUS LEAD ORES.

lowing is condensed from Mr. Guyard's description: The stack of one of the square furnaces was connected with a Sturtevant fan by means of a sheet-iron flue, through which the fumes were drawn from the furnace and blown through a sheet-iron pipe 150 feet in length which was connected, by means of two branch pipes, with two boxes of thin sheet-iron. The dust was collected in the sheet-iron pipe as in an ordinary flue. Each branch pipe was provided with a damper, or valve, similar to those used in stovepipes, so that the fumes could be distributed to one or both of the boxes at pleasure. Each box consisted of a dust-chamber and a

directly into the open air. The use of this arrangement was abandoned by the owners of the works partly on account of the expense involved and partly, as stated by them, on account of the large percentage of arsenic (15 to 20 per cent.) in the condensed matter and its low tenor in silver. As Mr. Guyard, in his analysis of this substance, found extremely little arsenic and much lead, chiefly combined with phosphoric acid, chlorine, and bromine, it is difficult to imagine on what ground the presence of arsenic in such quantity could be inferred. Mr. Guyard's analysis is supported by the fact that arsenic is present to but small extent throughout the district, while phosphoric acid exists in large quantities in many of the ores.

The shipments of Carbonado coal from Tacoma were 9000 tons for November, a considerable falling off as compared with former seasons,

The President's Message.

The President's message is too long a document for us to give entire, and can scarcely be summarized properly. For this coast, the principal questions referred to are those concerning silver and the Chinese. The President intimates that he is not opposed to restriction acts against the Chinese, and will earnestly consider anything Congress may offer to perfect the present laws. At the same time he regrets the "lawlessness" which recently occurred in Wyoming and Washington Territories.

As to silver coinage, the President, much to the regret of the mining community, strongly recommends that it cease. That subject is more fully treated than any other in the whole message. He states that a special effort has been made by the Secretary of the Treasury to increase the amount of silver coin in circulation, but it has soon returned to the Treasury in payment of duties. He also refers to the attitude of other Governments on the silver question, noting it as a significant fact "that four of the five countries composing the Latin Union mentioned in our Coinage Act, embarrassed with their silver currency, have just completed an agreement among themselves that no more silver shall be coined by their respective Governments, and that such as has already been coined and in circulation shall be redeemed in gold by the country of its coinage. The resort to this expedient by these countries may well arrest the attention of those who suppose that we can succeed without shock or injury in the attempt to circulate upon its merits all the silver we may coin under the provisions of our Silver Coinage Act."

THE LATE A. C. KNOX.—In another column will be found a memorial of the late A. C. Knox, which was read before his relatives and friends by Rev. Dr. Eastman, at the Larkin Street Presbyterian Church. In this connection it is proper to mention the kindness and good feeling shown by Mr. and Mrs. Stewart, of Lone Pine, Inyo county, towards the stranger in their midst, they having given the sufferer the best of care during his last illness. Everything they could do was done to make Mr. Knox comfortable and they deserve the hearty thanks of his friends for their kind actions.

THE annual report of the Chamber of Commerce shows a falling off in the foreign trade of New York during the year, compared with that of last year, of over \$97,000,000. The falling off at all the ports of the United States within the same period is but \$107,580,000.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 252 Market St., S. F.

FOR WEEK ENDING DECEMBER 1, 1885.

- 331,269.—ELEVATOR SAFETY CATCH—H. Albert, Crescent City, Cal.
- 331,383.—MIXED PAINT—H. C. Dort, S. F.
- 331,491.—DOVETAILING MACHINE—L. P. Garcia, S. F.
- 331,704.—VEHICLE TIRE, ETC.—A. Housner, Taylor, Nev.
- 331,500.—TILE SECTIONS—W. F. Higgins, S. F.
- 331,503.—GANG PLOW—D. M. Johnson, Stockton, Cal.
- 331,307.—FEED WATER HEATER—Dan'l Lee, Sacramento, Cal.
- 331,522.—DEVICE FOR LOCKING COLLARS AND RINGS TO SHAFTS—C. Meese, Oakland, Cal.
- 331,730.—PLANING MACHINE—G. V. Orton, S. F.
- 331,326.—LINK FOR CHAINS—J. P. Preston, Bisbee, A. T.
- 331,547.—SEED SOWER—F. Reyner, Lathrop, Cal.
- 331,336.—LIFT HANDLE FOR SASHES—W. F. Smith, S. F.
- 331,456.—PIPE TONGS—H. F. W. Sohst, S. F.
- 331,347.—BRAKE SHOE—S. Uren, Sacramento, Cal.
- 331,538.—SEEDER, ROLLER, ETC.—Walker & Barlow, Portland, Or.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

MECHANICAL PROGRESS.

Inventors Should Study Technicalities.

Inventors, as a class, do not study the laws of mechanics systematically.

It is frequently amusing to see the complication of cogs, ratchets and wheels found in machines, which have but a simple duty to perform.

Those who have studied machinery and have contributed inventions, can best appreciate how much more simple they can arrange the movements for performing a given duty after they have had several years of practice.

Practice is but another name for education, and why not substitute much of the time spent blundering around in the dark without the light of knowledge, for good books containing the results of the practice of other men in whatever art or science you desire to study.

It is much easier to read in a book and thoroughly understand, too, the best principles upon which epicycloidal cog gearing is constructed than it is to rediscover those principles; and this you would have to do, or find an equivalent, before you could possibly make a success in this line.

For another instance, the study of calorifics, as applied to the development of power in an ordinary steam engine: thousands of engines are running in this country, every day, wasting unnecessary quantities of fuel, variable clap traps in every particular, the result of the difference between what some engine builders actually know and what they ought to know.

Young men who have a life time before them, without the means to take a regular technical course, can find in any good library every principle that is necessary to make a systematic beginning. Special books can then be bought or borrowed, and in addition, scientific papers and periodicals can be obtained by any one, if he will exert himself with a fixed determination to be somebody, and not be an "it" in the world's great work.

Life is a serious matter, and those who have health and strength should be certain that not a day passes without they have learned something new that is of real value to add to their stock of good things, which, probably, some day they will ask the world to buy, when quality will be considered rather than quantity. So, then, young inventor, young mechanic, if you have been exercising your mind only upon the pictures of hope, you must

"Be up and doing.

With a heart for any fate,
Still achieving, still pursuing,
Learn to labor and to wait."

—American Inventor.

Tool Dressing.

There are few jobs in the machine shop that make so much general annoyance as that of tool dressing. The machinist has his own personal notion of the style and shape, the hardening and temper of the tool he uses, and the tool dresser in the smithy must ignore all his experience and observation, for the time being, to cater to the machinist's whim. In short the forger becomes only a helper to the fancy of the machinist. On the other hand, the machinist has frequently to encounter the obstinate peculiarities of the forger, who insists on teaching the machinist about work he alone understands. Good forgers dislike the job of tool dressing because of its annoyance, and so it frequently happens that the work is handed about in the smith shop until it rests at last with the least careful man. Some machinists also insist in dahlbing at the forge and greatly annoy the smith by their meddling. Indeed, this interference is often carried much too far for the benefit of good order, proper work and reasonable profit. It is too much the custom to consider the tool dresser as a man at call for the machinist, and where every lathe and planer hand has his own notion they make it somewhat lively for the smith.

Often to such an extent is this personal whim carried that there are few machine shops where there is a uniformity in shape of alterable tools; at every lathe and planer these tools differ in form or vary in temper—the workman is known by this peculiarity as much as by his personal name. There is no proper reason why this should be, any more than each workman should alter the size and change the shape of rule or gauge. There are determinate and exact forms for turning and planing tools adapted to cast-iron, wrought-iron, steel and brass, and these forms, once ascertained should be kept and used as standards for the shop. Models of tools should be kept for exemplars and no departure from these should be allowed except for special cause and for particular work.

One of the most common faults with the ordinary turning and planing tools in use in our machine shops is the excessive clearance; they are not made and ground to the right angle to keep down to the work, but are so constructed that this point and cutting edge alone offer resistance, as well as alone do the cutting. There is no sense in this, except that with a tool so constructed the workman can plow and gouge, and dig, and make a great pretense of work, and then blame the iron in the casting and the iron in the shaft for the irregularities of surface when it comes from planer or lathe. The cutting portion—point or edge—of a tool for such rigid material as iron or steel should

be as nearly on the moving plans of the work as possible, and the heel of the planer tool should be raised as slightly as possible above the level of the cutting point. To be sure, such a construction necessitates more frequent grinding, perhaps, when the work is rough and demanding, but it gives better results, and when there is after finishing to be done it will pay the proprietor, if it does not please the piece operator.

ENGLISH SHEET MAKERS WON'T HAVE STEEL.—The advantage of steel instead of iron for tin plates is now universally acknowledged by all who use that material. It is a manufacture now almost altogether confined to England, twenty or thirty million dollars worth being annually imported into this country. The English makers of ordinary sheets for merchant and galvanizing purposes won't have steel. They decline steelmasters' offers to supply blooms and billets at easy prices for rolling down in the iron mills. It is cheaper, they declare, and answers their purpose much better, to continue to make sheets out of puddled iron.

One important reason for the adherence to puddled iron is that rolling down from steel blooms would at once mean a large diminution, in some cases nearly one-half, in the amount of work which the mills could get through in a given time.

The largest portion of sheet worked up in this country is manufactured into cans for putting up fruit, meats, etc., for which purposes steel has a very marked advantage, and costs but a trifle if any more. The best solution of the question would seem to be the establishment of works for this manufacture in this country. A slight increase in the present tariff on sheet tin would enable the business to be profitably carried on in this country, and save to our producers the enormous sum of about thirty millions of dollars annually. This foolish move on the part of English sheet makers ought also to give a further impetus to this establishment in this country of this important and rapidly increasing business.

SUPERHEATED STEAM.—It is believed by many (and some technical papers insist upon it) that superheating steam increases its pressure in pounds. This, says the *Mechanical Engineer*, is incorrect. If the steam is ordinarily dry, superheating to any temperature does not increase the pressure one ounce. In steam engines, steam superheated slightly is economical, in that it maintains its normal temperature longer; that is to say, it does not condense so quickly, by reason of having a margin of heat above that due to its pressure, but highly superheated steam has disadvantages which are not counterbalanced. It affects fibrous packings, decomposes lubricants, attacks working surfaces, by drying them off so that they are apt to cut, and it has a special affinity for rusted surfaces, increasing and expediting the destruction of parts so affected most rapidly. From the instant that steam leaves the vessel in which it is generated, it commences to deteriorate in value, by loss of heat. The further it goes before reaching its work, the more it loses, and the only office that superheating can fill is to support the vitality of steam and reinforce it. No other work has yet been discovered for it in steam engines.

STEAM BOILERS BECOME BRITTLE BY USE.—Peter Carmichael recently read a paper upon steam boilers before the Scotch Institution of Engineers, in the course of which he mentioned that it had been found that "all qualities of iron get hard and brittle after the boilers have been at work more than a dozen years, more especially where exposed to the action of the fire; and that in the furnaces, even Lowmoor iron becomes as brittle as common iron in that time, and great care has to be taken in making repairs to prevent the plates from cracking. For this reason 16 to 17 years is long enough for a boiler to be in use, at a pressure of 40 pounds to 45 pounds. If used longer, the pressure ought to be lowered." Two boilers which had been in use 19 years, and which required repairs, were found by Mr. Carmichael so brittle that the rivet heads on the outside flew off when the inside heads were struck, showing that the rivets had deteriorated as much as the plates.

MIDGET LOCOMOTIVES.—The field of usefulness for the locomotive and iron rail is constantly being enlarged. "Midget locomotives" for plantation use are now said to be superseding mules. One of them weighs only three tons, and they are used on rails which weigh 12 pounds to the yard. The cylinders are only 10 inches long. These little engines are not confined to wood for fuel. As lumbermen, they burn wood. As plantation engines, they frequently burn refuse sugar cane. In a different form, but with the same diminutive cylinders, they are used in coal mines for hauling cars, and run either soft or hard coal or coke. In their smallest sizes they are only 10 feet long over all, 4½ feet high and 5 feet wide. A few bushels of coal and a few pails of water kept them running all day. One of these mules in a coal mine at Brookfield, Ohio, pulls 20 cars, weighing nearly three quarters of a ton each, up a grade 1360 yards long that rises at the rate of 105 feet to the mile.

KEEP YOUR FIRE SURFACE CLEAN.—Particular care should be taken to keep sheets and parts of boilers exposed to the fire perfectly clean.

SCIENTIFIC PROGRESS.

The Possibilities of Frog Life.

Some of our exchanges have recently been discussing the possibilities of frog life. The discussion arose from a query addressed to the editor of the *Manufacturer and Builder*, which was referred to Prof. Leidy, of the University of Pennsylvania. The Professor in his reply says: "The stories of toads, etc., living enclosed in the most ancient rocks, is simply absurd, and I get out of patience seeing them so constantly repeated by editors and others who ought to know better. The conditions, or laws, of life are well understood, and unless they are in constant 'play' life cannot exist. An incessant supply of nutriment, moisture, air, and a certain range of temperature are necessary. Without these the plant or animal is soon exhausted. Some animals may live two or three years at most, but are then worn out and die. What must of necessity follow if a toad breathes and acts without food? Can it hurn forever! The persons who tell such stories are either liars or incapable of observation.

A United States' senator once gave to Prof. Henry a supposed parasite, which he thought to be a centipede, and reported that he had seen his son vomit the creature, and had afterwards seen it squirm on the floor. It was submitted to me for information and name, and it proved to be a segment of an orange.

A century ago the French Academy appointed a committee to investigate the toad matter. The committee made experiments by enclosing toads in holes bored in soapstone, plugged with wood. After a few weeks or months the animals were invariably found dead. Only think of a toad in a marine rock, or in any ancient rock, in which all the fossils of these rocks are of extinct forms, while the living toad proves to be a modern species!"

If toads and frogs found in cretaceous rocks had been there from their formation it would be equivalent to saying that the live frog could be ages and ages older than its fossil relative. Such a declaration would be the height of absurdity. If thoroughly inquired into, it would probably be discovered that in each case there was a fissure in the rocks or trees in which frogs have been found large enough for the admission of water and the embryo frog which has developed there. It has been assumed by some that the frog naturally contains an acid, which by chemical action on the stone provides that the space of the frog's disposal shall be as large as its body. A second hypothesis is that not the egg but the primary frog, scarcely larger than the egg itself, falls into the rock or tree and continues to grow, deriving air and food in the form of small insects from the water that penetrates to its abode. Certain it is that frogs when artificially secured in air-tight and water-tight vessels speedily die. Experiments made by members of the French Academy a century ago proved this. Early in the present century Milne Edwards enclosed frogs in vessels made impervious to air, and the creatures speedily perished. Three frogs were once enclosed in a close box for eighteen months, at the end of which time one was dead and the others in a dying condition. Dr. Macartney hurried a toad in a vessel covered with a slate about a foot deep in the ground. At the end of a fortnight it seemed well and as plump as before. When, however, he enclosed the same toad in an air-tight vessel and buried it, it soon died, and at the end of a week was much decayed.

Dr. Buckland made some experiments which are claimed as conclusive. He placed 12 toads separately in 12 holes cut in blocks of hard flinty sandstone. They were firmly sealed in. The imprisoned animals were buried three feet deep on November 26, 1825. At the same time, four toads were deposited in holes cut in the heart of an apple tree and the opening securely plugged. Four others were also placed in plaster-of-paris covered with luting. On Dec. 10, 1826, all the buried toads were examined. All in the hard stone and in the tree, and two in the plaster-of-paris were dead. The remainder were dying; but some placed in a softer stone were in tolerably good health, and some were actually fatter than when placed in the holes. From this it would appear that in positions where water can penetrate, frogs may live, and even thrive, although buried at a considerable depth, entirely away from the light and any visible means of subsistence.

THE NATIONAL ACADEMY OF SCIENCES met at Albany, N. Y., on Nov. 10th, and enjoyed a large and distinguished attendance. During the four days of the session a large number of papers were presented; many of them were of more than ordinary interest. Prof. Young gave a resume of the history of that erratic star in Andromeda. Prof. Pickering's paper on "Stellar Photography" attracted marked attention. After pointing out the great progress which has been made in this department of late years, he cited a recent victory in gaining the impression of stars so distant or so minute as to be beyond the discovery of the most powerful telescope yet constructed. Major Powell's description of the stone ruins on the Colorado and Rio Grande pointed to the conclusion that the arid regions now so characteristic of the interior of the continent were once fertile and well watered. His paper was full of interest. Prof. Graham Bell made a preliminary report on hereditary deafness, having made a careful study of three out of the six branches of the

Lovejoy family, in which there are numerous deaf mutes. Other papers by Prof. Hall, Prof. Newberry, and other well-known members made the session one of much interest.

Artificial Winds.

A novel apparatus has been constructed by M. Rougerie, of Pamiers, France, and brought recently before the French Academy of Sciences. It gives rise to air currents similar to the great winds of the earth's atmosphere. As described in *Engineering*, the apparatus consists of a small artificial terrestrial globe put into rapid rotation in the surrounding air. In fact, it is a miniature of the earth, and by its rapid rotation it gives rise to air currents resembling the trade and other dominant winds of the world. These currents are shown by girouettes placed round the globe at small intervals, like the wind marks on the French marine charts. The apparatus reveals the following facts: The northeast and southeast trades are reproduced, and this equatorial zone of calms caused by their meeting. The gentle breezes from north and south, which disturb the equatorial calms, are also seen. So is the overthrow of the northeast trade in the southwest monsoons in the gulfs of Oman and Bengal. An ascending current in the equatorial regions is shown, and a descending current near the Azores under the center of maximum barometrical pressure of the North Atlantic; also a descending current is indicated between St. Helena and the meridional coast of Africa, under the center of maximum barometric pressure of the South Atlantic. At the poles there is a current descending from the zenith. The southeast trade at the Canaries is represented, while at the same time a south wind blows at the summit of the Peak of Teneriffs. Ascending currents from the east and west over Central America combine with the upper returning current of the northeast trade, thus explaining how the ashes of the volcano of Consequina, on Lake Nicaragua, were transported to Jamaica during the eruption of the 25th of February, 1835. Owing to the defects of construction, the device does not reproduce in a perfect manner the variable winds between the tropic of Cancer and 50° N. lat., nor the corresponding winds between the tropic of Capricorn and 50° S. lat. In the same way the southwest and northwest winds of 50° N. and S. lat. are not very faithfully imitated.

A NEW ILLUMINATING AGENT.—The *Organ fur Oelhandel* gives an account of some experiments lately made in St. Petersburg with pyronaphtha, an illuminating oil which Beilstein, the celebrated Russian chemist, thinks will supersede kerosene. It is said to be wholly free from danger of fire, and burning kerosene is easily extinguished by it. Pyronaphtha itself can be readily put out by water. It burns with a bright light, and gives off no smoke or vapor, while the fact that it is a residual product of the Baku distillation of petroleum makes it cost less than kerosene.

COATING IRON WITH ALUMINUM.—The process of Dr. Gebring of Germany, by which iron is coated with aluminum, is now largely made use of. There is used for the purpose a Bunsen burner with a blast or muffle. By this process it is possible to manufacture various articles of the durable metal for daily use, the coating of aluminum giving them a silver-white lustre. This metal, as is well known, does not oxidize under normal conditions, stands heat of an ordinary fire, and is susceptible of a much higher polish.

TWO LIQUIDS.—Recent experiments have shown that common atmospheric air, in the process of liquefaction by pressure, is separated into two distinct liquids, different in appearance and composition, and the one superimposed upon the other, separated by a well-defined marking. The lower liquid is found to contain 21.23 per cent in volume of oxygen, and the upper one from 17.3 to 18.7 per cent. These liquids remain separate for only a few seconds of time.

THE NEW STAR IN ANDROMEDA.—Prof. Young read an interesting paper before the late meeting of the National Academy of Sciences on the history of the new star in Andromeda, in which he quoted Monck's hypothesis for its luminosity on the ground, that it may be a dark star passing through the nebula and that its light may be due to friction, as meteors, which are small dark bodies, are made brilliant by friction in passing into our atmosphere.

THE NEW METAL GALLIUM melts at 81.1 degrees Fahrenheit, becoming liquid when held in the hand. Its specific gravity is a little less than six, or about half that of lead. It tarnishes but slightly in the air. It adheres readily to glass when fused, forming a beautiful mirror. In chemical characteristics the rare element gallium most resembles the abundant element aluminium.

TO MEASURE BELTING IN THE ROLL.—A simple method, which is very closely correct, is as follows: The sum of the diameters of the roll and the eye in inches, multiplied by the number of turns made by the belt, and this product multiplied by the decimal .1309 will be the length of the belt in feet.

SILICON AND TEMPERATURE.—Two French experimenters make the remarkable report that silicon, though unaffected by a temperature of 2370° F., volatilizes at 824°.

ENGINEERING NOTES.

Extensive Gas Piping Proposition.

The cheapness of natural gas as a fuel renders it a desirable acquisition, but the remoteness of the wells seems at first sight an insuperable obstacle. Nevertheless, it is a fact that companies are being formed by oil capitalists and Eastern manufacturers for the purpose of piping natural gas to seaboard at New York and to the lake cities of the West.

Chimerical as the scheme may at first appear, there are shrewd capitalists who are willing to venture their millions in the enterprise. The National Transit Company are already piping the crude oil 500 miles to refineries. Of course, it has to be forced by pumps. If crude petroleum can be forced 500 miles, it would certainly be much easier to force gas 1000 miles or more.

There is every reason to believe that the supply of gas is inexhaustible. The pressure required to overcome the friction of such long lines would be very great, but relays of pumps, worked by the gas itself, would keep it moving. Gas is a very handy as well as cheap fuel. All that is requisite is to turn a little wheel, apply a match, and your fire is kindled. No more family quarrels as to who shall do the disagreeable thing of kindling the fire. Anybody will do it.

Patents are pending, and many more are incubating, having for their object the utilizing of gas in various ways—for illuminating as well as heating. One party has patents pending for using compressed gas for locomotives. It will be accomplished by tubing and tanks in connection with the tender. Gas transportation tubes would naturally follow the lines of railroads. Nothing easier than to transfer a 20-mile supply of gas from a stationary to a locomotive condenser, in half the time it requires to take in water for the engine, and both operations may be performed at the same time.

HOW THE GAUGE OF A RAILWAY IS CHANGED IN A DAY.—The gauge of the Vicksburg and Meridian Road, 140 miles long, was changed October 22d from five feet to four feet eight and a half inches, by the following program: "Twenty-four gangs of twenty-six men each will work in each gang designated as follows: Six men drawing inside spikes, one man driving down studs, five men throwing rail, three inside spikers, eight outside spikers, three extra men for shoving car, carrying water, etc., making in all 624 hands, will proceed to move the south rail of said road in three and a half inches, thus changing the five-foot gauge to the standard or four feet eight and a half inch gauge. This is a big undertaking, and is one which, under the plans proposed, will necessitate a suspension of all trains on the road from daylight of the 22d inst., until the work is complete. The road will be broken instantaneously in thirteen different places at daylight, and will remain broken until the squads of twenty-six hands can have moved the iron or their respective sections, which vary in length from seven to ten miles. Each gang will be supplied with the following outfit: Twelve spike mauls, ten claw bars, six spike maul handles, one track wrench, one monkey wrench, one adze, one ax, two shovels, two track gauges, eight wooden hand spikes for throwing rail, one barrel water, one water bucket and one tin cup. These tools, together with one day's supply of cooked food, placed on the five-foot push car and taken to the end of the section, where they will commence work on the day of the change. The alternate inside spikes are now being pulled and driven in place and the ties and roadbed leveled for placing the rail, so that on the day of the change all that will be necessary to do will be the pulling of the remaining spikes and sliding in of the rail and spiking it temporarily, to be finished up on the following day."

A NEW STEERING DEVICE.—The St. Louis *Republican* says: Mr. Wm. H. Burns, of St. Louis, has invented a simple and ingenious device for steering steamers. As steamers are now built, the propeller screw is fastened at the end of a rigid shaft, which has the tendency to move a vessel either straight ahead, or straight back, the rudder controlling the direction of the vessel, and acting very gradually, so that one of the large ocean steamers has to travel nearly two miles to turn around. Mr. Burns' invention dispenses with the rudder, and puts in its place a strong iron frame, swinging just like a rudder on an upright shaft, but with the propeller screw mounted in it. This frame can be swung around by the man at the wheel in like manner as a rudder, but when it swings the screw swings with it, and, of course, in so doing changes the direction of its power, so that it no longer pushes the ship directly ahead. For instance, when it is desired to make a quick, sharp turn in the direction in which a ship is moving, the frame like a rudder, is swung around till it stands at right angles with the vessel's keel. The screw continues to revolve, and, of course, its entire force is applied to the work of pushing the stern of the vessel sideways, without contributing anything to the forward motion. The upright shaft on which the frame swings, and which corresponds with a rudder post, is revolved by the ship's engines, and the motion is contributed to the screw by a beveled gearing on its upright shaft, around which the propeller swings with perfect freedom.

USEFUL INFORMATION.

Protecting the Obelisk.

The progress of disintegration of the obelisk recently set up in Central park, New York, has been advancing so rapidly that the park authorities felt that its complete destruction would soon ensue unless some steps were taken to arrest the progress of the damage. After considering various methods which had been proposed to counteract the evil, they finally decided to adopt the method proposed by Mr. R. M. Coffall. This consists in treating the surface, under proper conditions, with a compound composed substantially of paraffine and creosote. The result, it is anticipated, will be the rendering of the surface of the stone proof against the percolation of water, and consequently frost and fungus proof.

The method of applying the preparation consists in first carefully going over the surface of the obelisk and removing with scraping instruments all loose fragments, chips and fungoid growths, then warming the cleaned surface with the aid of portable heaters, and applying to the warmed surface the melted compound. This operation is to be repeated until the stone has absorbed as much of the compound as it will take up, going over the entire surface of the monument in this manner.

The compound of paraffine and creosote is said to be chemically combined through the action of a third substance, in which both are soluble when heated. The name of this third substance is not revealed. The compound does not evaporate, is not affected by extremes of temperature, acids, alkalis, or destructive gases, and is practically imperishable.

The work of treating the obelisk has already been completed, and it is thought by good judges that it will be effective and permanent.

The examination and removal of the scale are said to have revealed the fact that the rapidity of the work of disintegration has been remarkable and had progressed much further than had been supposed. About 1000 pounds of scrapings were removed from the entire surface. Behind nearly every flake appeared a greenish fungoid growth, in addition to the dirt and dust which had found its way behind the scales and into the innumerable minute cracks which appeared upon the surface.

The outcome of the experiment will be watched with much interest. If successful, it will provide a simple and effective method of preserving from destruction many other interesting monuments, works of art and architectural decorations which are rapidly going to decay in almost all parts of the civilized world.

"BOTH" HANDED PEOPLE.—It is supposed to be a great misfortune to be left-handed; but is it not at least a misfortune to be merely right-handed? Why not be both-handed? We do not often realize what a useless and ineffective member this poor left hand of ours is until our right arm is disabled in some way or burdened with a fretful baby who must be held while we want to work. Now if we could only sew or write with the left hand, what a blessing it would be. Then too the right hand may be lost by some accident, when the use of the left hand becomes a prime necessity. Now why not teach children to be both-handed? They naturally use both hands with equal ease, and why should they not be trained to use both with equal facility? It is cruel to try up a child's left hand when he attempts to use it—unless he uses it to the exclusion of his right hand—since it practically maims him for life. Constant use of the right hand makes the right side of the body larger and stronger than the left, which is in itself a reason for not doing so. Let children have the free use of both hands, and encourage them in it. While nearly all machinery and working implements are constructed to be operated with the right hand, there is little enough encouragement for the left hand.

GOING BACKWARDS.—There seems to be an inclination on the part of the Federal Government, just at this time, to make war upon most of the Government bureaus and commissions which have been established to aid and encourage scientific and educational work. We might mention the Geological Survey, the Coast Survey, the Fish Commission and the Educational Bureau. Some reform is undoubtedly needed in these various directions, and retrenchment might probably be applied without any serious injury to the general progress of the work involved; but it is folly to condemn each work entirely because abuses have crept into the conduct of the same. In the mass of criticism which is now being directed at these bureaus and commissions there is undoubtedly some truth. If those in charge, or the friends of scientific progress, were wise they would be prompt in seeking out abuses and proposing such reforms as might be practical and proper, and thereby disarm criticism. The particular way in which reform is practical should be suggested by the friends of science, and not left to those who are incapable of appreciating the value to the country at large of such scientific work as has been taken in hand by the Government.

WOOD INDUSTRIES IN RUSSIA.—Few countries can show better utilization of forest products than Russia, particularly in furnishing industrial employment to the poorer and less skilled class of workmen. The better class of work is

also largely carried on. Carriage and wagon making is said to give almost full employment to the people of not less than 530 villages. It is one of the peculiarities, however, of Russian work in this line, that a vehicle is seldom finished on the spot where it is begun—one village is generally almost exclusively engaged in making spokes, another makes boxes, while a third will make the body, etc. Wooden spoons are an important product of Russia—126,000,000 being turned out there every year. A similar subdivision of labor is seen even in this simple manufacture, as in the case of carriages—one workman cuts the wood into proper lengths, another shapes the spoon in the rough, while a third hollows out the bowl. Spinning wheels form a large branch of manufacture, and a great number of articles in which wood forms the almost exclusive material for manufacture.

A Valuable Substitute For Wool.

The name of "vegetable wool" is applied to a fibrous material obtained from the leaves of the fir, a manufacture for this purpose having been established near Breslau, in Silesia. The species of pine thus operated upon is the *pinus sylvestris*, or wild pine; and it would seem that every member of the pine tribe might be turned to similar account. The leaves of these trees on examination will be found to be made up of a fibrous material held together by a resinous substance. The latter may be dissolved out by means of alkalis, leaving the woolly matter behind. Coverlets, blankets, and other articles made of vegetable wool are in use in Austria, and especially in the public institutions of Vienna. The material is warm, durable, and in all respects agreeable; moreover, it possesses the excellent quality of preserving a certain balsamic and decidedly wholesome smell, which nevertheless is so inimical to insects that they never harbor in it, as they do in almost all the ordinary descriptions of bed material. The resinous matter holding the woolly fibers together—and which is eliminated or dissolved out by the alkalis—is also turned to account, medicinal baths being made with it as a basis, and which are found to be useful in various chronic diseases.

It is stated in the *Augusta (Ga.) Chronicle* that experiments have been made in that city by Major P. H. Langdon with the leaves of the common Southern pine, which have been prepared and woven into a coarse fabric, which is of good texture and handsome appearance.

STEAM that does not carry more than three per cent of water is considered dry steam.

GOOD HEALTH.

Comparative Longevity of Men and Women.

Interesting researches concerning the comparative longevity of men and women in Europe have recently been made by the Director of the Bureau of Statistics at Vienna. From these it appears that about a third more women than men reach advanced age. Women oftener lead quiet, regular lives. They have fewer bad habits, are less exposed to strong passion and excitement. It appears from the gathered statistics of the world that women have a greater tenacity of life than men. Nature worships the female in all its varieties. Among insects, the male perishes at a comparatively early period. In plants, the seminate blossoms die earliest and are produced in the weaker limbs. Female quadrupeds have more endurance than males. In the human race, despite the intellectual and physical strength of man, the woman endures longest, and will bear pain to which the strongest man succumbs. Zymotic diseases are more fatal to males, and more male children die than females. Deverger asserts that the proportion dying suddenly is about 100 women to 780 men; 1080 men in the United States in 1870 committed suicide to 285 women. Intemperance, apoplexy, gout, hydrocephalus, affections of the heart or liver, scrofula, paralysis, are far more fatal to males than females.

Pulmonary consumption, on the other hand, is more deadly to the latter, which argues that we ought to give the girls of our families all the outdoor exercise that they need. Females in cities are more prone to consumption than in the country. All old countries not disturbed by emigration have a majority of females in the population. In royal families the statistics show more daughters than sons. The Hebrew woman is exceptionally long-lived, while the colored man is exceptionally short-lived. Dr. Hough remarks that there are from two to six per cent more males born than females, yet there is more than six per cent excess of females in the living population. The rush and worry of the average business man in this country is apt to make him prematurely old, unless he takes judicious recreation. The females are to a great extent exempt from this overstraining about business cares, which may, in a degree, account for their superior vitality.—*The Indicator*.

CRITICAL PERIODS OF LIFE.—From the age of forty to that of sixty, a man who properly regulates himself may be considered in the prime of life. His matured strength of constitution renders him impervious to the attacks of disease, and all functions are in the highest order. Having gone a year or two past sixty,

however, he arrives at a critical period of existence; the river of death flows before him, and he remains at a standstill. But athwart this river is a viaduct, called "The Turn of Life," which, if crossed in safety, leads to the valley "Old Age," round which the river winds, and then flows beyond, without a boat or causeway to affect its passage. The bridge is, however, constituted of fragile materials, and it depends upon how it is trodden whether it bends or breaks. Gout, apoplexy and other bad characters are also in the vicinity to waylay the traveler and thrust him from the pass; but let him gird up his loins, provide himself with perfect composure. To quote a metaphor, the "turn of life" has a turn either into prolonged walk or into the grave. The system and power having reached their utmost expansion, now begin either to close like flowers at sunset, or break down at once. One injudicious stimulant, a single fatal excitement, may force it beyond its strength, while a careful supply of props at the withdrawal of all that tends to force a plant, will sustain it in beauty and vigor until night has nearly set in.

How Artificial Teeth May Do Damage.

Another agent in the combination to maintain for the man of advancing age his career of flesh-eater is the dentist. Nothing is more common at this period of life than to hear complaints of indigestion experienced, so it is affirmed, because mastication is imperfectly performed for want of teeth. The dentist deftly repairs the defective implements, and the important function of chewing the food can be henceforth performed with comfort. But without any intention to justify a doctrine of final causes, I would point out the significant fact that the disappearance of the masticating powers is mostly coincident with the period of life when that species of food which most requires their action—viz., solid animal fiber—is little if at all required by the individual. It is during the latter third of his career that the softer and lighter foods, such as well cooked cereals, some light mixed animal and vegetable soups, and also fish, for which teeth are hardly necessary, are particularly valuable and appropriate. And the man with imperfect teeth who conforms to nature's demand for a mild non-stimulating dietary in advanced years will mostly be blessed with a better digestion and sounder health than the man who, thanks to his artificial machinery, can eat and does eat as much flesh in quantity and variety as he did in the days of his youth. Far be it from me to undervalue the truly artistic achievements of a clever and experienced dental surgeon, or the comfort which he affords. By all means let us have recourse to his aid when our natural teeth fail, for the purpose of vocal articulation, to say nothing of their relation to personal appearance; on such grounds the artificial substitutes rank among the necessities of life in a civilized community. Only let it be understood that the chief end of teeth, so far as mastication is concerned, has in advancing age been to a great extent accomplished, and that they are now mainly used for the purposes just named. But I cannot help adding that there are some grounds for the belief that those who have throughout life from their earliest years consumed little or no flesh, but have lived on a diet chiefly or wholly vegetarian, will be found to have preserved their teeth longer than those who have always made flesh a prominent part of their daily food.—*Popular Science Monthly*.

COCAINE A CURE FOR SEASICKNESS.—Dr. Manassese, of St. Petersburg, gives an interesting account of the employment of cocaine muriaticum in seasickness (*Berl. klin. Wochenschrift*, August 31, 1885). He argued from its usefulness in the vomiting of pregnancy that it would likewise be of value in this hughar of ocean travel. He made a voyage himself in order to test the drug, and, finding among his fellow passengers a man and a woman who were especially prone to the malady, made the following observation: Upon embarking, he administered to each every two or three hours a teaspoonful of a solution containing two and a half grains of muriate of cocaine in five ounces of distilled water, with the addition of a sufficient quantity of rectified spirits of wine. In spite of very rough weather for a period of 48 hours, both individuals escaped sickness for the first time in their lives. He also treated successfully a six-year-old child after it had begun to be sick, and a girl 18 years of age, who had been sick for 24 hours before the cocaine was given. Her case being severe, she was given a double dose every half hour, and the result is described as being "truly magical." She remained well during the rest of the voyage. Similar results followed in three milder cases. The writer thinks it justifiable to infer that in this drug we have a certain and harmless remedy against seasickness.

TO PREVENT BLEEDING AT THE NOSE.—The best remedy for bleeding at the nose, as given by Dr. Gleason in one of his lectures, is in the vigorous motion of the jaws as if in the act of chewing. In the case of a child, a wad of paper should be placed in its mouth, and the child should be instructed to chew it hard. It is the motion of the jaws that stops the flow of blood. This remedy is so very simple that many will feel inclined to laugh at it, but it has never been known to fail in a single instance, even in very severe cases.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

COAL NEAR LANCHANA PLANA.—Amador Ledger, Dec. 5: A sample of coal met with in the Stockton coal mine, 2½ miles northwest of Lanchana Plana, was left at the Ledger office on Saturday. It appears to be of a much better quality than that obtained from the mines in Lone valley. The mine is owned by a Stockton company, who located 80 acres of ground for mining purposes. They have done considerable work in developing the property. A shaft has been sunk to a depth of 100 feet, and in the drift run in a northeast direction a vein of coal six feet in thickness has been encountered. A large quantity of coal has been taken out, but none has been shipped as yet, although shipments are expected to be in order at an early date. Three men are working at present, and it is confidently expected that coal mining will become in the course of time a very important industry in that section.

GOVER.—This mine is now employing 30 men. The 20-stamp mill is kept running steadily; the ore is not of high grade, but there is plenty of it, and it pays something over expenses. About 10 men are kept on prospecting work, always a wise course in any mine, no matter how large and apparently inexhaustible the ore-body may be which is being operated upon.

MOORE.—All the indications at this mine are favorable. The work of sinking is in progress, the depth reached being somewhat over 250 feet. A ledge over four feet in width, and of paying quartz, has been discovered. The ore is not considered of high grade; but it is live quartz, that judging from appearance will yield at least from \$7 to \$8 per ton. Some ore of a much higher grade was taken out on Wednesday last. Assays of the quartz have given as high as over \$100 per ton; and the prospects by hand mortar would indicate an average of \$15 per ton. The sulphurets are also said to be of high grade, exceeding \$200 per ton. The present sinking contract will give the shaft a depth of over 300 feet. Sinking will no doubt be continued beyond that depth, although probably a new level will be opened, and preparations made to get the mill running. It is a noteworthy fact that the ore body appears to increase both in size and richness as depth is attained. Parties interested in this mine are very sanguine that it will develop into a big and permanent mine, and every day's developments seem to warrant their anticipations.

MISCELLANEOUS.—It is reported that negotiations are in progress for the sale of a controlling interest of the North California mine, near Drytown, to San Francisco capitalists, who are ready to buy stock at \$1 per share; there are \$15,000 shares in the company. A majority of the stock has already been deposited in Wells Fargo's office in Sutter Creek in acceptance of the proposition of the San Francisco parties; they have until April next to complete the purchase. The 5-stamp mill of the Lighthouse mine was started this week, with flattering prospects. The five-stamp mill which has been moved on to the St. Louis mine, near Pine Grove, was put in motion this week. The new hoisting machinery at the Kennedy is being put into position as fast as possible. The baling bucket, round wire cable, and new sheaves for the same are on the way from San Francisco. It is expected that everything will be in readiness to commence taking out water in two weeks.

Inyo.

WHITE HILL.—Inyo Independent: Twenty-five tons of ore from the White Hill mine were shipped this morning. Mr. Thomas Kehoe, one of the owners of the mine, will please accept thanks for several fine specimens. One of these specimens is a double cube of pure galena, about three inches by one and a half inches. The others are beautiful specimens of chloride of silver and sulphure of silver. The White Hill mine continues to be a good producer of fine ore.

PIUTE.—Last Wednesday ten tons of ore were taken down from the Piute mine to the Maxim mill to be worked. The Piute is twelve miles above Bishop station. There is said to be two hundred tons of ore on the dump that was taken out some time ago. If this sample is found to pay the whole amount will be shipped down and worked at the mill.

CHRYSOPLIS.—Mike Lasky and John Anton are doing assessment work at Chrysopolis. Since starting in this time the mine looks so promising that they think of working right along. A nice vein of gold ore has been struck at a depth of eighty feet; it is three feet wide and prospects well.

BROWN MONSTER MINE.—Bastian & Co. have about thirty tons of ore on the dump, and the pack train will commence packing ore on Monday. The first-class ore will be shipped to Selby & Co., while the balance will perhaps be sent to our local reduction works, when they get ready to run.

Mariposa.

PILING IT UP.—Mariposa Gazette, Dec. 5: Captain Diltz was in town yesterday, who says that the water from the recent rain has about all run down, hence his reservoirs and ditches are idle at present for the want of water. In the mean time he is wheeling out from his mine a large amount of vein matter, and piling it for milling and washing. The vein looks well and grows wider as it goes down. The strata and vein matter which carries the gold is some 30 or 40 feet wide and looks very promising. Should the rain-fall start up again, Captain Diltz will uncover a large amount of vein besides washing away considerable dirt.

Nevada.

BADGER HILL MINING COMPANY.—Grass Valley Union, Dec. 6: A meeting of the stockholders of the Badger Hill Gold Mining Company was held on Saturday evening to take into consideration an increase of the capital stock of the company and determine as to the resumption of work upon the mine, which has been standing idle for some years. There were several non-resident stockholders absent, but those present were in favor of increasing the shares from 500 to 50,000 so as to provide a working capital. The expression of the meeting was also in favor of resuming work, and it is understood that the

mine will be started as soon as the necessary arrangements can be made, within the next few months.

Placer.

GOOD CLEANUPS.—Herald, Dec. 2: A crushing of about 15 tons taken from a north extension of the Boulder mine by Fred. and Jacob Kaiser and J. B. Brown yielded a little over \$10 to the ton. They are down about 80 feet and have a two-foot ledge. On a cross lead in the same locality Louis and Charles Kaiser have just taken out a crushing which yielded a little over \$26 to the ton. Chas. Williams and Henry Johnson, on Rocky Ridge, finished a crushing in Pelster's mill the other day that went about an ounce to the ton. From an extension of the old St. Lawrence the Kittler boys have recently taken out a crushing of ore, which paid very satisfactorily.

A GOOD CRUSHING.—Sixteen tons of ore recently taken out of the old St. Lawrence mine, near Ophir, by Sam. Kaiser, Peeler Lozano and John Romero Jr., yielded something over \$50 per ton. The boys are now putting up a whim and making other necessary improvements, and in a few days will be ready to commence operations again in good earnest. The St. Lawrence belongs to Mr. Chas. Reed, of Ophir, and is no doubt a good property. This mine, some 10 or 12 years ago, was owned and run on a high-pressure scale by a San Francisco corporation, but from some cause was closed down, leaving the impression that the lead was worthless. It is, therefore, an illustration of what is frequently the case in California, wherein old and abandoned claims under practical and more economical management are being made to pay.

Plumas.

FOREST KING.—Greenville Bulletin, Dec. 2: Ten stamps of the Kettle mill have been put in order, and as soon as the condition of the road will admit hauling of ore from the Forest King will be resumed and the mill started. This mill is quite conveniently situated with reference to the mine, and will probably be kept running all winter.

INDIAN VALLEY MINE.—After a stoppage of about a week, occasioned by the inability to get suitable miners, the mill at the mine resumed crushing yesterday (Tuesday) morning. Mr. Cornell is expected from the city soon, where he has made arrangements to obtain all the skilled labor that the mine will hereafter require. Once more under way this mine will undoubtedly continue to run steadily throughout the season. The late storm assures a steady supply of water power from the Round Valley reservoir, and the developments in the mine continue to be of the same splendid character as recently noted. The owners have not feared to make a generous investment before expecting returns, and are now meeting with a deserved reward, while the community is correspondingly benefited.

GIBSONVILLE.—Cor. Plumas National, Dec. 3: Since 1850 there has been a prosperous mining town, and it would seem to have a good future before it. The Union, the North American, the Bunker Hill, and three other mines that are to be opened up in this immediate vicinity, will make Gibsonville what it was in early days. The Union mine, now owned by Messrs. Cahrs and Judd, is being worked by a strong force of men, and is proving as rich as it is inexhaustible.

Shasta.

PLACERS.—Shasta Co., Democrat, Dec. 2: The placer miners of Buckeye district are putting in their besticks, rain or shine. Reid & Co.'s mill on Star gulch was shut down yesterday to permit a cleanup, after having run through about 90 tons of ore. Billychoop from all accounts is a promising mineral field and is now receiving no little attention at the hands of mining men. Stamp mills in the near future will add stability to its progress and lend influence to its speedy development. Reilly, Mathews & Co. who purchased Conant's Squaw creek mines resumed work on the road to the camp from the railroad last Monday, and we are told it will be finished in a few days, when a ten-stamp quartz mill will be hauled over the road. The route now being utilized is but temporary. Some time in the future it will be improved.

San Bernardino.

CALICO MINES.—Print, Dec. 5: All the principal mines in Calico district are looking well, employing the usual number of men and turning out the usual amount of bullion. The Silver King one of the principal pillars that support the town of Calico, has attained a depth of over 600 feet and is turning out enough good ore to keep the 15-stamp mill almost in constant operation. There is every reason to believe that the mine will reach a great depth and continue to pay dividends to its owners for many years to come. The developments made in the Garfield are frequently wonderful, immense chambers being excavated that yield hundreds of tons of high-grade ore. The mine keeps Barber's 10-stamp mill in constant operation, and has reached a depth of over 500 feet and still shows no signs of exhaustion. The Silver Odessa is now a well developed mine and has an appearance of being a permanent one. It keeps the company's 10-stamp mill at Hawley constantly running at full capacity on ore that yields large dividends. The Bismarck is employing a small force of men taking out several tons of rich rock daily from the surface, and from points probably not deeper than 30 feet. The extent of this mine will be more fully determined when a greater depth is attained, and developments are prosecuted more extensively. It has been a paying property from the start. The Occidental has a large force at work principally taking out high-grade ore, not much dead-work and prospecting being being done. It is being worked with considerable profit, and it will be a long time before even the ore in sight is exhausted, and that it will reach considerable depth is guaranteed by its proximity to the Garfield. The Sue is still being worked at a profit, though small, and much smaller than when the present company first took hold of it. The ore appears to lie in rich pockets, but not in large quantities. The ore is hauled to the Waterman Mill. The Waterloo is progressing in good shape, considerable ore being extracted of fair grade. The mine improves as work advances and there is every reason to believe that it will develop into a good paying property. The Plutarch is looking better than ever and shows up plenty of low-grade ore that would pay a rich company to handle, and yields enough high-grade to make it an advantage for the owners to continue developments. There are a number of mines that are being worked to advantage in a small way, some of which are liable to develop into fine properties. There are not so many chlorides to work in the camp as there were this time last

year, some of the mine owners believing that digging up mines in any shape in search of rich ore injures them and lessens the chances of selling. The Last Chance mine which has been showing up well for some time during John Benefiel's lease was sold the other day to Messrs. Gillespy & Childs.

Trinity.

DEADWOOD.—Cor. Trinity Journal, Dec. 5: The richest ore we have seen for some time is that recently extracted from the new strike in the Brown Bear mine. The new ledge has every indication of permanence and value, and we hope that it will prove thus as it is in the hands of good and enterprising men who do a good share of benefit to the county. Westlake & Cosgrove have made a cleanup of the most satisfactory results, \$60 per ton. Everyone, as it appears, condemned the ore, saying it would not mill over \$10 per ton, and Westlake says he has taken many a drink the past week over bets made previously on the same. Wm. Blagrave has made several cleanups, the ore working over \$100 per ton. Rich rock is still being extracted and a good mine is being developed. Gibson & Leavitt, upon their small vein, have good ore. A shaft sunk about 50 feet proves the vein as good as ever. George Chenoweth will soon commence operations on the old Black Bear mine owned by Mr. John Gibson. George is a good enterprising miner and will succeed where others will fail. Minear & Co. are doing active work. Their lower tunnel will soon be into the ledge. Jud and Walter Van Matre have so far a bonanza.

EAST FORK.—Cor. Trinity Journal, Dec. 5: The North Star Co.'s five-stamp mill has been running four or five days and is a complete success in every respect. The boys are very busy putting their roads in order from the mine to the mill. Day & Moor's arastra is running day and night on very high grade ore, and the mine is looking remarkably well. Charles Hippler & Sons are busy repairing their ditch which was damaged by the recent storms. They will have their arastra running in about ten days. Abbott, Giffith & Sheehy are excavating for an arastra at the mouth of Barney gulch, having just finished their ditch, and expect to have the arastra completed by the 1st of January. They will work ore from their mine on Rich gulch, the prospects being very promising. The latest discovery is that made by Gustin & Bailey and named the Thanksgiving mine. Present developments show it to be one of the richest ever found in the county. When first discovered the rock prospected about \$10 per ton and has since kept increasing both in richness and extent. They have a tunnel on the ledge a distance of 40 feet, in the face of which the ledge is full 30 inches and will go from \$75 to \$150 per ton. There is water sufficient to run a 10-stamp mill by water-power all the year round, crossing the claim, and an inexhaustible supply of timber for mining purposes.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Dec. 5: In this mine, during the past week, the main lateral drift north on the 3100 level was advanced ten feet since last week's report. On Wednesday last work was discontinued at this point and two crosscuts started east at a point seventy feet north of the deep waste station. The east crosscut is now in fifty feet and the west crosscut the same distance. Material in the face of north drift, vein matter, looking splendidly. On the 3000 level a small quantity of ore is being extracted from the ore body in which the deep waste has been sunk below that station or level. It is proposed to go on and stope out this ore as high as to a connection with the 2900 level.

THE KEYES MINE.—There is really a good mine in Six-mile canyon, which has had to lie idle for several months on account of litigation. Recently the long continued suit between Dr. D. A. Hiller, of San Francisco and P. J. Keyes has been amicably settled, and work is to be started up again in the mine about January 1st. The shaft is nearly 300 feet deep, well timbered throughout. The ore is in a series of small veins or portions of a main vein, and the ore is of the rich black sulphuret order. It is estimated that there is nearly \$40,000 worth of ore in sight, which can be extracted at little expense. There are good steam hoisting works at the top of the shaft, with requisite buildings, etc.

CHOLLAR.—The main south lateral drift on the 3100 level is being pushed ahead as usual, being now in 560 feet south from the Combination west drift. The material encountered is dry, hard, black dyke lying next to the diorite of Mount Davidson, and to the westward of the main ore vein. The rock continues hard, but good daily progress is made. No crosscutting is talked about as yet, neither is there any talk at present of sinking the Combination shaft deeper. The hydraulic pump continues to work to perfection.

CON. CALIFORNIA AND VIRGINIA.—The old 1750 level continues its regular yield of 125 tons per day, supplying the Morgan mill. Average assays, \$15 per ton. From the Jones contract section, above the 1500 level, about the same daily amount is being extracted, which is shipped to the Eureka mill. Average assays about \$30 per ton. The drift northwest on the 1650 level is being pushed ahead steadily towards the old ore stopes.

YELLOW JACKET.—Daily yield, 175 tons from the old upper workings above the 1300 level. The main lateral drift on the 1700 level, from the Crown Point through the Kentuck, continues to make good progress northward toward the ore body expected to be found in that part of the mine.

CROWN POINT.—The usual supply of low grade ore to keep the mills running continues to be extracted from this and the Belcher mine. Explorations continue on the 1700 and 1750 levels, where some good ore is found, but not of very high grade or in great quantity.

OPHIR.—The main lateral drift south from the west crosscut on the 400 level is now in 290 feet, with a good continuance of low grade ore in its face. The west crosscut from this lateral drift is in 122 feet. Face in good vein material, carrying occasional streaks of ore.

KENTUCK.—Old regularity goes steadily ahead, as usual, yielding sufficient ore from the upper workings, above the 1300 level to keep the Rock Point and Douglas mills steadily running.

MEXICAN.—On the 500 level, the north lateral

drift from the east crosscut is in 165 feet, and the south lateral drift opposite to it, 166 feet. Both are running in very favorable vein matter.

GOULD AND CURRY.—On the 1000 level, west crosscut No. 2, which is in 170 feet south of the north line is in 204 feet. Material, dry vein porphyry, with streaks of quartz and clay.

UNION CONSOLIDATED.—On the 500 level, the crosscut east, 100 feet south of the Sierra Nevada line, is in 317 feet, and making good progress in very favorable vein material.

ALTA.—The explorations on the 700 level near the upraise from the 950 level, show good bunches and streaks of pretty fair ore, but no bonanza as yet.

BEST AND BELCHER.—On the 1000 level, west crosscut No. 3 is in 234 feet, and progressing well in good vein material, decomposed quartz, porphyry and clay seams.

Columbus District.

HOLMES.—True Fissure, Dec. 5: We made, during the past week, a fine development in a raise above the intermediate, that we call the Crummer raise. After we broke into the body of ore we drifted on it, and now it is 5½ feet wide for fifteen feet in length, and looks exceedingly well. We think this is the continuation of the McClane bonanza. From the Cross development we are taking some good ore. At point 18 we are still driving the drift. The ground is a little more favorable, and we are making better progress. The Creer drift looks better than at last report. The ledge is 12 feet wide and there are two streaks of waste in it that are equal to three feet in width. The balance will go to the mill as it comes out. This ore body is on the same ledge as the hot stope, and some of the ore is very rich. The car samples from here will average \$75. This is a very important prospect, being further north than any work done in the western portion of the mine.

POTOSI.—The lessees are taking out three tons of good ore from the Monk and Jolly workings every week, and four tons per week from the Potosi No. 1. All the stopes are looking well. As soon as they can get the sacks they will ship two carloads to Selby & Co. The boys were very much pleased with their last returns, and expect to do even better next time.

RUBY.—Mt. Messenger, Dec. 5: The last Ruby cleanup amounted to 123 ounces, and a dividend of \$6000 has been declared. About 40 men are employed. The Extension Co. cleaned up last Sunday 322½ ounces. The directors declared their fifth dividend (the first from the extension ground) Nov. 30th, payable Dec. 1st, of ten cents a share, aggregating \$6000, and, hereafter, there will be similar regular monthly dividends.

Jungo District.

PROVING RICH.—Silver State, Dec. 4: The Lottery mine in Jungo district, which is situated about 55 miles west of town, is proving to be very rich. It was located by W. C. Owens and Richard Nagle, and it is prospected to a depth of 23 feet from the surface. At that depth the vein is about six feet wide, and there are streaks of ore from two to six inches wide through it that assay several hundred dollars to the ton. A chunk of the ore, which would probably weigh four pounds, was exhibited at the courthouse yesterday, and good judges pronounced it free milling. It is principally chloride, and resembles the rich ores of the Ohio mine at Rebel Creek.

Hawthorne District.

THE YELLOW JACKET.—Walker Lake Bulletin, Dec. 9: The Yellow Jacket arastras are now at work on ore from the mine, and while the result will not upset the bullion market, the profit will be a very comfortable income to the owners. The mine, which for some time has been known to be one of the best and surest properties in this section, has latterly shown much improvement, and if it continues as it now is, it will not long be considered a little mine. This ledge is situated in that part of the country where all experts were satisfied nothing could be found, but, as the owners have the gold, they are willing to allow others to keep the theories.

SALE.—On Saturday, John Hendry sold all his interests in Hawthorne and Moss mining districts, to a company composed of Hawthorne people. This sale includes half of the celebrated Red Bank, in Hawthorne district, and half of the mines at Kinkead, which yield very rich gold rock.

Hiko District.

HIGH GRADE ORE.—Cor. Eureka Sentinel, Dec. 3: In a former letter to the Sentinel on the mineral resources of this district, I inadvertently made mention of the collapse of the Hiko Mining Company, attributing it to the inexperience of the managers. At the time I wrote the letter it looked very much as if mismanagement was the cause of the failure, but as the principal manager, Eugene Howell, has since shown himself, by actual results, to be an entirely competent mining man, I hasten to give him all the credit of his late achievements. Those achievements consist of unearthing large bodies of high grade ore in two of his mines and the working of the same up to 87 per cent of their assay value, and if he did not have to surrender the mill, which belonged to Mr. Burton, he would in a few months have cancelled the entire indebtedness of his company. As it is he has paid the greater portion of the outstanding bills, and hopes before long to have the wherewith to build a substantial mill at the mines. It is no exaggeration to say that if the mines of Hiko were in Colorado or Utah, or even in some accessible locality in this State, they would be worked extensively, for the country for miles around is one solid mass of mineral-bearing rock, scattered promiscuously and volcanically in all directions. This rock, or rather ledge croppings, will assay all the way from \$5 to \$30 per ton, sample pieces going away up in the hundreds.

Pennsylvania District.

COMING TO THE FRONT.—Cor. Eureka Sentinel, Dec. 3: Pennsylvania district, which is some 26 miles from Bullioville, is coming to the front, Mr. Barton being busily engaged in erecting a 10-stamp mill on the well-known Klingensmith mine. This property, although known to be a first-class one, has lain idle for years. The ledge is 16 inches wide, of free milling quartzite, five tons of which were lately worked at Mr. McFadden's mill in Pioche and yielded \$45 dollars per ton in silver and \$10 in gold. A shaft has been sunk on the property to a depth of 160 feet, where the ledge has been found stronger than on the surface. Experts who have visited the mine from time to time have pronounced it as resem-

bling the true fissure vein of the Comstock more than any claim they have ever seen. As Mr. Burton has some 3000 tons of ore on his dump, together with an abundance of wood and water close by, there is a snug little fortune awaiting him in the Klengen-smith.

Pioche District.

MAY BE BETTER.—Cor. *Eureka Sentinel*, Dec. 3: It need not surprise the readers if the town of Pioche should take on new life before many months, as parties who mean business are negotiating for the purchase of the famous Raymond & Fly and Meadow valley mines. I am aware that this statement, in view of the many similar ones that have been published from time to time, will be looked upon with suspicion by the general reader, but in this case I know whereof I write.

Spruce Mount District.

FURNACE STARTED.—Pioche *Record*, Nov. 28: A letter received from there, states that the furnace was started up, and that it worked like a charm. The yield is from 75 to 80 bars per day. This is the third time the furnace at Spruce Mount has been started up, but until the present time could never be made run successfully, as then stated, owing to the rebellious character of the ores of the district, but after R. C. Walsh, who went from Bristol to that place, did some experimenting with the ore and furnace, he has succeeded in knocking all the rebelliousness out of the ore, and the silver and lead flow through the furnace as smoothly as could be desired. Owing to his success as a skillful furnaceman Mr. Walsh has been appointed Superintendent of the Spring Mount S. M. Co. There are 1500 tons of ore on hand at the furnace, and a run of at least 75 days will be made. As the silver bars are shipped away, mining news from Spruce Mount will hereafter be interesting.

Tuscarora District.

ARGENTA.—*Times-Review*, Dec. 4: West drift on the 400 has been advanced 12 feet during the week.

NORTH BELL ISLE.—No change to note. Good progress has been made with the work on the 150-foot level.

BELLE ISLE.—North drift from crosscut east, 450-foot level, advanced 12 feet the past week; total length, 94 feet.

GRAND PRIZE.—North drift on the 300 level has been extended 13 feet during the week, and upraise above same level up 74 feet.

NAVAJO.—No. 1, crosscut west, 350-foot level, advanced six feet. Crosscut No. 2, 250-foot level, advanced five feet. West crosscut from the east lateral, same level, advanced six feet. South drift, east vein, same level, extended two feet. South drift, east vein, 150-foot level, advanced 15 feet. North drift, west vein No. 2, same level, advanced 16 feet.

Victoria District

GOLD LEDGE.—Walker Lake *Bulletin*, Dec. 9: The gold ledges discovered in Victoria district are reported to be very rich, and it is said that Hawthorne district will soon find its equal. Everybody is willing.

ARIZONA.

MOHAVE COUNTY.—*Miner*, Dec. 6: A lot of ore from the C. O. D. mine is expected at the concentrator in a day or two. This mine is turning out lots of good ore, and the whip is kept busy in hoisting it out. Mr. Ryan, the superintendent of Raymond's Concentrating Works, having placed the concentrating machinery in thorough working order, has placed W. R. Jones in charge of it, and is now turning his attention to the leaching process, which he intends to use in connection with the concentrator. He has already commenced work on the necessary vats. Ed. Burke will start up work on the Cupel shaft in a few days. This claim is owned by J. W. Yoacham, of this town, and is one of the best looking prospects on Stockton hill. Work on the I. X. L. mine has been suspended until after January 1st, the owners having to put in the balance of the year on assessment work on other claims. The Signal ro-stamp mill is expected to start up about the first of the year. Several parties are doing assessment work on their claims near town, and shots are going off in every direction. Beecher & Co. shipped a 400 bar of gold bullion yesterday for Eugene Fourtillot, who has just had a batch of ore from the Vanderbilt mine worked at the concentrator. One of our miners had as many as fifty assays made last month, and yet, in spite of all his care, discovered that he had been throwing 682 ounces over the dump. Fortunately, it can be easily sorted out, but this incident shows that one cannot be too careful.

COLORADO.

ELK MOUNTAIN.—*Pilot*, Dec. 3: Garret Fitzgerald shipped a carload of ore this week to the Moffat smelter from the Daisy lode in Redwell basin. The Pine Tree lode in Redwell basin, is being worked by James Affly and John Jones. At present they are running a crosscut tunnel to cut the vein of the Pine Tree lode, also the Daisy vein owned by Fitzgerald *et al.* Frank Winters has leased and bonded the Volunteer mine at Ohio city, and will begin work on it immediately and continue it all winter. Mat O'Loughlin has recently come back from a trip to some placer property situated about 8 miles west of Gunnison, and owned by himself and Capt. John Tetard. He purchased some additional interests while there, and did considerable work, building a tail ditch, etc. He has very great faith in the future greatness of their placer interests there.

CRYSTAL CITY.—A drift has been started from the Black Queen shaft at a depth of 110 feet, and they are taking out some fine ore, keeping three shifts at work. The Lost Horse is looking good and giving encouragement to the boys. Several sales are about to be made around this section which will be of great benefit to our camp.

IRWIN.—The Hopewell mine in Irwin, that is being worked under a lease by Tom Hodgson, Edgar Johnson and Simon Kautler, is now producing some mineral, we believe. The work is done in a shaft of the vein, and about 200 feet down the creek from the old shaft. The vein is right in the bed of a creek and no little trouble is experienced from water. The Ruby Chief has a new ore house built and everything under cover for winter work. The National mill is still running on the tailings that have been left at the mill for two or three years, and so

far as we can learn with good success. Mr. Metzler expects to run the Rose-Reed concentrator this winter. Mr. Nichols, who has had charge of putting the mill in order, feels confident of success.

WINNING CARD.—Georgetown *Courier*, Dec. 3: The last carload of ore shipped from this property was estimated to be worth nearly \$12,000.

EQUATOR.—This mine is producing quantities of good ore. A mill-run was made from the property this week.

BROWN.—The mine has been leased to Harry Lampshire, who is putting in air pipes and otherwise getting the property in working condition.

BELL CITY.—This lode on Covode mountain is now being worked by H. J. Blatter, and at the bottom of the 25-foot shaft, shows a nice streak of ore, which runs well in gold.

STEVENS.—Drifting is going forward each way from the Matt Harris tunnel, showing ore in each place. The stopes on the seventh and ninth levels are yielding well. The ore carries an average of 45 ounces in silver and 64 per cent lead.

CANIER.—The main shaft on this Empire property is being sunk at the rate of 20 feet per month, and exhibits excellent indications for the future. The drift is being driven and a crosscut of 32 feet run toward the south wall without striking it.

INDEPENDENCE.—But few men are at present operating on this mine. C. T. Gleason is the main lessee. He is stopping on about two inches of mineral above the No. 3 level, where he has extracted ore that returned 326 ounces. His last shipment of 2600 pounds returned him 189 ounces silver to the ton in one class.

JOHNSON.—Eight men are now at work on the property, situated in Argentine district. Carlson & Co. are stopping above level No. 3, upon a nice streak of mineral. Johnson & Peterson are sinking a winze from No. 4 to No. 5 level and begun drifting on from four to five inches of ore. The ore streaks in the mine range from one to six inches in width and yield from 70 to 360 ounces silver to the ton.

IDAHO.

SMELTER CLOSED DOWN.—Idaho *Messenger*, Dec. 1: The Clayton smelter closed down for the winter on the 25th of November, after the most successful summer's run it has ever made, leaving everything in the best possible condition—the ore houses empty, the coal bins empty, and the machinery in fine shape for another successful year's run. The output this year, although we do not know the exact figures, has been very large, and aggregates about 700 tons of bullion, matte and high grade ore, of the average value of not far from 500 ounces per ton, or a total product of \$350,000. A. J. Crook departed at once on the closing of the smelter for the East, and will probably not return before spring. The subordinate management, also, and most all of the laborers of the camp left at once, when the smelter stopped, and the town of Clayton, as well as the smelter, has, in the strict sense of the term, "closed down for the winter."

WOOD RIVER OUTLOOK.—*Times*, Dec. 5: Notwithstanding the general opinion to the contrary, business is better here now than ever before. There is five times as much money in circulation here now as a year ago, the dealers in general merchandise are busy from morning until night, and the volume transacted is double what it was a year ago. True, the profits are not as great; but on the other hand there is much less credit sought or given, and losses are smaller. The merchants are "solid" to a man. Our main dependence is upon our mines. They, thank goodness! are improving continually and their yield is increasing. From every section, district and ravine, almost, the news of improvement comes. The Lava Creek country is already demanding reduction works, and at least two mills will be erected there in the spring. The Little Wood River country contributes two or three groups of new mines, and even now estimates and plans are being prepared for a 60-ton concentrating works for Colonel Havens and ex-Marshall Shaughnessy. Resurrection district shows good mines, and Hon. John Hailey is making it his business to study out the best process for reducing their ores, with the view of building reduction works on Silver Creek in the spring. The Lee's Gulch and Broadford district continues to open up satisfactorily, one of the mines there—the Queen of the Hills—showing fully as well as any mine in Idaho. Deer Creek, as everybody knows, has recently shown up new deposits that promise exceedingly well, and if the unfortunate Montana-Snowfly-Taylor-Motherwell-etc. controversy is ever settled the yield of the mines along this tributary will be quadrupled. At Bullion the Bay State, King of the Hills, Mormon Girl and other groups are being put in shape for a heavy yield, while the Idahoan has enough in sight to insure a daily yield of \$1500 for an indefinite period. The upper country is looking better than ever, notwithstanding one of its foremost groups has ceased to yield. But Crook gulch is still the main artery, the region holding forth the most promise. In the Climax, within a mile of the Hailey bridge, there is a bonanza of unknown extent, but for which \$100,000 is said to have been offered; and Colonel Wall's trip out now is stated to have something to do with this proposition. Across the gulch, evidently on the same lode, the Fearnought continues to yield small lots of shipping and a large quantity of concentrating ore. Up above the springs the Idaho Democrat shows a new body of rich ore. But the quarter which gives us the most hope is the gold belt, as the formation there justifies the wildest anticipations. As repeatedly stated in these columns, there are several wide parallel veins of gold-bearing ore that, if properly opened, can give steady employment to thousands of miners, millmen, woodchoppers, teamsters, mechanics, etc., and be made to yield hundreds of millions of dollars. One 20-stamp mill is already at work there, and another—a Wiswell, with a capacity equal to 15 or 20 stamps—will doubtless be before Christmas. With two mills in operation, and conducted by thoroughly competent mine and millmen, the district will soon receive that crucial test which can alone give investors that confidence that will cause them to secure property in the district, and cause it to "boom." As above stated, our mines are our main reliance. With them we will prosper anyway, as even though Congress should be hostile to silver and lead it cannot legislate our gold out of value. There is no discount on gold, and cannot be. The outlook for this region is therefore better than ever before.

MONTANA.

PLACER STRIKE.—Butte *Inter-Mountain*, Dec. 2: This morning Charles S. Warren received a dispatch by telephone from Thomas Wallace, of Missoula, requesting him to forward the names of five men in Butte, who, with others, would organize a company for the purpose of developing placer claims in the Big Hole country. Half an hour later the gentleman wired Missoula the following names: G. W. Stapleton, S. A. Estes, Lee Mantle, G. W. Irwin, Charles S. Warren. The company will be at once organized and active operations commenced. The intelligence received from the new gold field, for such it may now be properly called, is almost startling, and many are of the opinion that a second Alder gulch has been discovered. Saturday last, Mr. George Orr and Thomas Hughes took out of their claim with a common rocker, \$120 in gold. Monday, Billy Edwards cleaned up after a week's operations, and sold to the Missoula National bank, gold dust to the amount of six hundred dollars. Such statements as these have in them the ring of early days, when the virgin gold fields of Montana attracted an eager throng from every quarter of the globe, and these facts are vouched for by unquestionable authority. It is a striking coincidence that the two men, Orr and Thomas, who have struck this placer bonanza, belong to the Fairweather party that discovered the rich treasures of Alder gulch. The golden harvest they gathered twenty years ago was scattered with a lavish hand, and they were obliged to return to lives of privation and toil. But undaunted by frowns of fortune, they have steadily persevered in prospecting expeditions until their labors have been again crowned with success. The new mines are located in Monument district, named after a granite shaft erected to the memory of the brave men who fell in the bloody battle of the Big Hole. The diggings are at and in the vicinity of the battlefield on the north fork of the Big Hole river. The nearest route by which to reach the district from Butte is by Mill Creek, on the trail leading north of French gulch to the river. Thence it is only necessary to follow up the stream. The distance from this city is about one hundred miles.

NEW MEXICO.

HIGH GRADE ORE.—Silver City *Enterprise*: The Cow Springs district is producing some very high grade ore. The Novelty mine at Gold gulch, shipped 20 sacks of first-class ore this week. Development on the Silver Bell mine in Chloride flat has shown up some rich mineral. The property is owned by Owens & Lloyd who consider it a most promising prospect. Seven bricks valued at \$10,000 were shipped by the Mimbres company this week. During the first 30 days run of the mill 27 bricks, worth \$34,000 were shipped by Mr. Pehey. No other mining camp in the country can make a better showing. The Young Man mine, at Gold gulch which has been worked for the past month is looking and producing well. A great deal has been said recently of the Slayback and Free milling claims in the Mogollons. The vein averages from 20 to 25 feet in width, and the assays average from one to three ounces in gold and from 18 to 20 ounces in silver. These claims are considered to be the best prospects in the Mogollons. The Providencia, which for years was the bonanza property of Grant county is again producing mineral that will average over \$500 in considerable quantities.

BLACK HAWK NOTES.—A good strike has been made in the Tom Jasper mine. The ledge shows 18 inches of native and horn silver, and it is regarded as one of the best ever found in the camp. The Rose is producing the finest ore in the history of the mine from a depth of 130 feet. This is a new and rich strike. The Black Hawk will start up in a few days as the necessary machinery arrived on Wednesday from Denver. Lowthian and Eckles are developing their property at Mineral Spring and are showing some fine ore.

OREGON.

DEVELOPMENTS.—Grant's Pass *Courier*, Dec. 4: Some very good developments are now being made on Foot's creek, seven miles above Grant's Pass, among them a prospect owned by Mr. Cliff Smith, of this place. Mr. Snelson, on Grave creek, near the mouth of Wolf creek has a good paying claim, for the amount of work done. He commenced on this property last fall, and developments thus far are very encouraging. Charles and Joseph Neill, are working a claim on the Jones creek ditch below Mr. Todd, which they purchased from him. They are well fitted up for ground-sluicing this winter, and as the formation of the ground and character of the gold is about the same as above, we doubt not they will take out considerable money this winter. From a gentleman who came up from down Rogue river a few days since, we learn that all the placers are in full blast in that vicinity. Mr. Jack Layton, one of the energetic men interested in mining in Josephine county, has a claim he has been working for years on Farris gulch, a tributary of Williams creek. The gold taken from these diggings is coarse, but of a very fine quality. Walter Simmons on Rogue river has one of the best fitted up claims in the county for sluicing. This mine is supplied with an abundance of water, and the manager will this season clean up a large area of ground, some of which would have been worked last year, but for the scarcity of water. The gold found in these diggings is of a very fine quality, and it is considered one of the best in this county. All the mines in the vicinity of Waldo are now in full running order. On Saturday last it was our pleasure to visit the mine of Mr. Geo. L. Todd three miles north of Grant's Pass. This mine was formerly the property of Campbell and Todd, before Mr. Campbell's retirement. Mr. Todd assumed the management and has been successfully working it since. The mine usually runs seven months in the year, but last season not being a good one the bedrock was not cleaned. Mr. Todd is now ground-sluicing, and the formation being of a loamy nature is easily got away with. There are now about ten miles of ditches on these diggings taken out of Jones' creek, and three miles out of Bloody Run. Generally considered, this is a handsome property.

NOTES.—Bedrock *Democrat*, Dec. 5: Charley Robinson has hauled all the heavy machinery from the depot to the Virtue mine. Wednesday George Boreman hauled a two-horse load of powder, Hercules No. 1, to the Virtue mine. The rich strike in the placer digging on Connor creek is well deserved.

The parties who made the strike have been engaged for two or three years past in running a bedrock flume, and until last week realized but little for their work. Their perseverance is deserving of success.

UTAH.

STAR AND LINCOLN.—Cor. Salt Lake *Tribune*, Dec. 3: The Harrington and Hickory mine is looking fine and a big dump of ore attests the truth of the matter. Considerable work is now going on throughout the entire district. A force of miners have been put on the Wild Bill and Flora mines. Peter Martin and J. F. Brown have struck a rich body of ore in the Monarch mine, Eureka hill. J. H. Cook has found 200-ounce ore on the St. Mary's, Monitor, Mammoth, Burning Moscow, Creedmoor, and many other claims with good results. The shutting down of the Campbell mill at Milford has not retarded the future outlook of the district, as it has been demonstrated that nine-tenths of the ores are concentrating and can be concentrated for \$2 per ton, and if Mr. Campbell does not work custom ores somebody else will, as a mill to concentrate ores alone can be constructed nearer Star than Milford for \$8000 with a capacity of 20 tons per day, and a well can be sunk that won't cave in. In the foothills of Star and in Lincoln districts there are silicious ores that will average 12 per cent lead, 20 ounces silver and from \$8 to \$20 in free gold that will pay to concentrate, but not to ship to Salt Lake and pay \$25 to \$30 per ton to smelt. Now here is a chance for some bright, enterprising man of means to erect a custom mill to concentrate the ores of Star and Lincoln, and do it before the resident miner dies with old age.

PARK NOTES.—*Record*, Dec. 5: The Ontario mill shipped for the week ending Nov. 30th, 90 bars of bullion, containing 63,351.37 fine ounces of silver, valued at \$59,686.50. The Morgan people have cut the apex of the great vein in their Maryetta shaft. The vein stuff is very similar to the Daly ore. We are informed that Charley Dolberg has sold his group of claims for sixty thousand dollars to Eastern parties. They adjoin the Morgan property on the southwest, and cover the apex of the Daly vein. Westerly, and adjoining the Dolberg group is situated the claims of Bogan & Co. They have run a tunnel south about two hundred feet, crosscutting the vein about two hundred feet below its apex; on its dip to the northwest, the vein is about two feet thick, somewhat broken, yet carrying high grade ore. Some two thousand feet westerly from the Bogan property, Hunter & Co. have run a tunnel southerly about six hundred feet, crosscutting the vein about five hundred feet from the mouth of the tunnel. The vein is large, but broken, and carries a high grade ore. The owners have been drifting westerly on vein. The vein, when crosscut, is about 400 feet below the apex. This property has a bright future. Doctor Reed is engaged in making a raise on his vein from the level of the lower tunnel to connect with his upper workings. The vein is about four feet between walls, and carries bunches and stringers of very high grade ore. When air connections are made he meditates drifting easterly. This property is undoubtedly located on the great Ontario belt. The doctor deserves success, having expended some thirty thousand dollars in developing this great property.

REVIEW.—Salt Lake *Tribune*, Dec. 4: The receipts of bullion in this city for the eleven months of the present year are shown in this table. It shows bullion receipts only, excluding all ores. Necessarily, also, it fails to include the product of a number of producers that make no current reports:

January	.....	\$378,644.56
February	.....	237,536.78
March	.....	273,771.69
April	.....	359,983.27
May	.....	238,620.43
June	.....	361,076.16
July	.....	260,567.40
August	.....	321,912.78
September	.....	319,079.40
October	.....	420,855.92
November	.....	419,853.28
Total	.....	\$3,765,902.67

Of course, the actual output was much in excess of this, though the above includes some bullion from Idaho and Montana. Yet the unreported product, together with the shipments of ore to smelters abroad, would largely overbalance our debts on outside bullion account. The receipts of the metals in this city for the week ending December 2d, inclusive, were—of bullion, \$65,669.78; ore, \$16,041.49; total, \$81,711.27. The previous week the receipts amounted in aggregate to \$153,784.17, of which \$127,734.99 was bullion and \$26,149.18 was ore. No Ontario output is reported for the week, but all is going well at the mine and mill. The Stormont sent up from the Silver Reef sandstones three bars of silver, \$3390. The product of the Hanauer smelter for the week was nine cars of bullion, \$29,470; of the Germania, four cars, \$7866.67. Ore receipts were \$2278.97 from Southern Utah, \$2700 from the Crescent, \$2520 from the Sampson, \$323.52 from the Toledo, Utah; \$4200 from the Queen of the Hills and \$4020 (15 tons) from the Bannock, Idaho.

CHRISTY.—Southern Utah *Times*, Dec. 3: A few weeks ago, a blue colored sandstone was encountered in the ledge in the upraise on the 500-foot level in the California, which is attracting considerable attention among our experts. The ore has not a sign or marker to distinguish it from common country rock, although it carries a good percentage of silver. There is probably a big body of it, as it runs across the bottom of the drift and is eight feet wide in the stopes. John Barbee shipped five tons of good grade ore from the old Bonanza mine on the White Reef to the Christy mill this week. Ottman & Miller and James Carroll made shipments from the Maggie to the Christy mill during the week. James McDonald also made a small shipment from the Tecumseh to the same mill. Al. Hartmann and Jack Pierce have struck a bonanza on the old Leeds ground. They have three feet of ore, four inches of which averages over 100 ounces. Their lease does not expire until January 1st, and they have over 20 tons of ore on the dump. There are more than 75 chloridizers at work in the camp and the number is constantly increasing. If capitalists knew one-half as much about the value of the sandstone silver deposits as the miners do, Silver Reef would be the best camp on the coast. As it is, the Reef is getting to the front in good shape.

TATUM & BOWEN,

25, 27, 29 and 31 MAIN STREET, SAN FRANCISCO.

91 and 93 FRONT ST., PORTLAND, OREGON

Manufacturers of

MINING MACHINERY, ENGINES, BOILERS, Etc.

We are manufacturing from Special Designs of the most experienced and successful Practical and Scientific Experts, Complete Plants for all descriptions of Mining Operations, as follows:

CONCENTRATING MACHINERY—Best and Cheapest, Cornish Rolls, all Steel Wearing Parts, Most Practical Styles of Two, Three and Four Compartment Double and Single Jigs, Sizing Screens, Patent Hydraulic Separators, Tables and Concentrators.

STAMP MILLS for Reduction of Gold and Silver Ores, whether free milling or base. Most useful and substantial styles of Single and Double Discharge Mortars, Wet or Dry Crushing.

STEEL SHOES AND DIES, Tappets and Cams, cheapest and best Blake Improved Rock Crushers and Automatic Ore Feeders, Superior Amalgamating Pans with wood or iron sides.

PANS FOR TREATING GOLD ONLY, Settlers, Clean-Up Pans, Retorts, Furnaces, Dump Cars, Hoisting Machinery, Cages, Landing Dogs, etc.

CORLISS, MEYER'S CUT-OFF AND BALL'S PATENT VALVE Engines of extra strength and durability.

STEEL BOILERS of Two Sheets only, Steel Economic Boilers, combining with the safety, durability and economy of the Stationary Boiler, the convenience and portability of the Portable. It occupies but little space, and is the best and cheapest boiler ever made.

WE ALSO MANUFACTURE SAW MILL MACHINERY.

We are also Sole Agents for the Gordon and Maxwell Steam Pumping Machinery, and carry a full stock of all kinds of Mill Supplies, including the

Albany Lubricating Compound and Oils.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'fg Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

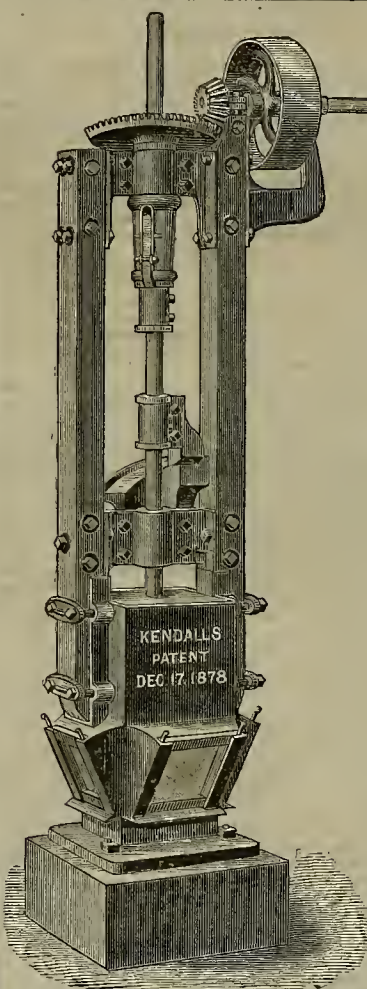
SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

218 California Street, San Francisco, Cal.



L. C. MARSHUTZ.

T. G. CANTRELL.

NATIONAL

IRON WORKS,

N. W. Cor. Main and Howard Sts.,
San Francisco,

...MANUFACTURERS OF...

Stationary and Compound Engines,

FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.

AMALGAMATING MACHINES.

CASTINGS and FORGINGS

Of Every Description.

All Work Tested and Guaranteed!

Improved Portable Hoisting Engines

...SOLE MANUFACTURERS OF...

KENDALL'S PATENT QUARTZ MILLS.

Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.

MARSHUTZ & CANTRELL.

Send for Circulars and Price List.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

A. T. DEWEY.
W. B. EWER.
GEO. H. STRONG. } Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

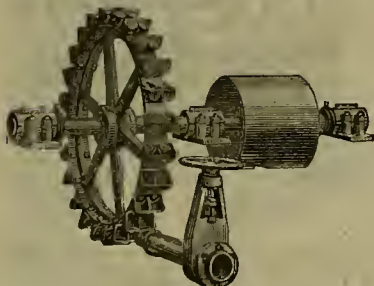
WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Ohiuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent, distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

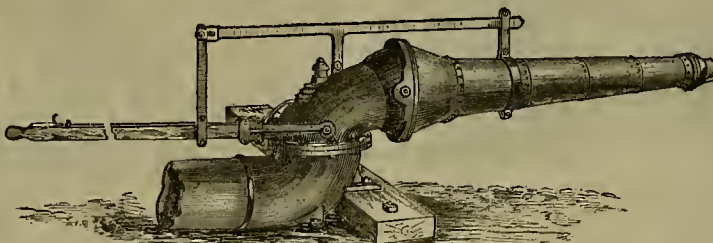
The California
Perforating Screen
Company.All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

IMPROVED FORM OF HYDRAULIC GIANTS.

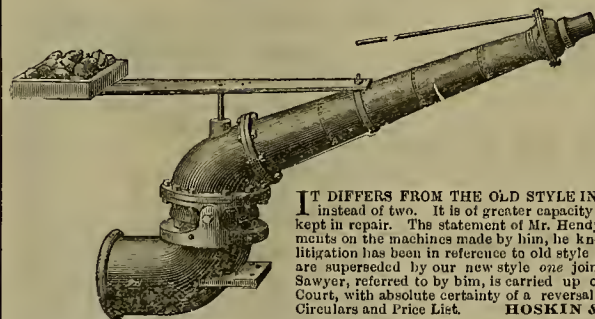


The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

Patents furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco, Cal.



This cut represents our

IMPROVED
HYDRAULIC
MACHINE.

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on the machines made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List.

HOSKIN & CO., Marysville, Cal.

JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.



Manufactured of BEST STEAM METAL. We claim the following advantages over other Valves and Ounce Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take them off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impossible to make them tight except by regrinding, which is expensive if done by hand, and if done by machine soon wears out the valve, and in most cases they have to be discarded from the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is manufactured under our 1830 Patent, and will stand 200 lbs. steam. Sample orders solicited. To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.

The most Complete Compound
manufactured in America.

Far and away ahead of anything in market. A great California invention.

Property Owners are interested
personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint

Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.Fire-Proof, Water-Proof, Acid
and Alkali-Proof.

CHILLED CAR WHEELS.

Medal Awarded, Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 First Street, San Francisco, Cal.

IRON CASTINGS OF ALL DESCRIPTIONS.

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY
And Assay Office.Highest Prices Paid for Gold, Silver and
Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the
most suitable Process for Working Ores.Special attention paid to Examinations of
Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.

Location of Works: Melroe, Alameda Co., Cal.

Office: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$40 upward per ton; Jewelers' sweepings and scrapings bought or worked for the owners at a fixed rate per ton. Rebellious ores especially solicited. Gores worked and practical working tests made by any process, to wit: Amalgamation in battery and copperplates for free gold ores. Amalgamation in pans for silver and gold ores, with or without roasting. Leaching of silver ores. Chlorination of gold sulphurets. Assaying, Chemical Analyses of Ores, Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

624 SACRAMENTO STREET,

SAN FRANCISCO,

CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG
GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL.

H. KUSTEL.

★ METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

WM. D. JOHNSTON,

ASSAYER AND ANALYTICAL CHEMIST.

118 Leidesdorff Street,

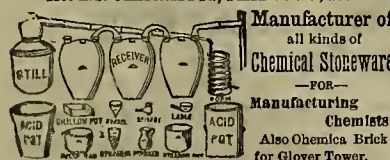
Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.

Manufacturer of
all kinds of
Chemical Stoneware

—FOR—

Manufacturing

Chemists,

Also Chemical Brick
for Glover Tower.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

Important Notice to Gold Miners Using Silver Plated Amalgamating Plates.

Mining men are cautioned against purchasing inferior quality of silver-plated mining plates now being manufactured and sold here in this city. The plates have proved very defective, the silver having no adherence to the copper, and assays showing great deficiency in amount of silver guaranteed.

There have been many complaints from purchasers. The delay, damage, loss of time, labor and money, caused by these defective plates, amount to considerable.

Good plates can be furnished at the same price these poor plates cost.

Mining men should purchase their mining plates only from a reliable house, having a reputation to maintain, and who can furnish genuine first-class references.

The San Francisco Plating Works, E. G. Denniston proprietor, 653 and 655 Mission street, have been manufacturing silver plated amalgamating plates for the past 18 years, and have filled over 3000 orders during that time, furnishing plates to all the prominent mining companies on the Pacific Coast. His plates are used in every mining camp. The great success of Mr. Denniston's plates is owing to perfect knowledge of the business, best modern facilities, and skilled workmen.

Perfect adherence of silver to the copper, and full weight of silver is positively guaranteed on every order. These plates have always proved durable and satisfactory in every particular.

All medals ever awarded for mining plates on the Pacific Coast were to Mr. Denniston. No gold medal was ever awarded for mining plates here. Parties advertising "gold medal awarded" make a mistake. The report of Mechanics' Institute Fair is good authority on these points.

Mining men are cordially invited to correspond with, or to visit the Plating works.

Lowest estimates furnished for sets of plates for any size quartz mills.

San Francisco Gold, Silver and Nickel Plating Works, 653 and 655 Mission street, San Francisco, Cal., E. G. Denniston, proprietor.

Mining Share Market.

There is very little new or particularly interesting to note from the Comstock, which mining center generally rules our mining share market here. There is supposed to be an ore body in the Hale and Norcross about and above the top of the winze on the 3000 level. This ore body was what the deep winze was sunk into, and which was subsequently followed down to the 3000 level. In chambering out for the boisterous works of this winze a large amount of fair-grade ore was worked, from which three fine silver bricks were produced; therefore, the management would like to get out some more of the same kind. They are raising and stopping out ore at the point designated, and will probably follow the ore vein up to the 2900 level, extracting the ore for milling. Some of the ore above the roof of this level, being stoped out, shows very well in both sulphurets and chloride, and may eventually develop into a good paying ore body. The mineral indications tend toward the belief that the much-coveted ore body is not far off. At any rate, good and efficient work is being done by the company with that end in view. The diamond drill, boring ahead at the north end of the 3000 level, has developed nothing good thus far, notwithstanding all rumors to the contrary.

The low-grade bonanzas of the north and south ends of the lode, in the Consolidated California and Virginia, and the Yellow Jacket, Kentucky, Crown Point and Belcher, are rolling out their regular daily contributions toward keeping the mills on Carson river steadily running, and considerable ore is being produced by outside mines. A large amount of dead prospecting work is being done at all points along the lode in the old mines.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	BAL.	SECRETARY.	PLACE OF BUSINESS.	
Baker Divide M Co.	California.	10.	25.	Oct 29.	Dec 1.	Dec 21.	D M Kent.	330 Pine St	
Buchanan M Co.	California.	14.	15.	Oct 30.	Dec 5.	Dec 21.	P J Sullivan.	121 Post St	
Bunker Con M Co.	California.	8.	05.	Oct 23.	Nov 27.	Dec 17.	G W Sessio. s.	309 Montgomery St	
Bulwer Con M Co.	California.	2.	20.	Oct 23.	Dec 10.	Jan 20.	W Willis.	309 Montgomery St	
Buller M Co.	Nevada.	15.	50.	Oct 21.	Nov 24.	Dec 16.	C E Elliott.	309 Montgomery St	
Con Amador M Co.	California.	10.	50.	Nov 2.	Dec 2.	Dec 18.	F B Latham.	327 Pine St	
Daisy Cement M Co.	California.	8.	02.	Nov 19.	Dec 23.	Jan 12.	C J Collins.	512 Montgomery St	
General L e M Co.	Arizona.	7.	01.	Nov 23.	Jan 9.	Feb 8.	C E Gillet.	628 Montgomery St	
Graduate M Co.	California.	1.	05.	Oct 12.	Nov 16.	Dec 14.	R E Elor.	310 Pine St	
Golden Jacket M Co.	Nevada.	1.	05.	Oct 27.	Dec 3.	Dec 26.	R G McClellan.	331 Montgomery St	
Gould and Curry S M Co.	Nevada.	51.	25.	Dec 4.	Jan 8.	Feb 1.	A K Durbrow.	309 Montgomery St	
Golden Fleece M Co.	California.	3.	20.	Oct 26.	Dec 15.	Jan 15.	F Schirmer.	Phelan Block	
Justice M Co.	Nevada.	43.	10.	Nov 25.	Dec 30.	Jan 19.	R E Kelley.	419 California St	
Julia Con M Co.	Nevada.	21.	10.	Nov 9.	Dec 9.	Dec 30.	J Steadfield.	419 California St	
North Gou d & Curry M Co.	Nevada.	8.	20.	Nov 23.	Dec 24.	Jan 11.	C H Mason.	331 Montgomery St	
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	Jan 4.	H Deas.	309 Montgomery St	
New York Hill M Co.	California.	9.	15.	Oct 30.	Dec 3.	Dec 24.	J B Leighton.	313 Montgomery St	
Navajo M Co.	Nevada.	15.	05.	Sept 29.	Dec 2.	Dec 23.	J W Paw.	310 Pine St	
Potosi M Co.	Arizona.	21.	30.	Dec 7.	Jan 7.	Jan 28.	C E Elliott.	328 Montgomery St	
Russel Reduction & M Co.	California.	1.	25.	Oct 15.	Dec 29.	Jan 19.	J Morizio.	328 Montgomery St	
Summit M Co.	California.	8.	05.	Oct 23.	Nov 30.	Dec 21.	G W Sessio. s.	309 Montgomery St	
Trinity M Co.	California.	1.	10.	Nov 2.	Dec 8.	Dec 24.	G W Pearson.	417 Kearny St	
Tuolumne Co.	California.	1.	05.	Sept 15.	Nov 13.	Dec 15.	H J Hyland.	309 Montgomery St	
Willow Creek M Co.	Nevada.	2.	1.	00.	Oct 12.	Nov 16.	Dec 14.	R E Elton.	310 Pine St

MEETINGS TO BE HELD.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Andes S M Co.	Nevada.	B Harris.	309 Montgomery St.	Annual.	Dec 13
Equitable Tunnel M Co.	Utah.	C J Collins.	512 Montgomery St.	Annual.	Dec 21
Gold Canon M Co.	California.	F A Berlin.	410 Montgomery St.	Special.	Dec 22
Gould & Curry S M Co.	Nevada.	A K Durbrow.	309 Montgomery St.	Annual.	Dec 21
Julia Con M Co.	Nevada.	B W Heath.	318 Pine St.	Annual.	Dec 21
Selby Smelting Co.	Idaho.	Called by Directors.	416 Montgomery St.	Special.	Jan 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Cal-donia M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Nov 25
Jackson M Co.	California.	D C Bates.	419 California St.	25.	Oct 5
Manhattan S M Co.	Nevada.	John Crocker.	419 California St.	25.	Spt 1
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Dec 15
Syndicate M Co.	Nevada.	J Steadfield Jr.	419 California St.	10.	Dec 21

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 19.	WEEK ENDING Nov. 25.	WEEK ENDING Dec. 3.	WEEK ENDING Dec. 10.
Alpha.	.65	.60	.70	.60
Alta.	.25	.25	.20	.20
Andes.	.30	.35	.30	.25
Argenta.	.15	.15	.15	.15
Belcher.	1.30	1.35	1.30	1.45
Belding.	1.25	1.80	1.15	1.05
Best & Belcher.	1.25	1.80	1.15	1.05
Bullion.	.35	.30	.35	.25
Bonanza King.	.10	.10	.10	.10
Belle Isle.	2.35	2.80	1.90	2.10
Benton.	1.0	1.50	2.20	1.75
Bodie Tunnel.	.15	.15	.15	.05
Bulwer.	.35	.30	.35	.55
California.	1.45	1.60	1.30	1.40
Challenge.	.30	.25	.30	.25
Champion.	.50	.50	.50	.50
Chollar.	.65	.75	.50	1.10
Confidence.	.90	.90	.90	1.00
Con. Imperial.	.15	.15	.15	.15
Con. Virginia.	1.45	1.60	1.30	1.40
Con. Pacific.	.70	1.01	1.25	1.40
Crown Point.	1.20	1.60	1.75	1.80
Day.	.15	.15	.15	.15
Debreka Con.	3.00	3.10	2.50	2.75
Eureka Tunnel.	.25	.25	.25	.25
Exchequer.	.25	.25	.25	.25
Grand Prize.	.25	.25	.25	.25
Gould & Curry.	.75	1.00	.65	.80
Hale & Norcross.	3.27	4.05	3.60	3.90
Hale & Norcross.	3.27	4.05	3.60	3.90
Holmes.	4.00	4.00	4.50	5.00
Independence.	.75	.75	.75	.75
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Martin White.	.10	.10	.10	.10
Mono.	6.25	7.50	4.70	6.00
Mexican.	.80	1.00	.70	.80
Mt. Diablo.	.30	2.50	2.60	.25
Northern Belle.	.30	.40	.25	.35
Navajo.	.30	.40	.25	.35
North Belle Isle.	.10	.10	.10	.10
Occidental.	.15	.15	.15	.15
Ophir.	1.05	1.35	1.00	1.05
Oreman.	.25	.30	.20	.30
Potosi.	.45	.60	.45	.60
Practical.	1.75	1.85	1.60	1.50
Sage.	.60	1.10	.70	.60
Sierra Nevada.	.90	1.10	.70	.60
Silver Hill.	.25	.25	.25	.25
Silver King.	.675	7.00	.60	.75
Scorpion.	.25	.25	.25	.25
Sierrita.	.20	.20	.20	.20
Tioga.	.20	.20	.20	.20
Union Con.	.60	.80	.45	.60
Utah.	.70	.70	.65	.50
Yellow Jacket.	1.50	1.60	1.80	1.35

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Dec. 10.	300 Exchequer.....	.20	
1100 Alta.....	.25c	100 Gold & Curry.....	.75
50 B. & Belcher.....	1.15	1570 Hale & Nor.....	1.45
100 Bodie Con.....	1.75	400 Holmes.....	10.00
100 Bulwer.....	.55c	280 Mexican.....	.65c
50 Crown Point.....	1.15	41 Mono.....	4.00@2.45
300 Chollar.....	1.00	20 Potosi.....	.25c
20 Confidence.....	.90c	50 Savage.....	1.80
50 Crown Point.....	1.15	50 Sierra Nevada.....	.70c
150 Con. Pacific.....	.70c	250 Utah.....	.65c
200 Con Va & Cal.....	2.55	150 Yellow Jacket.....	1.10

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLEY—Amador and Calaveras Co's.
F. H. HORN—Nevada (State).
G. W. INOALLS—Arizona.
E. L. RICHARDS—San Diego Co.
R. O. HUSTON—Idaho and Montana.
Geo. McDOWELL—Santa Clara and Santa Cruz Co's.
HUGH ELIAS—Nevada Co.
J. DE PUTZ, Butte and Yuba Co's.
J. WINKLER, Alameda Co.
M. L. DEXTER, Plumas and Sierra Co's.
J. B. PATCH, Nevada and Utah.
L. D. CLARK, Tebama and Shasta Co's.

GREAT rush—for Muller's holiday goods, 135 Montgomery street, near Bush, opposite Occidental.

AARON'S TESTINO AND WORKING SILVER ORES.—Illustrated, 114 pages. 1876. A useful and practical work, free from technicalities and extremely serviceable for miners' use. Post-paid, \$2. Published and sold by Dewey & Co., S. F.

DEWEY & CO
PATENT
SOLICITORS.
252 MARKET ST. S. F.
ELEVATOR 12 FRONT ST. S. F.

W. S. Smith.
ENGINEER AND DRAFTSMAN.

Drawings, Specifications and estimates furnished. Machinery of all kinds constructed. Engines tested. Inventions perfected. Blue Prints. 258 Market St., S. F.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT NO. 51.

Levied.....December 4, 1885
Due in Office.....January 8, 1886
Amount.....25 Cents per Share
Sale Day.....Monday, February 1, 1886

ALFRED K. DURBROW, Secretary.

OFFICE—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

HALF SHARE IN GOLD MINE FOR SALE.

Three full claims; one claim developed; 400 feet shafts and tunnels. Mill test 3 1/2 tons gave 2 1/2 ounces gold, 3 ounces silver per ton; 100 tons gave \$20 gold per ton on plates and \$20 in tailings; 14 tons gave \$7 per ton on plates. Custom mill within 6 miles of mine. For further particulars apply to G. W. SPAWFORTH, Leng Station, Cal.

GOLD QUARTZ MINES.

Miners owning leads of developed value, and who are willing to dispose of an interest for a mill, will address with particulars,

ALMARIN B. PAUL,

Room 20, Safe Deposit Building, San Francisco.

BADGES FOR ALL SOCIETIES,

Police, firemen, etc., presentation prizes or charms, in gold, silver, or metal, sold at society prices by the agents of the Universal Badge Manufacturing Co., NATHAN JOSEPH & CO., 641 Clay St. Workmen and K. of P. badges in gold, \$1 each, sent C. O. D. Trade supplied.

SITUATION WANTED—AS ENGINEER OF A QUARTZ mill. Address Engineer, 339 Eighteenth St., S. F.



THOMSON & EVANS STEAM PUMPS.

The BEST and CHEAPEST, MOST ECONOMICAL and Reliable for all Purposes.

Compound Pumps, Duplex Pumps, Double-Acting
Deep Well Pumps, Etc.

PUMPS FOR IRRIGATING, ETC.

Steam Engines and Machinery of all kinds made and repaired.

C. H. Evans Machine Works,

Successor to THOMSON & EVANS.

Send for Catalogue,

110 and 112 BEALE ST., SAN FRANCISCO, CAL.

SAN FRANCISCO TOOL CO.,WORKS: First and Stevenson Sts., - - - San Francisco, Cal.
MANUFACTURE ALL KINDS OF**MACHINE TOOLS,**

INCLUDING ENGINE LATHES, DRILLING MACHINES, Etc.

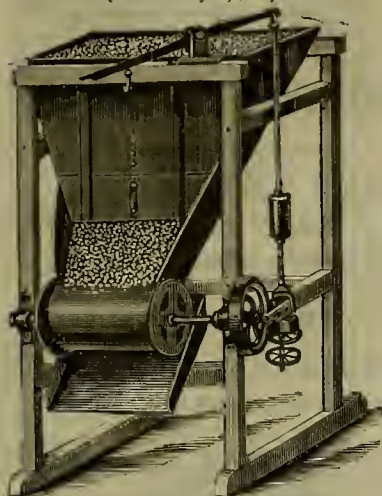
Pumps for Dredging, Reclamation, and Irrigation.
Pit, Vertical, Bulkhead, Turbine, Centrifugal
and Low Lift Pumps.**HORIZONTAL, SINGLE-ACTING, and AUTOMATIC STEAM ENGINES.****CAST IRON SECTIONAL BOILERS.**Boiler Furnaces, Water Valves, Water and Steam Fittings,
Hydraulic Jacks, etc., etc.

SEND FOR CIRCULAR.

SEND FOR CIRCULAR.

THE ROLLER ORE FEEDER

[Patented May 23, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repair.

Golden State and Miners' Iron Works.
Sole Manufacturers,

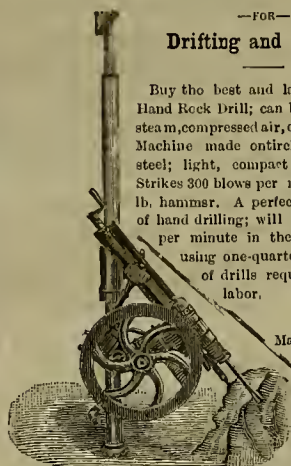
237 First Street, SAN FRANCISCO, CAL.

**CALIFORNIA
HAND ROCK DRILL**

—FOR—

Drifting and Sinking.

Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 300 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.



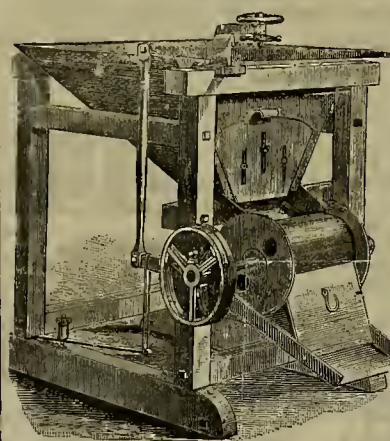
Machines on exhibition at No. 32 First St., San Francisco.

Send for circulars.

C. O. BARLOW, General Manager.

**THE ORIGINAL
Roller Ore Feeder.**

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ore; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ore.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

A Golden Opportunity in Montana.**FOR SALE.**

20,000 TONS OF SEDIMENT from the tailings of a Gold Mill. Money in a metallic state; will average, gold, \$9.00; silver, \$7.00. Also 5000 feet of placer ground, which paid to ground sluice in 1886. Also 2 water rights. Apply to

BRAND & O'KEEFE,
Gloster Mine, Lewis & Clark Co., Mont.

AN EXTRAORDINARY RAZOR

HAS BEEN INVENTED BY THE QUEEN'S OWN COMPANY of England. The edge and body is so THIN and FLEXIBLE AS NEVER TO REQUIRE GRINDING and hardly ever setting. It glides over the face like a piece of velvet, making shaving quite a luxury. It is CREATING A GREAT EXCITEMENT in Europe among the experts, who pronounce it PERFECTION. Two dollars in buffalo handle; \$3 in ivory. Every razor, to be genuine, must bear on the reverse side the name of NATHAN JOSEPH, 641 Clay street, San Francisco, the only place in the United States where they are obtained. Trade supplied; sent by mail 10c. extra, or C. O. D.

THE PACIFIC COAST**ELECTRICAL CONSTRUCTION CO.**

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

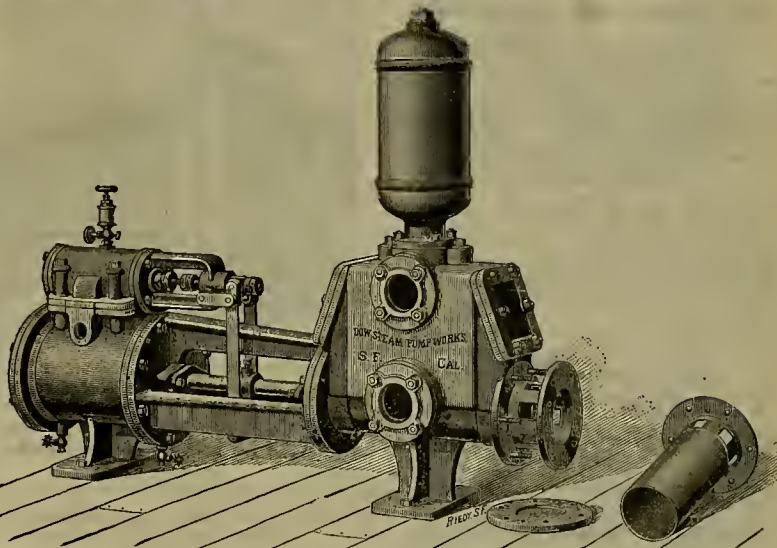
The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. **THE BEST LIGHT FOR MILLS AND MINES.**

SEND FOR CIRCULARS GIVING FULL INFORMATION.

DOW STEAM PUMP WORKS,

San Francisco, Cal.

**DOW'S IMPROVED STEAM PUMPS
And Pumping Machinery**

FOR EVERY POSSIBLE DUTY.

COMPOUND PUMPING ENGINES,

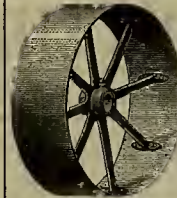
Condensing and Non-Condensing,

.....FOR.....

**Water-works,
Mining Purposes,
Irrigation, Etc.**

GRAND SILVER MEDAL Awarded at Mechanics' Institute Industrial Exhibition for Best Direct and Double-acting Pump.

Works: 114 & 116 Beale St. Correspondence solicited. Call or send for Catalogue.

**PERFECT PULLEYS**

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

PAT. OCT. 25, 1881.

SHAFTING, HANGERS AND APPURTENANCES.

SEND FOR CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

- SAN FRANCISCO, CAL.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS**MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,****AC'TS DYER CANNON BALL QUARTZ MILL**

222 & 224 FREMONT STREET. SAN FRANCISCO.

WANTED.**Situation by a Competent Chemist.**

Graduate of the Imperial Polytechnic Institute at Graz, Austria. Expert analyst, assayer, technologist and metallurgist. Would also go to Spanish America. Address care of F. SUSTERSIC, Big Spring, Howard County, Texas.

A CHANGE OF POSITION DESIRED.

A first-class Chemist and Mineralogist, at present Superintendent of a mining and milling company in California, wants to change his position. Besides being expert in assaying, as well as analytical chemistry, he has great experience in mining and reducing silver and gold ores. He would prefer a position in a refinery or reduction works. He can give first-class references. Address this office under A. L., 1700.

American Exchange Hotel,
SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of this business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50
PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

**THE HOME SCHOOL,
FOR YOUNG LADIES,**
1825 Telegraph Ave., Oakland, Cal.

(Founded in 1872 by the late Miss H. N. Field.) Gives thorough instruction in foundation studies. Admits special students. Prepares for College. Has a resident French Teacher. The Next Term will begin on Wednesday, Jan. 6, 1886. Address

MISS L. TRACY.

**HEALD'S BUSINESS
COLLEGE,**
24 Post St. S. F.
Send for Circular.**INVENTORS, TAKE NOTICE!**

L. PETERSON, MODEL MAKER,
253 Market St., N. E. cor. Front (up stairs), San Francisco.
Experimental machinery and all kinds of models, Tin, Copper, and Brasswork.

Iron and Machine Works.

UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kind of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

BUILDER OF

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging Machines

Brodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.

Manufacturers of B. E. Henrickeon's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.] The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tanned Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

FULTON IRON WORKS,

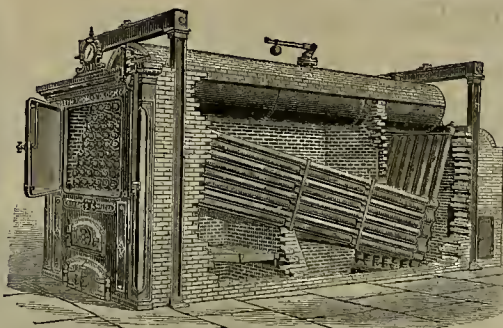
HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries

OF EVERY DESCRIPTION.

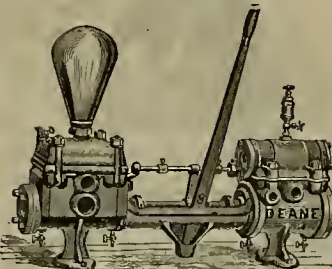
Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers, Tustin Ore Pulverizers.



DEANE STEAM PUMP.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel, Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

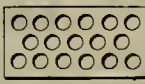
HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.



FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,

ROOM 43,

NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.



Denver Office:
No. 243
18th Street,
Denver, Colo.

Mexico Office:
No. 11
Calle de Diaz,
Chihuahua,
Mexico.



INGERSOLL ROCK DRILLS

...AND...

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

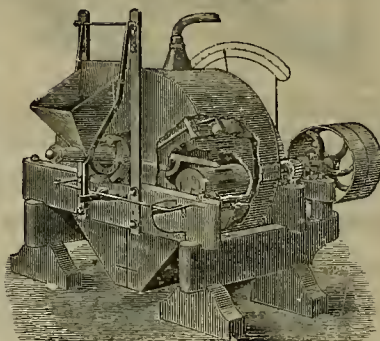
PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

Tustin's Pulverizer

WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

....MANUFACTURER OF....

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED For Best Slide Valve Engine and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street,
SAN FRANCISCO.

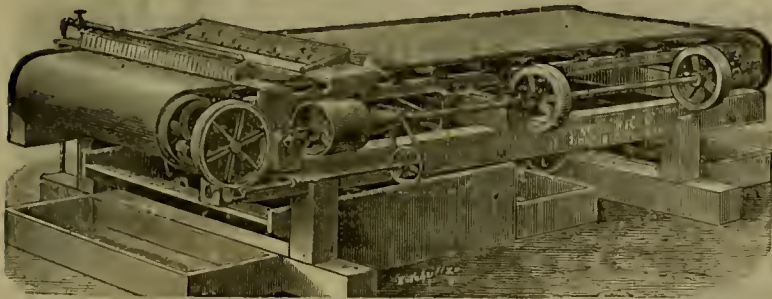
AUTOMATIC

ENGINES

A Specialty.



\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

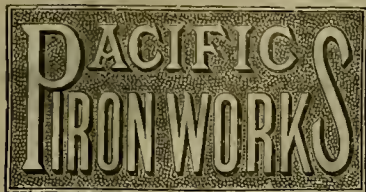
PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS!
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco. As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement. The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them. Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for. N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

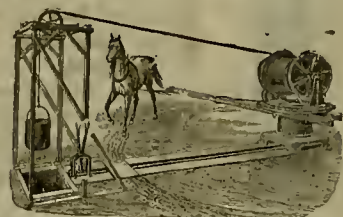
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished in order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



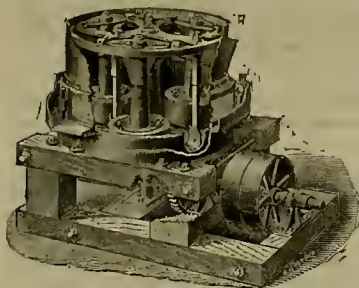
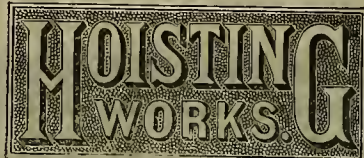
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE FRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH of the YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves ALL THE AMALGAM GOLD and SILVER that ESCAPES THE BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Centrifugal Roller Quartz Mill.

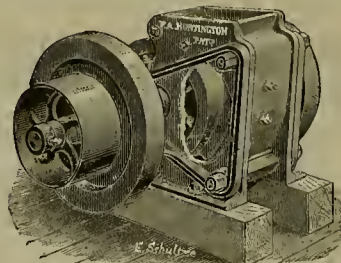
F. A. HUNTINGTON, MANUFACTURER OF Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



Ore Crusher.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Homs Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

JAS. LEFFEL'S TURBINE WATER WHEEL The "Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and Lowest head used in this country. Our new Illustrated Book sent free to those owning water power. Those improving water power should not fail to write us for New Prices before buying elsewhere. New Shops and New Machinery are provided for making this Wheel. Address

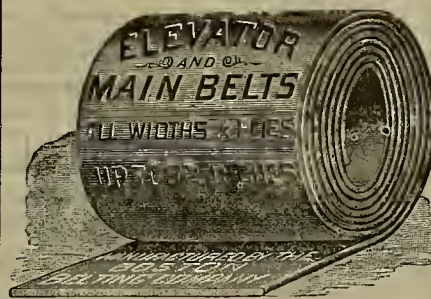
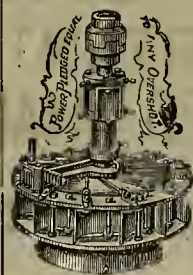
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire,

The BEST ROCK DRILL HOSE Made



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

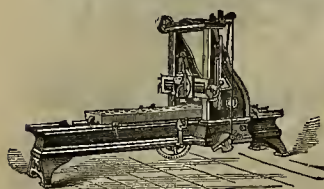
J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Ovens, Cement and Soot Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (inc). Orders Promptly Executed.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.

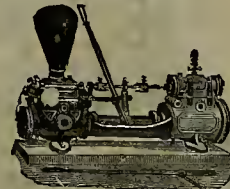


Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Knowles Steam Pump
The Standard.

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

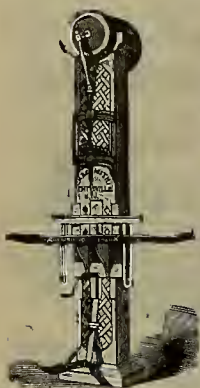
Mining Machinery, Steam Pumps, Wood and Iron Working Machinery.

ENGINES and BOILERS.

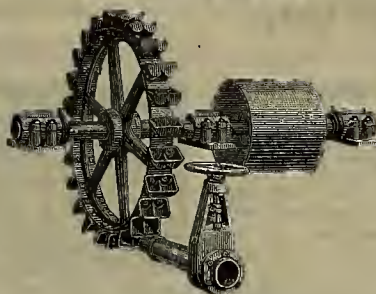
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors,
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE



Of all kinds, Flat and Round, any Sizes and Lengths, made from only the Best Material and in the most careful manner.



WIRE Of all kinds for Telegraph and Telephone purposes, Baling Hay, and all purposes that wire can be put to. Brass and Copper—Galvanized, Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manufacture of Barbed Wire, Two and Four Point Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes from 1 to 10,000 to the square inch, for Quartz Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING

Of various designs, for Stores, Banks, Asylums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights, Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.



SEND FOR CIRCULAR.

IMPORTANT TO GOLD MINERS!

SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

Old Mining Plates Bought, Replated, or Gold Separated. 3000 Orders filled. Reference first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve, Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 19, 1885.

VOLUME LI
Number 25.

The State University and Its President.

There was general satisfaction expressed when the Regents of the State University chose Prof. Edward S. Holden, of Wisconsin, President of the institution. The choice was made with due care and deliberation, for there was time to make full inquiry and examination, and of a number of available candidates one was chosen whose talent and learning are attested by his scientific work, whose executive ability has shone clearly in the performance of the many trusts placed upon him; whose manliness and geniality are vouched for by those who have known him longest and best, and who comes to his important work upon the Pacific Coast in the full vigor of middle age. Knowing the interest of our readers in the welfare of the University, and their wish to become acquainted as far as possible with the President lately chosen to guide its destinies, we have engraved the portrait of Prof. Holden, which appears upon this page. In preparing a descriptive article to accompany the engraving we shall draw upon various sources of information which are available, and largely from a sketch prepared for the *Call* by Dr. J. H. C. Bonte, Secretary of the Board of Regents.

Edward Singleton Holden, passed his youth in St. Louis, where his unusual gifts of character and intelligence attracted the notice of Chauvenet, who was by general consent the first of American mathematicians with perhaps a single exception. He entered Washington University, of which his distinguished teacher was then chancellor, and graduated from its scientific department as B. S., with the highest distinction, in 1866. During the period of some five years or more that he passed in study at this institution he also did an important portion of the work in the classical course. His unusual powers and attainments in mathematics at this early period (he was only 18 at graduation) led his great teacher to form the highest expectations of him. These were shared by his other instructors and his acquaintances generally.

In the purpose of making a mathematical career he now secured an appointment as cadet in the United States Military Academy. Here he graduated in the foremost rank in 1870. The exceptional extent of the preparation for the West Point course, which his college graduation and his rare opportunities which a great mathematical master-mind had given him, enabled him to devote an unusual amount of time outside of his class routine to the private mathematical studies that formed his absorbing pursuit. He was Second-lieutenant of the Fourth United States Artillery from 1870 to 1872, when he became Second-lieutenant, United States Corps of Engineers. In 1873 he resigned, and was commissioned Professor of Mathematics in the United States Navy, which commission he resigned in June, 1882. He was Assistant Professor of Natural and Experimental Philosophy at West Point, 1871-72, and Instructor in Practical Military Engineering, 1872-73. In 1873 he was appointed Astronomer of the United States Naval Observatory at Washington. He was there long in charge of the great twenty-six-inch equatorial. As an astronomer, he is ranked among our ablest, and the value of his work is recognized in all quarters of the scientific world. His investigations upon comets and their constitution are regarded as having exceptional value. Other astronomical researches

in which he has been engaged with noticeable success are the distribution of the stars and the rectification of important star catalogues. In the former, he has carried on laborious observations and reductions in correction or reversal of the long-accepted hypothesis of the elder Herschel, that star-distribution, taking the celestial regions as a whole, is quite uniform. Professor Holden's results tend, on the con-

work: During the five years of Prof. Holden's administration, three volumes of the publications of the Washburn Observatory have been printed, and a fourth volume is ready for the printer. The astronomers have discovered and measured many new double stars, new nebulae, etc., and have lately been engaged in determining the positions of 303 fundamental stars for the southern zones of the *Astronomische Gesellschaft*. In this work they have been aided by an appropriation from the National Academy of

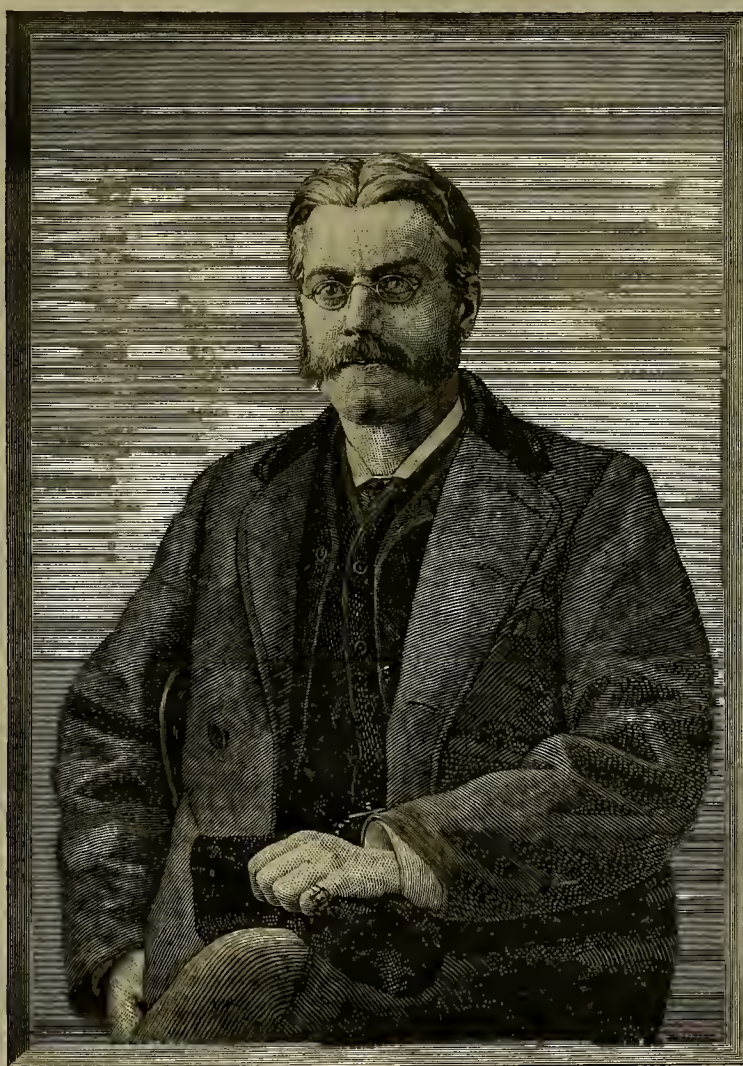
manent endowment fund, the interest from which will be employed in maintaining it. Prof. Holden superintended the mounting of the instruments at the Lick Observatory. These have mainly been manufactured in Europe, and they are all of the most modern design, and the best calculated to perform the work required of them.

Professor Holden is well known as a writer in the field of his favorite sciences, partly as the joint author, with Professor Simon Newcomb, of notable mathematical and astronomical textbooks, but in a more important sense as an independent author. Besides his original researches, he has given to the public a life of Sir William Herschel, a work based on original materials previously inaccessible, and distinguished by every merit proper to the biography of a man of science. In this, as in all his writings he shows himself, not only the master of his technical specialty, but the man of large general culture, and the elegant literary scholar. By this, what is a rather rare conjunction of knowledge and appreciation of both science and letters, he seems peculiarly fitted to serve the complex needs of our University, in the whole compass of its various departments. In a University, as the growth of the age has now reconstituted it, there is an essential requirement that its President should be a competent critic of the work done in its scientific side, and consequently, that he should be himself an expert in some commanding science; but it is, if possible, of still greater importance that he should be a competent appreciator of the ends and means of purely literary culture, and a hearty lover of the permanent interests of human nature, as involved in the pursuit of letters, art, philosophy and character for their own sake. The Regents and the State are to be congratulated on their fortunate selection of a man who unites these qualifications in so decided a degree.

Professor Holden's disciplinary and administrative experience, not only as an officer in the successful command of men, but as chief in charge of assistants engaged in scientific duties of the greatest importance, involving not only the most thorough disciplinary arrangements, but careful financial adjustments as well, furnishes an assuring presumption that he will be able to deal, in a temper at once firm and judicious, with the administrative problems of which, to say the least, his hands will be full.

As a man, he is said by those who enjoy his acquaintance, to unite decision and clearness of purpose with suavity and approachableness. His temper is even, but manly and direct, and his bearing is characterized by tact and geniality. He married Miss Mary Chauvenet, the daughter of his early teacher and friend.

In connection with mention of the new President it will be timely to give some general information of the present condition of the University. The annual report of Secretary Bonte, which has been published by the State Printer, contains many interesting facts in this connection. We collate a few of them. The report shows the real property, funds and endowments of the University to aggregate in value over \$3,000,000, including a State endowment fund of \$811,500; United States endowment, \$492,000; D. O. Mills' endowment, \$75,000; Brayton fund, \$90,155; Reese Library fund, \$50,000; University site and building, \$1,000,000; Lick fund and observatory, \$700,000; Toland property, \$15,000; Hasting endowment, \$100,000.



EDWARD S. HOLDEN, PRESIDENT OF THE STATE UNIVERSITY.

trary, to show the decided non-uniformity of the general distribution.

In 1882 he conducted the Government expedition to the Southern Pacific to observe the transit of Venus. The work and results of this expedition are regarded as of the highest character. A similar quality is recognized in those of the Government party, likewise in his charge, sent to Colorado in 1878, to observe the total eclipse of the sun, with a view, particularly, to ascertain the nature of the corona. In 1881 he was appointed professor of astronomy in the University of Wisconsin, and Director of the Washburn Observatory at Madison in that State. There he has since continued, engaged, largely, in his researches on comets and star distribution.

The Wisconsin State Journal says of his

Sciences, and by a liberal gift of money from O. H. Ingram, of Eau Claire. This work is nearly done, and will be printed in the forthcoming volume of publications. A number of important researches on the latitude of the observatory, on the astronomical refraction, etc., are far advanced, but must be left to be completed by Prof. Holden's successor."

His great astronomical attainments and practical knowledge cannot fail to be of the most distinguished service to the Lick Observatory when, as in the course of the next two years it probably will be, it is completed and handed over, as Mr. Lick's will requires, to the Regents of the University. As its director, there is every reason to anticipate for Prof. Holden a record of the highest order. The observatory, fully equipped, is expected to entail an expenditure of \$400,000, leaving \$300,000 of a per-

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Helena, Montana.

[Written for PRESS by Our Traveling Correspondent,
R. G. HUSTON.]

Helena is the present capital and metropolis of Montana Territory. For many of the earlier and prosperous years of the placer mining interests, it was the grand center of supplies, and consequently of the whole territory as it paid tribute to Helena's prosperity. Whatever might be the want of an outside mining camp they either were compelled to go to Helena to get it or send for it East or West as the case might be; it came through Helena and an unparalleled era of prosperity was the natural result. At present the largest portion of the accumulated wealth of 20 odd years is now centered in Helena. Whenever you meet an old Montanian he will refer you with pride to the capital city as the richest city of its size in the Union. Whilst I am not at this moment conversant enough with statistics to know whether such is the fact I am willing to give them the benefit of this doubt, as I am satisfied that there is a vast amount of wealth aggregated here. Without confining my attention to small improvements, I have seen where \$1,000,000 has been expended in the past year in first-class improvements, notably, the Masonic Temple, the Grand Central Hotel, Union Block, S. T. Hauser's and D. A. G. Flowen's private residences. Either of these mentioned are structures that would do credit to any of our Eastern or Western metropolitan towns of many times the population of Helena. The surrounding country is developing in such a manner that the future of Helena is assured, as very many of the steady, regular paying quartz mines are within the short distance of 25 or 30 miles. As they are compelled to draw supplies through the town, they thus will contribute their regular ratio to the prosperity. The agricultural interests are convenient. Prickly Pear valley is within a stone's throw, as it were, and 20 to 30 miles to the eastward is the Missouri valley, with its tributaries of Confederate, Duck Creek, Ray Creek, and Deep, on the east side, and Beaver, Warm Spring Creek and Crow Creek on the west side, all of which find their market in Helena.

The educational interests are well looked after in Helena, having one large graded school building erected in 1875, at an expense of \$25,000. It contains, besides an assembly-room, seven division rooms, and has a seating capacity of 600. Since that time the growth of the town and convenience of the scholars have compelled them from time to time to erect additional buildings in different parts of the town until I should think that the capacity was fully doubled.

The Catholic fathers also have a school for boys, and the sisters a seminary for girls. There was a classical school established some two years ago. The object of the school was to place within the reach of the youth of Montana many of the advantages the colleges of the older States offer.

The Helena Commercial College was established about the same time, and is in a prosperous condition.

As to banks, the First National was established in 1866 by S. T. Hauser & Co. This is the oldest and largest banking institution of the Territory, and this year reported as resources \$2,825,556.12, which shows no mean proportions for a comparatively new country. The Merchants' National reports its resources \$944,663.53, and the Montana National and United States Depository \$862,903.19—a good showing for the financial portion of the community.

The United States assay office I was unable to get statistics from, as at the time I was in Helena the change of administration was taking place and I could not bother them then.

This place is well supplied with first-class hotels, having three very good ones, each of which is ably managed—the Cosmopolitan by Schwab & Zimmermann, the Grand Central by Reed & Riuda, the Merchants' by O'Brien & Son.

The fraternal orders are all represented, and in a flourishing condition; as are most of the different religious sects, without exception. They worship each one in their own edifice, showing that in the haste to amass wealth they are not disposed to neglect their immortal souls.

The Helena Gaslight and Coke Co., supplying consumers with a good article of gas and at fair rates, are doing, I think, a lucrative business. The Electric Light and Power Co. are having a fair share of business, and are giving general satisfaction. The city is provided with an efficient fire department and two steam fire engines that are always on hand when a fire alarm is sounded, and show that they are fully alive to the fact that they do not want their fair town devastated by fire, as it has been several times. I have seen it twice burnt myself, when the burnt territory represented more value than the portions remaining. It is well for them to be on the alert.

The city is incorporated and is governed by a mayor and the usual amount of aldermen and officials that are necessary to carry on a well regulated and well behaved community. There

are a great many cozy, pleasant houses built up here, mostly of brick, and surrounded by well kept lawns, and at this season (the 20th of November) plenty of flowers have escaped Jack Frost's attentions, a fact that perhaps is surprising to Californians, as they always connect Montana with cold weather. I did not succeed in interesting many in Helena in the PRESS, but I must say that whenever the railroad reaches a town I have a large amount of sympathy for the people, as the newspaper men are very numerous, and the more inaccessible a place is the better list I am sure to get; for when a man has one of those fellows after him every day he is not always good-natured, and once in a while I run across a case where they utterly fail to be civil, but have to excuse them on account of the number of such attacks they must have during a season.

The assessed valuation of property of the county is nearly \$8,000,000, that of Helena alone being near \$6,000,000. The city has outgrown her old courthouse which we old Montanians used to point to with a large amount of local pride. The contractors are now at work erecting one that is to cost \$150,000. Brick and granite foundation, brick, iron and brownstone above. This will certainly be a credit to the city when completed, which will be some time next season, unless something should happen to prolong it indefinitely, after the fashion of the City Hall in San Francisco. Let us devoutly hope that no calamity of that kind will overtake Helena in her courthouse speculation.

They have an organization of Montana pioneers, the spirit of imitation I suppose, as California originated that idea; but they have quite a large organization and no doubt the old-timers, as they are called, will derive a great amount of comfort from it, by meeting together and fighting their old battles over again in more comfortable quarters than they were used to in the earlier days of settlement of Virginian or Alder Gulch and Last Chance and many others discovered about the same time.

Oro Fino District, Calaveras Co.

[From Our Regular Correspondent, FRANK M. OCHOA.]

As this new mining district seems to be attracting considerable attention among mining men and capitalists, I will give a brief description of it. It is bounded on the north and east by the once celebrated Blue Mountain district, and lays on the westerly flank of the Blue Mountain range, at an average altitude of 3000 feet. Its southerly boundary is the Railroad district with West Point district on the west. Unlike the latter district, the formation of which is composed of granite, syenite and trap, fissured and cross fissured by metalliferous quartz veins, which in turn, at a date subsequent to their formation, have been bisected by a system of fissures filled with eruptive rocks.

The ore-bearing veins of the new district we find encased in a highly metamorphosed slate, with a northerly and southerly strike (stratification), carrying longitudinal fissures filled with trachyte, which forms the nucleus or core of the metal-bearing portion of the vein (the dyke proper carrying no values).

On both sides, however, of these dykes gold-bearing quartz is found of an extraordinary high tenor, and in many places the slates are auriferous for a considerable distance from the matrix proper. The formation being of a soft, friable nature, and the veins heavily mineralized, surface decomposition has taken place to so great an extent that the ore-bearing lodes rarely crop, and are known as "blind veins," with but little float to guide the prospector—accounting for this region having been ignored as a gold-producer to this recent date.

During the past summer, however, attention has been attracted to it, miners and prospectors flocked in, and the new district formed. A great number of locations have been made, some of them giving promise of provoking valuable mines. The most prominent is the "Fine Gold," recently purchased by Haggin & Kervin. This mine is an old discovery, and has been feebly but successfully worked by the owners, John and Baptiste Guillemaigne (Frenchmen) for several years. The vein was four feet and opened by a shaft and adit level, a small primitive arastra (entirely axe made) with water for a motor was the milling machinery used. The ores were free, and paid from \$12 to \$20 per ton, results covering all expenses for development. Through the assistance of Messrs. Laus & Severance as promoters, the property was sold to the present owners. Suitable hoisting works have been erected, and the mine is being systematically developed by a working shaft. A 10-stamp mill is in process of construction, and at an early date will be pounding away on the ores of the mine, which are said to be rapidly improving in value as depth is attained. The north and south extensions of this mine have been handed by Henry Janin, of San Francisco, who proposes developing them.

These mines are situated on the south bank of the south fork of the Mokelumne river. Three miles distant in a northeasterly direction on the Licking Fork an important discovery has been made by the Cook brothers, and known as the "Oro Fino." As yet the property is only a prospect, but it is a remarkably good one. A 30-foot shaft and a 20-foot drift has developed a four-foot vein of great promise. The average

ores of the vein show an assay value of \$41 per ton. They are, however base, and will have to be treated by chlorination. In the vicinity of this vein we find the Golden Harvest, owned by Gryalva & Severance. The mine has been developed by shaft; the ores are as yet said to be low-grade; vein three feet. Also, a promising discovery recently made on Groves' ranch; vein four feet; ore \$7 to \$8 per ton developed by shaft; mine so situated that it can be developed and worked from an adit to a considerable depth and the ores milled by water power. Groves' ranch is situated on the broad bottom lands of Licking Fork at the present head of wagon-road navigation. It is the stopping place where the tired traveler feels like taking a rest, and partaking of the hospitality and generous cheer of mine host Fred. Groves and his amiable daughter, Miss Quickstep, who makes it generally pleasant for the guests. Licking Fork is celebrated for its mountain trout, but Fred. Groves' three fish ponds are swarming with carp, and our lady hostess cooks them to a turn. Notwithstanding popular prejudice, they make a very toothsome pan fish. Mine host Fred prides himself on his blooded stock and brood mares which he pastures on his broad fields of alfalfa; but his particular weakness is a patch of Broddinug cabbages. And such cabbages—great solid heads, round, square and oblong, many of them weighing 40 pounds! Let the reader imagine half an acre of sauerkraut—and Fred is an artist in manufacturing it, which he supplies to his patrons far and near. The Groves ranch is the central point of the district, and will be an important point for quartz mills and reduction works, should the newly discovered mines go to the deep and carry their ores.

This point is accessible at all seasons of the year by wagon road. But little snow falls. The range is heavily timbered with spruce and the several varieties of pines and oak. The streams never fail to furnish water for power. The water shed of this section is drained by Licking Fork, and branches of the middle and south forks of the Mokelumne river. The mountains are gently sloping and are not broken up by irregular and precipitous canyons. The climate is temperate and healthy, with no extremes of heat and cold. There is no malaria. The scenery is picturesque, and at the proper season there is wild game, fish, flesh and fowl in abundance.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TILE-SECTIONS BETWEEN WALLS, JOINTS, &c.—Wm. F. Higgins, S. F., No. 331,500, dated Dec. 1, 1885. This invention consists in a new and useful improvement on the shape and construction of the various tiles which comprise a section between walls, joints, etc.

GANG PLOW.—David M. Johnston, Stockton, No. 331,503. Dated Dec. 1, 1885. This invention consists in an improved construction of the etandards, a means for securing them adjustably to the frame, and also relates to the wheels by which the plow frame is supported; the means of raising and lowering either the front or rear plows, or the whole line, and a means by which the wheels may be allowed to run as caster-wheels, or by which they may be caused to turn on fixed axles.

PIPE-TONGS.—Henry F. W. Sohst, S. F., No. 331,456, dated Dec. 1, 1885. The object of this invention is to provide a simple and effective means adapted to secure different sizes of pipes and to grip them without danger of slipping. The invention relates to that class of tongs in which a fixed jaw is made integral with the stock or handle and a swinging jaw is pivoted to the fixed jaw; and it consists in the novel construction of the pivoted jaw, its arrangement with relation to the fixed jaw, and a spring for the said pivoted jaw.

DOVETAILING MACHINE.—L. P. Garcin, S. F. No. 331,491. Dated Dec. 1, 1885. This apparatus is especially applicable to cutting dovetail grooves on the edges or sides of strips of wood. It consists of a saw or cutter, the arbor of which is journaled in a frame, said frame swinging about trunnions fixed to a plate or table, over which the article to be dovetailed passes, and these trunnions form the center from which the sides of the dovetailed cut diverge. The arbor is adjustable on its frame to vary the depth of the cut.

SAW-MILL SET-WORKS.—D. L. Harbach, S. F. Assignor to Tatum & Bowen. No. 330,020. Dated Nov. 10, 1883. This is an improvement in setting the saw-mill log on the head-block. The invention consists in the power devices, by which the ordinary or main knees of the head-block are adjusted, in peculiar opposing knees, by which the log is stopped, and the mechanism for operating said knees. The object of the invention is to provide a single and effective mechanism for operating the various setting-knees.

HAIR CLIPPING MACHINE.—C. K. Whittier and John H. Donlon, San Francisco, No. 330,535. Dated Nov. 17, 1885. This hair clipper consists of a curved plate secured to or formed with the under side of the comb plate and acting as a bearing on which the head of the machine is adapted to rock. The object of the in-

vention is to enable the operator to graduate the length of the cut, not by a fixed gauge requiring a stoppage of the operation to adjust the gauge, but by a rocking bearing which permits a graduation of the length of the cut during the operation, while the machine is continuing its work, and on any portion of the hair surface. This improvement may be applied on any hair clipping machine.

CORE-MAKING MACHINE.—Richard Savage, S. F. No. 329,959. Dated Nov. 10, 1885. This is an improved apparatus for manufacturing cores from sand for casting purposes. It consists of a belt passing over drums or rollers at the upper or lower ends, and provided with projections, teeth or corrugations, so that when caused to travel rapidly it carries the sand downward and discharges it upon the core-hair with any desired speed and force. This belt may have a cover or directing chute in which the sand is received from a hopper or receptacle above a toothed or flanged roller, revolving in the outlet of the receptacle to regulate the flow of sand, and a means for cleaning the teeth or flanges of the roller as it revolves. It also consists in a regulating gate by which the supply passing through the discharge may be regulated. The whole of the belt or carrier is caused to travel, thus giving all the sand upon it an impetus corresponding with its own velocity of movement.

BROODER FOR CHICKENS.—Geo. B. Bayley, Oakland, No. 330,547. Dated Nov. 17, 1885. This brooder for young chickens consists in a means for supplying a requisite and equable temperature, and a space where the chickens may congregate, and in which they may be protected from wind and cold. It also consists of a peculiarly shaped chamber, into which the heat is admitted and distributed from below to the plate or surface upon which the chickens may congregate, a covering to inclose the chamber, with suitable ventilating spaces, and in certain details of construction. In the ordinary construction of brooders, which are heated from above, and have no extension from the source of heat, as this one has, the chickens will crowd to the sides and corners should there be too much heat, and the weaker ones will be trampled to death. It is claimed there will be no crowding in this brooder, since the heat is from below the chickens; will crouch and distribute themselves on the warm surface; and as it is colder at the sides will not crowd to the corners.

HARVESTER.—John Hay, Tracy, San Joaquin Co. No. 330,978. Dated Nov. 24, 1884. The invention relates to a harvesting machine of that class in which the apparatus for shading or cutting the grain is combined with the thrashing and cleaning machinery, so as to be drawn about the field and cut, thrash and clean the grain in a single continuous operation. It consists of a header mounted upon bearing-wheels, the axle or shaft of which extends directly through into the thrasher, which is supported at one side of the header, a joint connection in said shaft, so that the independent movement of the header and thrasher over uneven ground will be provided for, and the two supported upon three wheels in line, and a draper or canvas belt upon which the cut grass falls, and by which it is delivered by the thrasher, said draper having a cutting mechanism attached to its front edge, a means for conveying the thrashed straw and grain upward and backward from the thrashed cylinder and separating the grain from the straw, and in certain details of construction.

FEED CASE FOR MAGAZINE GUNS.—John C. Kilton, S. F., No. 331,244. Dated Nov. 24, 1885. This is a paper case for packing original ammunition, and a means by which said case may be directly attached to the stock or barrel of the gun, the case becoming a temporary magazine, so that the ammunition may be conveniently contained within the reach of the rifleman without the necessity of transferring it from one case to another. The invention is designed to meet the need felt by riflemen—that of securing a number of cartridges upon the gun or rifle entirely out of the way of the hands in manipulating the piece, and at the same time convenient to the hand, and in view. This design contemplates the putting up of all cartridges in small cases of five or ten, having metallic plates or straps fixed to each cartridge case so that the cases may be attached at once to a shoe, which is secured beneath the gun, where they will be out of the way, and at the same time ready for instant use, without the disadvantage of removing the cartridges from an original package or a belt, cartridge-box or receiver.

THE PRESS IN SIERRA COUNTY.—A correspondent writes us from Downieville, Sierra county, as follows: "Your energetic and wide-awake canvassing agent, Mr. Dennys, is here, and has succeeded, as I believed he would, in securing many new subscribers to the MINING AND SCIENTIFIC PRESS. He appears to be thoroughly interested in the good cause. You should have a large list in Downieville, as there are many here who are in duty bound to assist the leading scientific journal of the Pacific States and Territories, that so warmly espouses their mining interests. He ought, and I think will, do equally well in other Sierra towns. I think you are well represented."

MECHANICAL PROGRESS.

Steel for Structural Work.

At the meeting of the Engineers' Club of Philadelphia, on Nov. 7th, in addition to other proceedings, Mr. James Christie presented a paper upon "The Adaptation of Steel to Structural Work." The price of steel has now fallen so low, as compared with iron, that its increased use will be actively stimulated as the building industries revive. The grades and properties of the steels are so distinct and various that opinions differ much as to the adaptability of each grade for a special purpose. Hitherto engineers have favored open hearth steel on account of uniformity, but recent results obtained from Bessemer steel tend to place either make on equality. The seeming tendency is to specify what the physical properties shall be, and not how the steel shall be made. For boiler and ship plates the mildest and most ductile steel is favored. For ship's frames and beams a harder steel, up to 75,000 pounds tenacity, is frequently used. For tension members of bridges steel of 65,000 or 75,000 pounds tenacity is usually specified, and for compression members 80,000 to 90,000 pounds. Such a marked advantage occurs from the use of high-tension steel in compression members, and the danger of the sudden failure of a properly made strut is so little, that future practice will favor the use of hard steel in compression, unless the material should prove untrustworthy. In columns even as long as 40 diameters, steel of 90,000 pounds tenacity will exceed the mildest steel 35 per cent, or iron 50 per cent, in compressive resistance. The present uncertainty consists largely as to how high-tension steel will endure the manipulation usual with iron without injury. A few experiments were recently made by Mr. Christie on riveted struts of both mild and hard steel, which had been punched, straightened and riveted as usual with iron, but no indication of deterioration was found. Steel castings are now made entirely trustworthy for tensile working stresses of 10,000 to 15,000 pounds per square inch. In some portable machinery an intermittent tensile strength is applied of 15,000 pounds, sometimes rising to 20,000 pounds per square inch of section, without any evidence of weakness.

The uses of steel are rapidly enlarging. Eight thousand tons of steel castings are used in the construction of an immense block of bonding warehouses in London. Soft Bessemer steel is now largely used in boiler-making, and in a thousand other new directions steel is finding new uses. The iron age is rapidly passing away and the age of steel has taken its place.

Edging by Forging.

In a forging shop recently the smith was dressing some cold chisels and some lathe tools. It was noticed that by the help of his assistant, after drawing the tool to an edge, he cut off the very edges before hardening and tempering the tool. After observation showed that he had left an edge thickness of not less than one-sixteenth of an inch, somewhat more. The smith was an old workman, verging on being an old man; so he was asked "the reason why." In answer he took a bar of tool steel, heated and forged it, and made a chisel point. Then he hardened it, as usual, in clean water, scoured it, and drew it to a pigeon blue temper. A slight tap with a hammer drove the edge off as though it had been glass. He explained that good, high steel could not be hardened and tempered when drawn to a thin edge; that there was not material enough left in a fine edge to sustain an edge after hardening and maintain an edge after tempering. His plan was to harden and temper the solid metal and grind to an edge. Possibly his method was adapted only to "high" steel; and yet it is indisputable that when tools are forged to edge and hardened, they frequently crumble until they have been ground and worn far below the forged edge.

There are steels that will take a cutting edge without fire and water hardening. Wood working tools, as plane irons, can be hammered to temper without ever touching water; but usually tool steel is amenable to treatment for cutting purposes only by fire and water. Sometimes it is necessary to dress tools to shape by the file, and in that case the tempering must be the finishing.

An instance may be related. It was necessary to make some miniature hobbins to hold flattened gilt wire to be spun around a core of silk thread, producing a gold yarn or thread for embroidery and harding purposes. The hobbins were made of boxwood, and were so small that three of them would not weigh an ounce. They were run with great rapidity and needed to be exactly balanced, as they revolved around a central spindle. The tools for finishing these hobbins were of necessity made to accurate gauge, and after hardening and tempering could not be touched except to "finger stone" them to a polished edge. These tools were heated in the usual way, but instead of being plunged in water, were pushed through a cake of common beeswax on the top of a can of oil in which they were cooled. They required no tempering.

A mixture of beeswax and hard soap is handy for tempering small tools, or those that must be brought to edge as well as shape before being tempered. If the steel is good and has been properly handled, not overheated by the smith, very satisfactory results can be secured, even

when the tool is fairly edged down; and no after drawing to color will be required. But it is best, in ordinary work, to grind back from the hardest edge of any common machinist tool. A hammered edge—"cold tempered"—is a delusion; it will not stand for anything. Even in stone drilling it has been proved that those drills and chisels are best which are ground after the hammering. This is contrary to the old-fashioned notion, but it is really fact; a ground and polished edge is better than any that can be given by hammer, fire and water.—*Exchange.*

Boiler Compounds.

An engineer gives his experience with boilers in the *Iron Trade Review*, illustrating the same homely experience of some of our local engineers. He says: "I have no boiler compound with me, but remember being told by an old and experienced engineer at one time that he had taken oak logs and fastened them to the tubes of the boiler he used so that they were in constant contact with the water. He said they kept his boiler perfectly clean. I dammed up a small creek to form a sufficient body of water, cut down some oaks and threw them into it. As soon as we had commenced sawing I used to throw all the oak sawdust into the water also, and dug a narrow trench from it to a big barrel I sunk into the ground at a short distance from it. From the barrel I pumped direct to the boiler, and continued using this kind of water the whole six months I was there. The water was very muddy all the time, as teams were always disturbing the small stream which supplied this reservoir or pond. Yet at the end of the time mentioned, on blowing out the boiler, I found it as bright and clean as when perfectly new."

He then asks the question, Can not sawdust be used to advantage?

He can demonstrate this question himself by first leaching the sawdust and using the water therefrom. When done with this, we advise him to take the bark from the oak logs and leach it, using much smaller quantities to mix with water from the well or pond, and see if this is not more effective. The sawdust from oak wood may do it, and will, if it contains enough of the same principle as the bark yields.

Our conclusions are from the experience of some of the boys who claim to have tried, and are supported by charges recently made that a local boiler cleaner manufacturing company was collecting tan-bark liquor and harreling it for sale to engineers at \$1 per gallon. It was probably this fact that led to the experiments which are given above.

AXE MANUFACTURE.—A new mode of forming the cutting edge of an axe has been brought out by H. Hammond, of New Haven, Conn. In place of upsetting the edge by a hammer, it is sheared off on the desired line by any suitable shearing mechanism. The shearing operation leaves the metal in a state of uniform density and undisturbed crystallization, while the upsetting operation is said to leave the metal in a state of variant density and broken crystallization. This variant density results from the varying number and force of the blows. The claim of the patent obtained for this invention covers the process of forming the edge of the axe blade, preparatory to grinding, by shearing off the blade on the line of the proposed edge.

HARDENING STEEL.—Mr. Hammond, at the late meeting of the Mechanical Engineers, in Boston, in a paper read before that body, referred to the difficulties experienced in hardening steel, and remarked that the film of steam formed when the piece to be hardened is dipped into water very probably exercised an important influence on the result. This film, being of varying thickness, would naturally give rise to varying effects. In hardening thick steel plates he found running water to be much to be preferred. Mr. Hammond also spoke of the difficulty of obtaining sound steel castings, and some methods which he had found to yield good results.

BENEFIT OF MACHINERY.—The days of machinery, remarks a contemporary, have been for the poor man days of home-making and home-making comforts, as no other days ever were. If machinery has given the rich man luxuries, it has given the poor man the necessities and comforts of habitation, and clothing and travel, such as he never had before. The printing press, especially, is the man's servant and benefactor, scattering abroad our intellectual wealth, raising all to an intellectual level and hindering all into one whole.

PRIMING.—The worst defect a boiler can have is a disposition to prime; in other words, to send water as well as steam to the engine. Whether a boiler primes much or little, the defect is serious. Priming is in conventional terms nothing more than boiling over. The steam, as it is generated, instead of escaping freely from the water, is entangled with it, and carries over in its grasp a certain portion of the fluid.

THE POWER HAMMERS made in the United States enjoy a high reputation abroad, if we may judge from the frequent orders received for them by the manufacturers. We see it stated that Sweden has been ordering Vulcan power hammers from the firm of Duncan & Co., of Bellefonte, Pa., and that orders for them are being constantly received from other foreign countries.

SCIENTIFIC PROGRESS.

The Moon's Heat.

At the Albany meeting of the National Academy of Sciences, Professor Langley reported on the progress of his remarkable researches with the bolometer, by which he has so greatly extended our notions of the invisible spectrum. This time he dealt with the lunar spectrum, and estimated the heat derived from the unilluminated moon. Rosse had estimated the temperature of the moon's surface as from 200° to 500° F. By studying the moon at its full with a rock-salt prism obtained only after repeated failures, and which from its nature had already required replenishing seven times, each time necessitating a new determination of its constants, he had succeeded on repeated occasions in securing a spectrum which showed two curves—one according with that previously obtained in the infra red region beyond the visible portion of the solar spectrum, clearly due to reflection, and another, lying entirely beyond that, as clearly due to the moon itself, and revealing its real temperature. This, as shown by studying the spectrum of frigid masses, is colder than the temperature of melting ice. By comparing the mean of the spectra obtained in summer with that of those obtained in winter, it is evident that a much greater amount of heat is received from the moon in winter than in summer. This may simply be due to the greater amount of aqueous vapor in our own atmosphere in the summer, as contrasted with the winter clarity. By directing the bolometer to the zenith and to the horizon the temperature of space has also been measured by direct experiment for the first time, and the amazing transparency of our atmosphere to radiation of the earth's heat revealed; for his experiments show that our atmosphere transmits the earth's heat more readily than the sun's.

IMPROVED TELEPHONY.—A telegraph operator in Texas has made what he claims to be so much of an improvement in the telephone that he will be able to use the ocean telegraph cables as telephone lines, and by which articulate sounds may be transmitted with about the same facility that telephoning is now carried on over the telephone wires of ordinary distances. The inventor was led to his discovery through the very simple reasoning that, if machinery and batteries of a given power can convey the sound of the voice a certain distance, more powerful machinery might transmit it further. This theory, it is stated, has been confirmed by experiments made by the inventor with enlarged instruments and machinery, the voice having been conveyed several hundreds of miles with absolute accuracy. His scheme has been placed before one of the great cable companies, which company, having examined the results achieved, has entered into an agreement for the purchase of the sole right to use his telephone, and at the same time gave him *carte blanche* to continue his experiments. Electricians of the highest standing on both sides of the Atlantic have been engaged to watch and assist in the work, which, although it has now been going on for months, has been conducted with the strictest secrecy. It is said that the deductions made from the results of the experimental instruments have convinced scientific persons overlooking the work that the final machinery will insure conversation between the two hemispheres. The money required for carrying out the undertaking is being supplied by a millionaire of world-wide fame, who expresses himself thoroughly convinced of its practicability.

TELEGRAPHING FROM MOVING TRAINS.—Mr. Phelps, the Superintendent of the Induction Telegraph Co. to the Harlem River branch of the New York, New Haven and Hartford Railroad, claims to be able to demonstrate that moving trains can become telegraph offices for the transmission and receipt of telegrams, and that it is practical, easy and feasible to govern the movements of trains in perfect safety by instantaneous telegraphy. He says: "I have lately rearranged the coil cable, placing it on the side of the car just outside the trucks and wheels, instead of horizontally under the center of the floor, and this adjustment permits us to lay the wire outside the rail on the sleepers, which diminishes the cost four-fifths, or, in other words, our property has become five times as valuable as when we placed the insulated rubber-covered wire within a box on the center of the track, midway between both rails." He believes that this telegraphing to and from a car in motion can be made to do away with the "block system" entirely.

WATER RUNNING THROUGH A SMALL HOLE.—In a paper read before the late Boston meeting of the Society of Mechanical Engineers, Mr. Oberlin Smith, of Bridgeton, N. J., in contributing to the list of unexpected things which often happen, remarked that on one occasion he made a metal cup about three eighths of an inch deep and from two to three inches in diameter, into which he wanted water to leak through a small hole in the bottom by partially submerging the cup. With a hole one-sixty-fourth inch diameter, he found that no admission of water could be effected unless the cup was submerged to a depth of more than one inch. Successive diameters of hole gave but little better results. By making the hole slightly larger at the top, however, the water

passed through readily. Thus, with a hole tapering from one-thirty-second inch in diameter at the bottom to one-sixteenth inch in diameter at the top, no great difficulty was experienced.

CONVERTING NATURAL GAS INTO ILLUMINATING GAS.—This process is said to be very simple and cheap. The following is a description of the process: Natural gas and steam are simultaneously passed at a pressure of 40 pounds into a large pipe which admits them into the machine. The gas and steam then pass up and down 60 feet of red-hot pipe, when it is superheated. They then pass into the heaters, which are filled with iron turnings heated to a cherry red, where the steam is decomposed. The gas then passes into another heated pipe, where it is carbonized. It next passes into a long coil of piping in the center of a furnace. The high heat of the furnace changes it into acetaline, which gives it its luminous property. It is then passed through a coil of gas-piping, where it is cooled, and next passes direct into the gas-holder. The process makes gas at a rapid rate, and has the merit of simplicity. It makes natural gas an illuminant of 21 candle-power, at a cost of less than 10 cents per 1000 feet.

THE TOES IN ANCIENT AND MODERN TIMES.—In a paper read before the Anthropological Institute of Great Britain, Sir J. Park Harrison has stated that, according to his observations among the English the great toe is longer than the second; but as the ancients have represented in statuary the second toe as the longer, this must have arisen from a different proportion prevailing in Greece and Italy. Barroli finds, however, as the result of 447 measurements of Italians, that 62 per cent have the great toe longer; and although it is true that, of 12 antique statues in the galleries of Florence, all but two have the second toe longer, he thinks this has arisen from a conventional feeling, which regarded that shape of the foot as more beautiful. It is found to be the case frequently that the relative length varies in the two feet. While the great toe is the longer in the majority of mankind, the case seems to be reversed in the mongoloid and negro races.

INVESTIGATING THE GULF STREAM.—Some fresh information about the Gulf stream is given by a Boston scientist. It is a stratum of warm blue water not more than 50 fathoms deep, and it flows due east at a rate that would take it to England within 100 days. Off Cape Hatteras this northward flowing stream is in the form of a fan, its three warm bands spreading out over the Atlantic surface to an aggregate breadth of 167 miles, while two cooler bands of an aggregate breadth of 52 miles are interposed between them. The innermost warm band is the one that shows the highest temperature and speed, its velocity being greatest where it is pressed laterally by the Arctic current, so that the rate of four miles per hour is occasionally observed. The peculiar blue color of the water, probably, is because the river silt washed into the gulf by the Mississippi is held in suspension.

THE SLEEP OF FISH.—An experiment has recently been tried at the Inventions Exhibition aquarium by Mr. W. August Carter with a view to discovering how far fish are prone to sleep. After close examination he found that among fresh-water fishes the roach, dace, gudgeon, carp, tench, minnow and catfish sleep periodically in common with terrestrial animals. The same instincts were found to actuate marine fish, of which the following were observed to be equally influenced by somnolence: The wrasse, conger eel, dory, dogfish, wrasse bass and all species of flat fish. Mr. Carter states that, so far as he can discover, the gold fish, pike and angler fish never sleep, but rest periodically. Desire for sleep among fish varies according to meteorological conditions. Fish do not necessarily select the night time for repose.

OBSCURE HEAT.—In a paper recently read before the Paris Academy of Sciences on the increase in the luminosity of incandescent carbons with the intensity of the electric current and the consequent temperature, and the diminution of the luminous intensity after a certain point (about 4713 degrees C.) is passed, M. F. Felix Lucas argued that it is probable that the thermic radiations, which are at first dark and then luminous, passing from red to white, ultimately go beyond the violet rays and cease to be visible.

SINKING TO GREAT DEPTHS.—A cannon-ball or any heavy substance will sink to the bottom of the ocean as fast as gravity will carry it through the water. No matter how great the pressure is at great depths from the superincumbent mass of water, the specific gravity of the water is but little greater than at the surface. Hence all substances as stone, sand, mud, clay, shells, etc., exist at great depths with but little variation, except from the effects of decreased light.

A Texas telephone experimenter claims to have perfected a magnetic telephone, the whole appliances of which are a simple transmitter and receiver and a horseshoe magnet. With this and a single wire he claims to be able to send a message around the world. He proposes to secure foreign patents before making application in this country.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

SUBSCRIPTIONS—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES.	1 week.	1 month.	3 mos.	12 mos.
Per line (agate).....	25	80	\$2.50	\$5.00
Half inch (1 square)...	\$1.50	\$4.00	10.00	24.00
One inch.....	2.00	5.00	14.00	45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 19, 1885.

TABLE OF CONTENTS.

EDITORIALS.—The State University and Its President, 401. Passing Events; Annual Expenditures on Claims; Further Discouragement; "The Rude Cable Grip on the Bridge," 404. Coal Lands; Practical Hydraulics; Zinc; Roll Feed Surface Planing Machine, 405.

ILLUSTRATIONS.—Edward S. Holden, President of State University, 401. Large Double Cylinder Feed Surface Planing Mill, 405.

CORRESPONDENCE.—Helena, Montana; Oro Fino District, Calaveras Co., 402.

MECHANICAL PROGRESS.—Steel for Structural Work; Edging by Forging; Boiler Compounds; Axe Manufacture; Hauling Soller; Benefit of Machinery; Priming, 403.

SCIENTIFIC PROGRESS.—The Moon's Heat; Improved Telegraphy; Telegraphing from Moving Trains; Water Running Through a Small Hole; Converting Natural Gas into Illuminating Gas; The Toes in Ancient and Modern Times; Investigating the Gulf Stream; The Sleep of Fish; Obscure Heat; Sinking to Great Depths, 403.

USEFUL INFORMATION.—A Lesson in Shop Management, Large or Small Engines—The Safe Slide; Antiquity of Sheep on the Earth; Neatness in the Engine Room; Boiler Insurance; Explosions in Mines, 407.

GOOD HEALTH.—Inoculation of Hydrophobia; Bitten by a Centipede; A Rapidly Growing Health Evil; A Dangerous Diet; Danger from Fig Tree Twigs, 407.

MISCELLANEOUS.—Notices of Recent Patents, 402. Practical Hydraulics, 406. Town Sites and Mineral Lands, 407.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 408-9.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board. Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 412.

Business Announcements.

Assayer—C. H. Aaron, Nogales, Arizona.
New Traction Motor—D. N. Dilla, Oakland.
Photography—Prof. E. Longley, Los Angeles.
Insurance Agents—Butler & Haldan.
Galvanic Belts—Dr. Emory L. Willard.

See Advertising Columns.

Passing Events.

The Big Hole placers are just now exciting the Montana mining people, reports from there indicating good prospects. In fact, some of those who have visited the mines are confident they are going to be as extensive placer mines as have ever been discovered in the Territory. Of course, claims have been taken up, and a number of miners from other camps have gone in there.

Interest in Nevada mines is just now centered in some of the districts along the Carson & Colorado railroad; notably at Hawthorne district, where the Lapanta and one or two other mines are doing remarkably well.

Oregon mines are just now attracting more attention than for many years past. The Pine Creek excitement started a sort of boom for that region, and now other portions of the State are being more carefully prospected.

Before the PRESS makes another visit to its readers Christmas will have come and gone, and we therefore wish them all, thus early, the "compliments of the season."

At Tombstone, A. T., the jury in the case of the Mountain Maid Mining Company vs. James Reilly, brought in a verdict for defendant. The action was an important test case, affecting title to a large number of town lots. The effect of the verdict is to quiet title and leave the present owners in possession.

Annual Expenditures on Claims.

For the past month or two miners in all the camps have been actively at work on their claims in fulfilling the requirements of the United States laws regarding annual expenditures on mining claims. In some cases this "assessment work" has resulted in mines being developed out of prospects. In others, it has served only to continue the ownership of undeveloped claims. The law, as a whole, has worked well, and has prevented, in a measure, one or two men holding a whole string of claims for an indefinite period without doing any work on them. It has, moreover, decided definitely as to abandonment, which was formerly one of the vexed mining law questions. Now, if a man does not do his assessment work, the claim is legally abandoned and may be relocated by any one who chooses to do so. All unpatented claims on which \$100 worth of work was not done before January 1, 1886, were forfeited and subjected to relocation, according to the old ruling of the Commissioner of Public Lands. A more recent ruling provides that in cases where owners or locators of mining claims are actually engaged in doing their annual work on January 1st, such claim is not subject to relocation, providing the owner puts in the full amount of labor required by law during said month.

There are several points in connection with this subject, to which it is proper to call the attention of miners at the present time. For instance, Congress has expressly provided that money which has been expended in running a tunnel for the purpose of developing one or more lodes owned by certain persons or a company is considered as expended on the lode. The person or company is not therefore required to perform work on the surface of the lodes, in order to hold them. In other words, the work may be from the surface or by tunnels, as the owner desires.

Expenditures may be, of course, made by an agent, and not necessarily by the owner or owners of the claim.

It must be remembered also that the fact that a large expenditure has been made on a claim in the past will not relieve a claimant from the necessity of performing the required annual labor.

A party also contributes his proportion of the required (annual expenditure) expenditures can retain his interest in the mine. If a party fails to contribute his proportion of the actual expenditures upon a claim, the remedy must be sought outside the Land Department.

The land office has ruled that the claim is not subject to relocation as abandoned ground, until the expiration of the year next succeeding that for which annual expenditure has been made.

It is held that labor performed or money expended upon a mining claim, prior to the first day of January succeeding the date of location thereof, will not be considered as a part of or applied upon the first annual expenditure required by law. Thus, upon a claim located at any time during the year 1884, the period within which the labor must be performed commences January 1, 1885, and during the calendar year 1885 the expenditures must be made, or the claim will be subject to relocation on and after January 1, 1886. The expenditures must afterwards be done annually by the calendar year.

It must also be remembered that if the assessment work is not done within the year, the claim is subject to relocation by any one, provided that the original locators, their heirs, assigns or legal representatives have not resumed work upon the claim after failure and before such location. In other words, if the original locators or owners have begun work on the 1st of January, before others have located the claim, they can, of course, hold it.

By decision of the Honorable Secretary of the Interior, dated March 4, 1879, annual expenditures are not required subject to entry for patent, the date of issuing patent certificates being the date contemplated by statute. That is to say, that after entry for patent the claim is not subject to relocation for abandonment or failure to make annual expenditures.

The law provides for getting rid of co-owners who do not pay their share of the expenditures. Upon the failure of any one or several co-owners to contribute his proportion of the expenditures necessary to hold the claim or claims held in ownership in common, the co-owners who have performed the labor or spent the

money for it, may, at the expiration of the year, give such delinquent co-owner personal notice in writing or notice by publication in the newspaper published nearest the claim, for at least once a week for 90 days, and if, upon the expiration of 90 days after such notice in writing, or on the expiration of 180 days after the first publication of notice, the delinquent co-owner shall have failed to contribute his proportion to meet such expenditures or improvements, his interest in the claim by law passes to his co-owners who have made the expenditures or improvements.

We append three forms which miners may find use for at this time, in connection with the question of annual expenditures:

Proof of Labor.

—of—County of—, ss.

Before me the subscriber personally appeared —, who, being duly sworn, says that at least — dollars' worth of labor or improvements were performed or made upon [here describe claim], situated in — mining district, — county, — of —, during the year ending —, 188—. Such expenditure was made by or at the expense of —, owners of said claim, for the purpose of holding said claim.

[Jurat.] — (Signature).

NOTE.—The record of an affidavit like the above is prima facie evidence of the performance of such labor.

Notice of Forfeiture.

—County, —, 188—

To—(names of all parties who have record title to any portion of the mine). You are hereby notified that I have expended — dollars in labor and improvements upon the — lode (describe the claim), as will appear by certificate filed —, 188—, in the office of the Recorder of said county (or district), in order to hold said premises under the provisions of Section 2324 Revised Statutes of the United States, being the amount required to hold the same for the year ending —, 188—. And if within ninety days from the service of this notice (or within ninety days after this notice by publication), you fail or refuse to contribute your proportion of such expenditure as a co-owner, your interest in said claim will become the property of the subscriber under said Section 2324.

— (Signature).

NOTE.—At the expiration of 180 days, this notice should be recorded with the affidavit of the newspaper publisher, that the same was published for the period of ninety days, together with the affidavit of the party signing the notice to the effect that one or more of the co-owners named in the published notice have not paid their share of the expenditure. This completes the record title.

Affidavit of Failure to Contribute.

—of—County of—, ss.

—, being duly sworn, deposes and says that for the year ending —, 188—, he expended at least — dollars in labor and improvements upon the — lode [or—placer claim] (here describe the claim), to hold the same under the laws of the United States and of this — (district, Territory or State); that due notice thereof was personally served upon —, co-owners, on the — day of —, 188— (or was duly published in the —, as appears from the affidavit of the publisher thereof); and that — (of the said) co-owners have failed or refused to contribute their share of said expenditures within the time required by law.

Subscribed and sworn to before me this — day of —, 188—.

Further Discouragement.

The hydraulic miners feel discouraged in their efforts before the courts, as so many points have been decided against them. They have just received what they consider another set-back in Nevada county, where Judge Walling has granted, in the case of Hedges and Merriam against the supervisors of Yuba county and their bondsmen, a change of venue to Yuba county. The suits were brought by taxpayers of the mining portion of Yuba to restrain the supervisors there from paying out of the treasury of that county large sums of money to be used against hydraulic miners, and to recover to the county from the bondsmen of said supervisors the sum of \$13,007.08 already appropriated in that manner.

In Nevada county they think this change of venue will result in the injunction being raised on the supervisors and thus enabling the free spending of Yuba county money in forcing with increased vigor and bitterness the fight against the hydraulic miners, which has for some time lagged on account of the pending of these suits.

THE Bodie Free Press says that one of the mysteries of nature's laboratory can be fathomed by a visit to Allen's Springs, near Bridgeport, Mono county, where a vein of mineralized quartz is under process of formation.

"The Rude Cable Grip on the Bridge."

The above heads an editorial in the New York Herald in relation to the terrible accident that occurred on the Brooklyn Bridge Cable Railway on the 5th inst., by which five persons were severely injured, while many others in the crowded cars were badly scratched and bruised two or three cars being badly wrecked. The Herald further says, "the cable motor system on the Bridge is a rude mechanical appliance quite behind the age." In this the Herald is right, for the Bridge railway from the start has been a chapter of accidents. Competent cable railway engineers in this city who have examined the "system" on the Bridge have pronounced it rude in the extreme, and the appliances used have been the laughing stock of practical men who are familiar with the cable system as worked in this city.

Quoting further from the Herald, "The conductor has only partial control of his train. He can neither regulate its speed nor stop it without throwing the grip off the cable." What would he thought of such an arrangement in this city where the gripman has full control of his car at all times, and by the perfect system of brakes can stop with certainty and almost instantly, if necessary?

Whenever an accident of this kind occurs, the managers of the Bridge raise the cry that more room is wanted for handling the cars on the New York side, and have been trying for some time to have the Bridge extended across the street to City Hall Park, at a very heavy expense. This will not remedy the cable system, and these accidents will be just as liable to occur. We are informed that there is ample room to handle the cars with perfect safety when a proper cable system is applied. The whole system is wrong. The cars weigh about ten tons each, and are built strong enough to run across the continent, with wheels as large as ordinary steam roads, while they have no greater carrying capacity than the Market street cars in this city, which do not weigh over half as much. The cable cars in this city have low wheels and track brakes, as well as the ordinary wheel brakes. With the grip that is used upon the California and Sutter street lines, and the same kind of brakes, no such accidents could happen on the Brooklyn Bridge as are continually reported.

As far as room is concerned to handle the cars, there is more on the Bridge than the Market street road has at the ferry landing in this city, where we have seen seven cars started within five minutes, and here a turn-table has to be used. A train can be started here every 20 seconds if desirable. The fact is, the switching arrangement on the Bridge is about as rude as the grip. Perhaps after a few people are killed the Brooklyn Bridge Trustees will send a competent engineer here to learn something about the cable system and apply a remedy.

INYO COUNTY VIEWS.—We have been shown by Capt. J. I. M. Keeler, a fine collection of photographs of Inyo county scenery. Many of the photographs are of mountain scenery and show most remarkable formations. Those of the summit of Mount Whitney are particularly interesting to the geologist. The canyons in that part of the Sierras are precipitous and grand in the extreme. The region when better known is one which will be visited largely by tourists in search of sublime and picturesque scenery. Captain Keeler is now here for the purpose of having magic lantern slides made from these photographs. He has written, in verse, several lectures descriptive of Inyo county, which it is probable he will deliver here, as well as in the East. The object is to call the attention of the people to the resources of Inyo county, which is now thinly settled, and of which there is comparatively little known by the general public. Captain Keeler has been a resident of Inyo for some years, and has visited every portion of it, even the peaks of the highest mountains, so that he is well qualified to describe its scenery and resources.

A TON OF GOLD.—The exact value of a ton of gold is \$602,927.23. In Mr. Cadwallader's article on the "Debris Question," in last week's PRESS, he said that a ton of gold is worth over \$600,000, but the types made him say it was worth over \$6,000,000.

J. W. MACKAY went to Mexico as a tourist, not as an investor in mines.

Coal Lands.

The Secretary of the Interior has decided in an appeal case from the Land Commissioner's ruling that in case of an application to purchase coal lands under Section 2347, without having filed declaratory statement, no rights are acquired by virtue of alleged prior possession, as against adverse claimants who filed within statutory period.

The contest occurred in Wyoming. One man filed a declaratory statement June 1, 1882, another filed June 6, 1882, and still a third filed application to purchase July 24, 1882. The last one of the three kept possession, and expended \$480 in developments. He asked a hearing to determine the rights of the several parties, and, the land officers, at the hearing, decided in his favor. The U. S. Land Commissioner, however, on appeal reversed the decision, and rejected the application to purchase. He then appealed to the Secretary of the Interior. That official sustains the Commissioner and decides that the third applicant (who alleged prior possession, and filed application to purchase) acquired no rights by virtue of his alleged prior possession as against the adverse claimants, who filed their declaratory statements within the time prescribed by law.

A portion of the land applied for was within a section reserved for school lands in Wyoming.

book will be one greatly used by miners and engineers. If there are any questions connected with the subject which occur to our readers, which might be properly elucidated, the suggestions would be gladly received.

A NEW concession has been made by Mexico to the Eads' Ship Railway Co. These amendments add to this previous land grant 1,700,000 acres, the whole land concession being equal to half the area of New Jersey. Coaling stations are to be permitted at either end of the railway, to which coal from the United States, or any other foreign nation co-operating with Mexico and guaranteeing interest on the bonds of the railway company, is to be admitted free, to the exclusion of coal from all other countries. This will give a new market to the United States coal trade if Congress joins with Mexico in the guaranty upon which this bonds to build the ship railway are to be based. Mexico guarantees the payment of \$1,250,000 a year for fifteen years, provided the United States or some European nation will guarantee \$2,500,000 more for the same period. The time for completing the road has been extended to 1894.

CLIMBING OUT OF A SHAFT.—A dispatch from Mokelumne Hill, says: Saturday evening last Edward Pippin, whilst returning home from town alone, fell into one of the many abandoned shafts near the trail leading to his cabin. It being very foggy and dark, Pippin was unable to find his way, and accidentally walked into the shaft, which is about 35 feet deep and con-

Double Cylinder Roll Feed Surface Planing Machine.

The accompanying engraving illustrates a new large double cylinder roll feed surface planer. It is a marked departure in surface planing machines. It is massive and heavy, the framing of the machine being made with heavy plate sides, with internal ribs. The joints are planed, holes reamed, bolts turned, and every part constructed in the most thorough and careful manner, the object in designing this machine being to construct the most reliable and powerful roll feed surfacing machine made. Its capacity is to dress from $\frac{1}{4}$ " to 30" in width, and up to 6" in thickness.

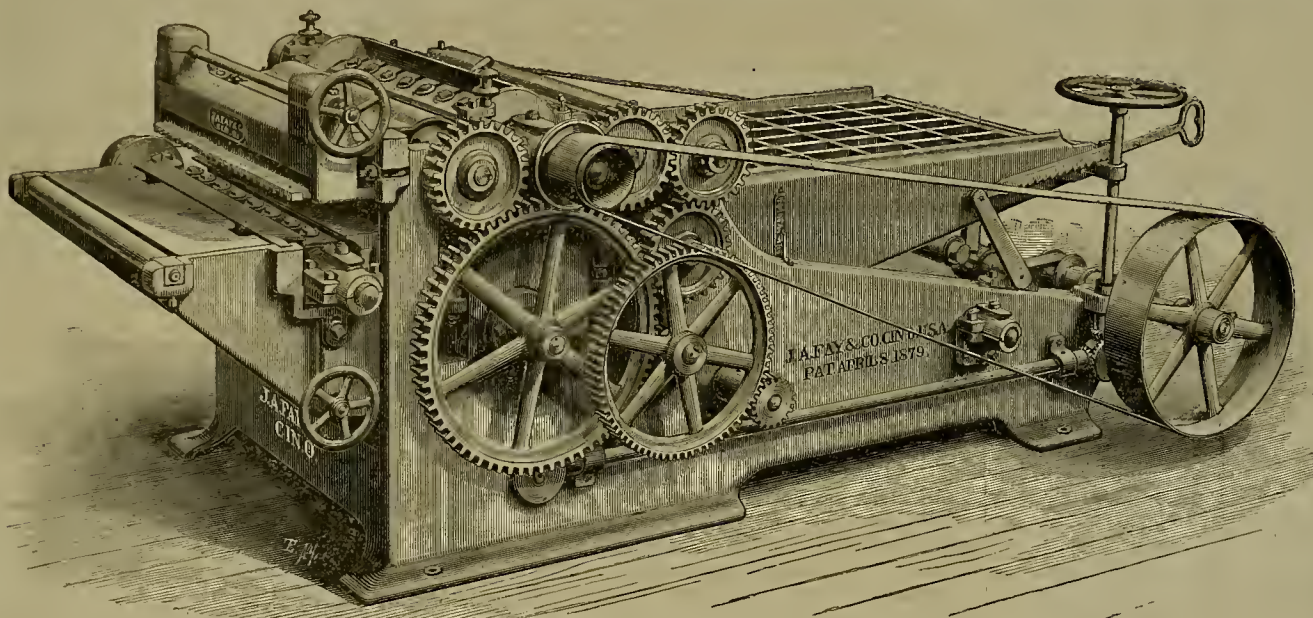
Pressure bars are placed close to the cut upon either side of the lower cutter head; also a holding-down bar above it, by unloosing a hand nut, can be instantly swung entirely out of the way, affording ready access to the cutters. Yielding pressure bars are also arranged upon each side of the upper cutter head, that on the leaning-in side being attached to swinging arms, which allows the edges of the bar to work close to the cutters; this prevents tearing and splintering in cross-grained lumber. It can easily be raised up for gaining access to the cutters. The bar after the cut is also self-adjusting.

The upper and lower cutter heads are formed with steel lips upon their faces, have heavy cast

Zinc.

The greater part of the zinc ore used in this country is obtained as a more or less valuable by-product in the mining of lead ore, and its selling price is not controlled, either by the value of the metal it contains, or by the cost of its discovery and mining. Hence the value is subject to sudden changes, and the investment of capital in zinc mining is rendered more or less unsafe. This fact has exerted a controlling influence on the methods of mining and selling the ore, on the districts most extensively worked, on the location of the principal smelting works, and on their policy towards the ore producers. Its full importance may perhaps be obscured by the fact that lead and zinc ores are almost universally found associated together; but when the selling price of both ores is controlled by the value of the metal they contain, each bears its proper proportion to the cost of mining, and neither unduly depreciates the value of the other.

The inland location of existing mines and works in this country, as compared with the mines and works of Europe, makes them more dependent on railroad transportation, and less easily adaptable to changes in the mining and smelting centers. The metallurgy of lead is so simple that when such deposits of lead and zinc ores are discovered, the lead ores are quickly



LARGE DOUBLE CYLINDER FEED SURFACE PLANING MILL.

The Secretary says in this connection: "It will be unnecessary to discuss the question as to the effect of said reservation where sections 16 and 36 contain mineral, but no locations have been made thereon prior to survey, for the reason that in the case at bar the locations were made prior to the filing of the township plat of survey in the local land office, and your office was advised on July 30th last, that such locations prior to survey were not intended to be included in the order of suspension dated March 24, 1885."

Practical Hydraulics.

The articles on "Practical Hydraulics," by P. M. Randall, now being published in the PRESS, are worthy of careful perusal and preservation by miners and engineers. Those portions recently published devoted to the "Flow of Water Through Vertical Rectangular Orifices in Thin Partitions," and to the "Miner's Inch," are especially useful. The article this week, which embraces the subject of the miner's inch, takes up the miner's inches of different values, with some interesting tables, examples and calculations.

The clearness with which the subject is treated commends a careful perusal of the article by all interested in this branch of hydraulics. To the analyst are presented concise formulæ, and to all familiar with elementary arithmetic are presented rules and tables susceptible of easy application in practice; besides, practical examples, with their solutions simplified to the greatest extent, are given. The requirements of all classes are thus happily and fully met. Mr. Randall quotes from authorities, but the matter is largely original and presented in novel and convenient form. When printed in book form, we feel assured that the

tains about five feet of water. Pippin finding himself uninjured and standing in water up to his neck, considered it useless to attempt making himself heard, and proceeded at once to try and get out. With a pocket-knife he cut holes in the side of the shaft, which acted as steps. After falling back to the bottom about 25 times, he succeeded in reaching the surface more scared than injured. He was in the shaft over 36 hours.

BIG COPPER CONTRACT.—A dispatch from New York, dated the 16th, says: The Lake Superior companies have made contracts within the past few days with home manufacturers for a large amount of ingot copper for delivery next year. According to a good authority, 10,000,000 pounds were contracted for at 11½ cents—an advance of fully half a cent upon what moderate lots were selling for one month ago.

THE Sisters of Charity are erecting a large building on the corner of Gough and Geary streets, to be used as a technical school for girls over 14 years of age, for whom the State makes no provision. It is expected to be self-sustaining from the sale of the work of pupils.

THE Oroville Register gives an account of a young man named Henry Johnson, who is now able to go without sleep for ten days at a time, and gets along well with only four hours' sleep in a week. He says it is of no particular benefit to him, as he gets tired the same as other men and has to rest the same number of hours that they sleep.

It is stated that for three months a large pump has been at work in the Grand Central mine at Tomahstone, without diminishing the amount of water in the lower levels. It has just been discovered that the water pumped out found its way back into the mine, and was being simply handled over and over again.

steel shafts, which extend entirely through the heads, with the journals finished in the very best possible manner. The upper head remains stationary, the head raising and lowering to suit the thickness of the material. The under cylinder is easy of access for convenience to the operator, as the upper housing, carrying the pressure bar over it, is made to swing entirely out of the way. Both cutter heads are belted on each side, although the engraving shows the latter belted upon one side only. The lower cutter head runs in connecting hearings, and has a vertical adjustment with the platen or bed.

The feed rolls are large in diameter and powerfully geared, part of the train of gearing being upon each side, making the draught very uniform. The rolls are supplied with patent weighting attachment, and readily adapt themselves to varying thicknesses of material. A roll cover extends from the cylinder to the front pressure bar, entirely protecting the feed-out rolls from dust and shavings. The feed is started and stopped by means of a belt tightener operating upon the slack side of the belt, actuated by a hand lever.

The platen or bed is glided to the sides of the machine, and is raised or lowered to accommodate the thickness of material to be worked by means of a hand wheel at the end of the machine. The agents for this coast for these machines are H. P. Gregory & Co.

THE marble lately discovered in Inyo county is found to improve in quality the deeper the mountain is pierced. Samples sent to Sacramento are pronounced by experts to be equal to any ever found in Italy.

THE monthly pay-rolls for labor in the mines of Eureka district, Nevada, and at the two reduction works in town aggregate \$35,000.

made available by furnaces erected to treat them and are mined extensively; while large amounts of zinc ore are often neglected or thrown aside as worthless. The metallurgy of zinc is so complicated and expensive that it is slow to adapt itself to new localities, and the works within reach of the new ore fields have a practical monopoly of these markets. The present sources of supply in this country, according to Government authorities, may be grouped under three divisions: the Eastern, including New Jersey, Pennsylvania and Virginia; the Middle, including Wisconsin, Illinois and Tennessee; and the Western, including Missouri and Kansas.

Holiday Art Cards.

L. Prang, of Boston, gives us again (through dealers generally) the most beautiful of all specimens of Christmas and New Year art and decorative cards. The people of our whole country cannot too highly appreciate Mr. Prang's success as a superior, honorable and world renowned art publisher.

Many new productions have this year been added to his previous large list of rarely beautiful designs.

Two new folding calendars have been added to the line, one with four landscapes representing the four seasons, the other with a procession of very charming children, representing the twelve months. These are particularly useful, ornamental and desirable.

In satin art prints the line excels all previous efforts in the artistic execution of the pictures, as well as in the rich and tasteful mountings. Among the new shapes are a scroll and clover leaf, and among the material used, a very clever imitation of different kinds of wood, such as walnut, satinwood and bird's-eye-maple, which forms an artistic background to the rich and delicate satin prints.

THE Alice mine, of Montana, has paid four dividends this year, aggregating \$125,000.

PRACTICAL HYDRAULICS.

NUMBER 9.

PRINCIPLES OF HYDRAULICS.

Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.
[COPYRIGHTED.]

On this data, the value of the statutory miner's inch, the mean coefficient of discharge being in practice .6216, is as follows:

For one second (second inch), 0.02 cubic feet.
For one minute (minute inch), 1.20 cubic feet.
For one hour (hour inch), 72.00 cubic feet.
For 24 hours (24-hour inch), 1728 cubic feet.

If a cubic foot be divided by the flow in one second, there will result the number of miner's inches whose discharge is equal to a cubic foot per second. Thus, $1 \div .02 = 50$ statutory miner's inches; that is, fifty statutory miner's inches are equal to one cubic foot flow per second.

NORTH BLOOMFIELD, ETC., MINER'S INCHES.

At the North Bloomfield, Milton and Columbia Hill hydraulic mines, the water is measured in its flow through a rectangular orifice 50 inches long, 2 inches wide, and under a pressure of 7 inches on the center of the opening. The flow per square inch of orifice, for 24 hours, due this head, as given me by Hamilton Smith, Jr., C. E., formerly chief engineer of the North Bloomfield Works, and president of the Miners' Association, is 2230 cubic feet; of which the coefficient of discharge is found to be .6064. Mr. Smith's experiments made with a module of equal dimensions under a 7-inch head, at Columbia Hill in 1874, found, as stated by Aug. J. Bowie, Jr., M. E., in an article entitled "Bowie on the Measurement and Flow of Water," found the value of the 24-hour inch to be 260.8 cubic feet, and the coefficient of discharge to be .616. Mr. Bowie, in the article referred to, gives, in addition, substantially the following data, with respect to the

SMARTSVILLE MINER'S INCH.

Height of orifice, 4 inches; head on center, 9 inches; value of 24-hour inch, 2534.4 cubic feet; coefficient of discharge, .6078.

SOUTH YUBA CANAL INCH.

Height of orifice, 2 inches; head on center, 6 inches. And with respect to a series of experiments made by himself at La Grange with an orifice 12 inches high, 12.75 inches wide, under a pressure of 6 inches on the top of the orifice, or head of one foot on the center. The mean of which experiments gave as the value of one miner's inch for 24 hours, 2159.146 cubic feet; effective coefficient of efflux, .5905. The flow through this module was assumed equal to 200 miner's inches.

A comparison shows that these coefficients of discharge approximate closely those given in Table 7, obtained on equal data. The results of these experiments also clearly show that the value of a coefficient of discharge depends, among other things, upon the form of the module. In illustration, the module being 50 inches long, 2 inches wide, the coefficient of discharge is found to be .5905. Should we estimate the effect of the difference between the given heads (7 inches and 1 foot) on the coefficients of discharge, there would result .5885 instead of .5905.

The variety of values comprised in the term, miner's inch, as employed in California, is often a source of no little annoyance and confusion. To aid in overcoming this difficulty, Table 8 prepared from Table 7, is given. Each result so obtained is a mean of the experiments of the world's ablest hydraulicians.

TABLE 8.

Flow of water through rectangular orifices due Miner's Inches of different values.

Head on Cent. In.	Orifice. High In.	Orifice. Wide In.	Coef.	Sec. inch Flow. Cub. Feet.	Min. inch Flow. Cub. Feet.	Hour inch Flow. Cub. Feet.	24-hour inch Flow. Cub. Feet.	1 Cub. Ft. Flow per Sec. Miner's in.
3	2	12.	.631	.01758	1.055	63.29	1519.	58.87
4	2	12.	.631	.02030	1.218	73.10	1754.	49.24
5	2	12.	.632	.02274	1.364	81.85	1964.	43.98
6	2	12.	.632	.02490	1.494	89.65	2152.	40.15
7	2	12.	.632	.02690	1.614	96.84	2324.	37.17
8	2	12.	.632	.02876	1.725	103.53	2484.	34.77
9	4	12.	.624	.03011	1.807	108.42	2602.	33.20
10	6	12.	.617	.03139	1.883	113.00	2711.	31.85
11	9	12.	.609	.03249	1.949	116.98	2807.	30.77
12	12	12.75	.601	.02562	1.537	92.24	2214.	39.03

*The flow due the given opening, $12'' \times 12.75'' = 153$ square inches, divided by 200, has been proposed, as hereinbefore stated, as the standard miner's inch. Its adoption seems to be but local.

*This series of articles will shortly be published in book form by Dewey & Co., the MINING AND SCIENTIFIC PRESS, 252 Market St., S. F. Subscriptions will be filled in the order in which they are received.

EXAMPLES AND CALCULATIONS.

Ex. 45.—A water right location is made for 6000 miner's inches. What is the equivalent flow in cubic feet per second?

Cal. 1st.—The statutory miner's inch is estimated, as stated, under a 4-inch pressure.

By Table 8, opposite 4 inches in "head on center" column, find 49.24 miner's inches in "1 cubic foot flow per second" column, $6000 \div 49.24 = 121.6$ cubic feet.—Ans.

Cal. 2d.—For the most part in practice, 50 miner's inches measured under a 4-inch pressure, are adopted as equal to a flow of one cubic foot of water per second. This results, as shown in discussing the statutory miner's inch, from taking the mean coefficient .6216 for different heads, instead of the tabulated coefficient .632 for the given 4-inch head.

Whence, $6000 \div 50 = 120$ cubic feet.—Ans.

Ex. 46.—In a water right claim of 5000 miner's inches, measured under a 4-inch pressure, are how many North Bloomfield miner's inches—miner's inches measured under a 7-inch head?

Cal. 1st.—By Table 8, the value of a second inch, under a 4-inch head, is .0203 cubic feet flow; and the value of a second inch, under a 7-inch head, is .0269 cubic feet flow.

Whence, $.0203 \times 5000 \div .0269 = 3773$ miner's inches.—Ans.

Cal. 2d.—In the discussion of the miner's inch, it has been shown that in common practice the value of the 24-hour inch, under a 4-inch head, is 1728 cubic feet; and under a 7-inch head at North Bloomfield is 2230 cubic feet.

Whence, $1728 \times 5000 \div 2230 = 3874$ miner's inches.—Ans.

Ex. 47.—In 2000 miner's inches, through a rectangular opening 2 inches high, and under a 6-inch pressure, as employed at the South Yuba canal, are how many miner's inches flowing through a rectangular opening 4 inches high and under a 9-inch pressure, as adopted at Smartsville?

Cal. 1st.—As the result will be the same, whether the calculation be made in second, minute, hour, or 24-hour miner's inches, let the 24-hour inch be employed; then by Table 8, under a 6-inch pressure through opening 2 inches high, the value is 2152 cubic feet; and under a 9-inch pressure through opening 4 inches high, the value is 2602 cubic feet; whence, $2000 \times 2152 \div 2602 = 1654$ Smartsville miner's inches.

Cal. 2d.—Under the heading Smartsville, "Bowie on Measurement and Flow of Water," makes that miner's inch, 2534.4, due coefficient of discharge .6078, instead of .624, as adopted in Table 8.

Whence, $2000 \times 2152 \div 2534.4 = 1698$ Smartsville miner's inches.—Ans.

Cal. 3d.—Table 8 shows that the coefficient due a 6-inch head, and opening 2 inches high, is .632, and that the coefficient due a 9-inch head, and opening 4 inches high, is .624. Now, as commonly practiced, the "mean" coefficient .62 would be employed; so that, the result sought would depend upon the square root of the ratio of the given heads, 9 inches=.75 feet, and 6 inches=.5 feet; thus, by Table 5,

$$\sqrt{\frac{.5}{.75}} = \frac{.75}{.8165} = .8165.$$

$.8165 \times 2000 = 1633$ Smartsville miner's inches.—Ans.

EXAMPLES AND CALCULATIONS.

Ex. 48.—The head being 2.25 feet on the center of a circular orifice .0328 feet diameter, what is the discharge in cubic feet per second?

Cal. 1st.—Rule 27 is equally applicable to rectangular and circular orifices.

By Table 6 square root of given head 2.25 feet=.15 feet.

Area of given orifice .0323 feet diameter is equal to the square of the diameter, multiplied by .7854; $(.0328)^2 \times .7854 = .000845$ square feet.

By Table 9, coefficient of discharge due a head of 2.25 feet, according to Castel, is approximately equal to .673; then by Rule 27,

$.873 \times .0025 \times 1.5 \times .000845 \times .00685$ cubic feet.—Ans.

Cal. 2d.—According to Weisbach, the coefficient due a head of 2.25 feet, and orifice .0328 feet diameter, is approximately .628. Employing this coefficient instead of .673,

$.628 \times .0025 \times 1.5 \times .000845 = .00639$ cubic feet.—Ans.

Weisbach observes, that "for square orifices from 1 to 9 square inches area, with from 7 to 21 feet head of water, according to the experiments of Bossut and Michelotti, the mean coefficient of efflux is $m = .610$;

for circular ones of from $\frac{1}{2}$ to 6 inches diameter, with from $\frac{1}{4}$ to 21 feet head of water, $m = .615$."

A mean of the coefficients of Table 9 is equal to .62 nearly.

In ordinary practice this is employed. When greater accuracy is required, reference will need be had to Table 9.

PARTIAL CONTRACTION.

Experiments show that if contraction be suppressed, the flow of water through an orifice will be increased accordingly.

Let $n =$ the ratio between the entire perimeter of an orifice and the part suppressed—that is, if p denote the entire perimeter, and p' the part suppressed, then $n = \frac{p}{p'}$.

$c =$ coefficient of discharge due perfect contraction.

$c_n =$ coefficient of discharge due partial contraction.

$x =$ a number deduced from experiment, which, being multiplied by the product of the ratio, n , and the coefficient, c , gives $c_n x n$, the increase due partial contraction; thus,

$$c_n = c(1 + xn) \quad (93)$$

TABLE 9.

Coefficients for the Flow of Water through circular orifices. Extracts from D'Aubuinssin, Fanning and Weisbach.

OBSERVERS.	Diam. Feet.	Heads. Feet.	Coefficients.
Mariotti.....	0.0223	5.8712	.692
".....	.0223	25.9120	.692
Castel.....	.0328	2.1320	.673
".....	.0328	1.0168	.654
".....	.0492	0.4526	.632
".....	.0492	0.9840	.617
Eytelne.....	.0856	2.3714	.618
Bossut.....	.0889	4.2640	.619
Michelotti.....	.0889	7.3144	.618
Castel.....	.0984	0.5510	.629
Venturi.....	.1345	2.8864	.622
Bossut.....	.1771	12.4968	.618
Michelotti.....	.1771	7.2160	.607
".....	.2657	7.3472	.613
".....	.2657	12.4968	.612
".....	.2657	22.1728	.597
".....	.5314	6.9208	.619
".....	.5314	12.0048	.619
		Mean.	.630
Gen. Ellis.....	.2	1.7677	.58829
".....	.2	5.8269	.60915
".....	.2	9.6381	.61530
".....	.1	1.1470	.57373
".....	.1	10.8819	.59431
".....	.1	17.7400	.59994
".....	.5	2.1516	.60025
".....	.5	9.0600	.60191
".....	.5	17.2650	.59626
Weisbach.....	.0328	2.0000	.628
".....	.0656	2.0000	.621
".....	.0984	2.0000	.614
".....	.1312	2.0000	.607
".....	.0328	.8333	.637
".....	.0656	.8333	.629
".....	.0984	.8333	.622
".....	.1312	.8333	.614
		Mean.	.609

An inspection of Table 9 shows that the coefficient of flow for small orifices and for small velocities, is greater than it is for large orifices and for great velocities.

It will also be observed that the results of experiments differ considerably, though the data employed is approximately similar.

Thus Castel finds the coefficient of flow for an orifice .0328 feet diameter, under a head of 2.132 feet, to be .673; while Weisbach finds it, for an orifice .0328 feet diameter under a head of 2 feet, to be .628.

Bidone's experiments give, for circular orifices, $x = 0.128$, and for rectangular orifices, $x = 0.125$.

Weisbach's experiments give, for rectangular orifices, $x = 0.134$.

Weisbach, however, employs for rectangular orifices the mean between these results—that is,

$$1.5 \frac{.125 + .134}{2} = 0.143.$$

Substituting these values in eq. (93) there results, for circular orifices:

$$c_n = c(1 + 0.128n) \quad (94)$$

And for rectangular orifices:

$$c_n = c(1 + 0.143n) \quad (95)$$

TO FIND THE COEFFICIENT OF DISCHARGE OF PARTIAL CONTRACTION FOR CIRCULAR AND FOR RECTANGULAR ORIFICES.

Rule 28.—Case 1st.—The orifice being circular, add 1 to .128 times the ratio of the entire perimeter to the part suppressed, and multiply this sum by the coefficient of discharge of perfect contraction.

Case 2d.—The orifice being rectangular, add 1 to 0.143 times the ratio of the entire perimeter to the part suppressed, and multiply this sum by the coefficient of discharge of perfect contraction.

Town Sites and Mineral Lands.

The Supreme Court of the United States has made a decision of great importance in a conflict between the claimant of a placer claim and a town site in Dakota. The decision brings on the question of people occupying mineral land for other purposes than mining. In effect it decides that people cannot get a good title to land known as mineral, unless it is purchased for the purposes of mining. The decision is very long and interesting, and we shall shortly give it in full. For the present we give a syllabus as follows:

1. No title from the United States to land known at the time of sale to be valuable for its minerals of gold, silver, cinnabar or copper can be obtained under the pre-emption or homestead laws, or the town site laws, or in any other way than as prescribed by the laws especially authorizing the sale of such lands, except in the States of Michigan, Wisconsin, Minnesota, Missouri and Kansas.

2. A certificate of purchase of mineral land upon an entry of the same by a claimant at the local land office, if no adverse claim is filed with the Register and Receiver, and the entry is not cancelled or disaffirmed by the officers of the Land Department at Washington, passes the right of the Government to him, and, as against the acquisition of title by any other party, is equivalent to a patent. The land thereby ceases to be the subject of sale by the Government, which thereafter holds the legal title in trust for the holder of the certificate.

3. The officers of the Land Department have no authority to insert in a patent any other terms than those of conveyance, with recitals showing a compliance with the law, and the conditions which it prescribed. The patent of a placer mining claim carries with it the title to the surface included within the lines of the mining location, as well as to the land beneath the surface.

4. There can be no color of title in an occupant of land who does not hold under an instrument or proceeding, or law purporting to transfer the title or give the right of possession. Nor can good faith be affirmed of a party in holding adversely, where he knows he has no title, and that under the law, which he is presumed to know, he can acquire none. So held where, in an action of ejectment for known mineral land by a holder of a patent of the United States, and the occupant set up a claim to improvements made thereon under a statute of Dakota, which provides that "in an action for the recovery of real property, upon which permanent improvements have been made by a defendant, or those under whom he claims, holding under color of title, adversely to the claim of the plaintiff, in good faith, the value of such improvements must be allowed as a counter claim by such defendant," he not having taken any proceedings to acquire the title under the laws of Congress authorizing the sale of such lands, or to acquire the right of possession under the local customs or rules of miners of the district.

5. It would seem that there may be an entry of a town site, even though within its limits mineral lands are found, the entry and the patent being inoperative as to all lands known at the time to be valuable for its minerals, or discovered to be rich before their occupation and improvement for residences or business under the town site title.

ANNUAL EXPENDITURES.—Owners of unpatented mining claims have less than a month remaining, in which to do the annual holding work required by the mining act of Congress. All unpatented claims on which \$100 worth of work was not done before January 1st, were forfeited and subject to relocation, according to the old ruling of the Commissioner of Public Lands. A more recent ruling provides that in cases where owners or locators of mining claims are actually engaged in doing their annual work on January 1st, such claim is not subject to relocation, provided the owner puts in the full amount of labor required by law during said month.

NEW DISTRICT.—Some rich gold claims have been discovered about 15 miles east of Schurz station, a station on the Carson and Colorado railroad, Esmeralda county, Nev., and a new district has been formed under the name of Victoria mining district. The boundary lines are defined as follows: Commencing at a point three miles due north of the "Black Hawk" discovery shaft, thence three miles due west, thence due south six miles; thence due east ten miles, thence due north six miles, thence due west seven miles to point of commencement. Wm. G. Young has been elected Recorder for the district.

NOGALES, ARIZONA.—There will soon be a smelter at Nogales, Arizona, and Mr. C. H. Aaron, the assayer at that place, writes us that his business already feels the favorable effect of it. Mr. Aaron is well known from his works on assaying and metallurgy, and is in a location where he is enabled to attend to business in connection with mining, both in Arizona and Sonora.

The bill of exceptions in the case of A. D. January was stricken from the court records at Sacramento. The sentence of January is for ten years at Folsom.

USEFUL INFORMATION.

A Lesson in Shop Management.

The costly results of putting off till to-morrow the thing which ought to be done to-day are nowhere more surely felt than in a workshop. The number of unsuccessful shops or actual failures in business which could be traced to this habit can scarcely be told—but they are very numerous. How this evil was pointed out and checked in one workshop is related by the *Cabinet Maker* as follows:

"We once worked in a shop where a specialty was made of builders' finish, brackets, moldings, fancy finish, etc. About eight hands were employed in the room we worked in. The machinery consisted of railroad combination, band and jig saws, panel and buzz planer, a boring machine and a two-spindle molder. The two planers and the jig saw had loose pulleys, which were so badly worn as to necessitate throwing off the belts from the main shaft to the counter every time each machine was used. In that shop each man took an order from the order book, got out his stock and finished the job, using whichever machines were needed. When it was necessary to use the panel planer we had to climb up on the jig saw table and throw on the belt; when the buzz was needed, the planer must be used to stand on, in order to get at the requisite belt. If the planer was running it must be stopped, thus delaying the man who was running it.

One day after getting thoroughly disgusted we "went for" the boss and asked him if he was going to have those pulleys hushed this year. He said he was going to "just as soon as he got time," but he let them run in this way for two whole months. One day we noted the number of times we had to throw on and off those belts. We used the planer 15 times, the buzz 10 and the jig saw 16 times, making 41 times in all. It took about a minute to put on, and another to throw off a belt, thus making in all 80 minutes in one day. There were eight of us who had to do the same thing, so it took 650 minutes, or 11 hours, to handle those belts—more than one man's time every day. Running this way for nine weeks would amount, at the rate of 40 cents per hour, to \$212, and our boss could not find time to have the pulleys fixed. We showed the figures to him one day. He scratched his head, took them into his office, and ten minutes afterward came out, shut down the shop instantly and sent these counters and pulleys to the machine shop. A loose pulley that rattles has not been seen nor heard in that shop since. You may go in every shop in the land and six out of every ten will have one or more of these "hand shippers" in operation. How is it in your shop?—If the coat fits put it on."

Large or Small Engines—The Safe Side

The natural and commendable desire to be on the "safe side" in making a calculation may be, and often is, carried to an extreme which leads into a greater error than that which it is sought to avoid. A man is going to put in an engine; he has often heard and read of the wastefulness of too small a motor; and so, to be on the "safe side" he orders an engine which is correctly proportioned for about four times the load which it will be run under, reasoning that a big horse can drag a little load but a little horse cannot drag a big load. There is this difference between the horse and the engine: that while the big horse might not cost any more to buy or to keep, both the selling price and the cost of running an engine increases with its size, owing not only to the increased friction of the larger machine, but to the fact that in order to keep it from exerting its great power it must be run with low steam, a high grade of expansion, and at a very low speed. The owner finds in consequence, that he has paid a number of hundred dollars more than he needed for a machine which is less economical than the smaller and cheaper would have been, in order to be on the "safe side."

It is quite as possible, though not so frequent in occurrence, that the boiler power may be too great as it is too little, and as for the boiler material the government authorities are obliged, in the interests of safety, to restrict the fire sheets to a given thickness.

Many superintendents and managers will, to be on the "safe side," fit their boiler room up with all manner of patent traps and get it where it will almost run itself, or so that "anybody can run it," and then to be on the "safe side" of the ledger they put any "thing" in to run it. Any "thing" depends upon the safety automatic machinery to look out for everything—he does not even look after the machinery itself, and when it slips up at some critical moment with more or less damage, who is to blame? Any "thing," the automatic safety appliance, or the man who substituted it for brains, to be on the "safe side."

ANTIQUITY OF SHEEP ON THE EARTH.—It is a somewhat singular fact that no unequivocal fossil remains of the sheep, have yet been found in the bone-caves, the drift, or the more tranquil stratified newer pleiocene deposits, so associated with the fossil bones of oxen, wild boar, wolves, foxes, otters, heavers, etc., as to indicate the coevality of the sheep with those species, or in such an altered state as to indicate them to have been of equal an-

tiquity. Wherever the truly characteristic parts, viz., the bony cores of the horns, have been found associated with jaws, teeth and other parts of the skeleton of a ruminant, corresponding in size and other characters with those of the goat and sheep, in the formations of the newer pleiocene period, such supports of the horn have proved to be those of the goat. No fossil horn-core of a sheep has yet anywhere been discovered; and so far as this negative evidence goes, we may infer that the sheep is not, geologically, more ancient than man; that it is not a native of Europe, but has been introduced by the tribes who carried hither the forms of civilization in their migrations westward from Asia.

NEATNESS IN THE ENGINE ROOM.—In some engine-rooms that we know of, says an exchange, there are carpets down the center and a bright oilcloth close to the engine and all about it. There are even pictures on the walls, and plants in pots in the windows. The engine does not say a word. Beyond the signing of the exhaust and the "creep" of the main belt, as it parts from the pulley, there is not a sound to indicate that there is a tremendous force at work. Contrast this with the hammer and tongs, a clatter like bedlam broken loose, broken windows, and floors like an oil works for filth, and we have just the difference between thrift and sloth, between care and carelessness, between proper economy and the "willful waste" that sooner or later "makes woeful want."

BOILER INSURANCE.—In steam boiler engineering the only observable change seems to be the slow but steady gain made in the introduction of water-tube coil boilers, and in the extension of a rational system of inspection and test while in operation. To-day the intelligent owner of the boiler secures inspection and test with insurance, by intelligent engineers, and responsible underwriters as invariably as he obtains inspection and insurance of his buildings. Under this system, steam boiler design, construction and management is becoming a distinct art based upon real knowledge. The system of forced circulation proposed by Trowbridge and others seems to me likely to prove useful in the solution of the problem to-day presented.—*Thornton.*

EXPLOSIONS IN MINES.—A permanent commission has been appointed in Austria for investigating the causes of explosions in mines. Among the subjects to be dealt with are safety lamps, coal-dust explosions, meteorological observations, the employment of gunpowder for blasting, and ventilation of mines.

GOOD HEALTH.

Inoculation for Hydrophobia.

Another splendid triumph has been achieved by M. Pasteur in effecting a cure for one of the most terrible of human maladies—hydrophobia, which to all present appearances is to be stamped out of existence, wherever the remedy is applied.

It is now several years since this indefatigable worker has been directing a large portion of his time and skill to devising means for the cure of this dread disease, and we have now almost indubitable evidence of his complete success. His process is that of inoculation. Some time ago he succeeded in rendering proof against rabies some 16 out of every 20 dogs experimented upon. But to ascertain that immunity had really been given he had to wait four months after the inoculation had taken effect. He therefore set himself to obtain virus of different degrees of strength, with the object of obtaining prompter and more certain results. This was effected by the following means:

How the Virus is Obtained.

A rabbit was inoculated with a fragment of tissue taken from the spine of a rabid dog. The incubation of the poison occupied 15 days. As soon as the rabbit was dead, a portion of its spinal marrow was in turn inoculated into a second rabbit, and so on, until 60 rabbits had been inoculated. At each successive inoculation, the virus became of increased potency, and the last period was not more than seven days. Having ascertained that exposure to dried air diminishes the virus, and consequently reduces its force, M. Pasteur supplied himself with a series of bottles containing dried air. In these bottles were placed portions of the inoculated spinal marrow of successive dates, the oldest being the least virulent, and the latest the most so. For an operation, M. Pasteur begins by inoculating his subject with the oldest tissue and finishes by injecting a piece dating from two days only, whose period of incubation would not exceed one week. The subject is then found to be absolutely proof against the disease.

His First Human Subject

Was a man in the hospital, upon whom a perfect cure was obtained. His next patient was a young man from Alsace, who presented himself in July last, sixty hours after he had been bitten by a rabid dog fourteen times. His case, left to itself, being considered hopeless by M. Pasteur, Professor Vulpian and other high authorities, the patient was submitted to the same series of inoculations that had been so successful on dogs. As a proof, a series of rabbits

were simultaneously subjected to the identical processes. In 10 days 13 inoculations were made with pieces of spinal marrow containing virus of constantly increasing strength, the last being from the spine of a rabbit which had died only the day before. The youth thus operated upon by the successive administrations of weaker virus was made proof against the virus of the intensest strength. At the latest accounts, the young man was to all appearances perfectly well, while the rabbits, on the contrary, which were first inoculated with this strong virus, without first being rendered fit to receive it, became affected within the proper incubation period, and died with the usual symptoms.

The third patient is a shepherd boy whom Pasteur is confident of curing. The remedy having become publicly known, other patients are presenting themselves. This is certainly a brilliant discovery, and adds fresh laurels to those already won by the genius of M. Pasteur.

Six Cases from New York.

A few days ago six young boys were bitten by a mad dog in the State of New Jersey. Several medical and other philanthropic gentlemen immediately telegraphed the occurrence to M. Pasteur, at Paris, who readily promised to take their cases in hand if they were sent on by the next steamer. The money was raised and the boys sailed under the care of a matron—the mother of one of the little unfortunates—on the steamer several days ago. The result of the treatment of these American patients will be awaited with much interest and anxiety by the entire country.

BITTEN BY A CENTIPEDE.—A remarkable, and at the same time most distressing case of insect poisoning occurred in this city on Saturday last. In the afternoon of that day Miss Irene Tay, a well known society young lady, residing at No. 1005 Leavenworth street near Pine, was visiting a friend on the same street west of Davisadero. It was the season of housecleaning at the friend's house. The carpets were up, and while Miss Tay was walking through one of the rooms she felt something creep up one of her legs and bite her. The bite was followed by an insufferable burning sensation, and she decided to return home immediately. On leaving the car of the California-street line the young lady was obliged to walk about half a block to reach her home, and this she did with great difficulty, as her leg was paining her frightfully, and was partially paralyzed. On reaching her home and removing her clothing, by the assistance of her mother and sister, an enormous centipede fell to the floor. Members of the family applied arnica to the injured limb, but it afforded little relief. The member was much inflamed and swollen. A druggist was sent for, but he afforded little relief, and finally Dr. Eckle, the family physician, arrived. The doctor pronounced the case a very serious one. The young lady was suffering so severely that it was feared she would die, but under the care of the physician she recovered, so that now she is thought to be out of danger. The centipede was three and a-half inches long and supplied with innumerable legs and tentacles. An attempt was made to kill the venomous reptile by pouring ammonia on it and scorching it with a flat iron, but it seemed to suffer little inconvenience from these attentions. It was finally placed in a bottle and shown to the physician, who at once announced its dangerous character.—*Call, Dec. 5th.*

A RAPIDLY GROWING HEALTH EVIL.—It is not generally known that coal oil and gasoline stoves rapidly vitiate the air of a room for breathing purposes by the development of large quantities of carbonic dioxide. How much longer must this continue before manufacturers of such goods will obviate this new danger by inventing some form of hood and pipe for conveying this poisonous gas to the outside atmosphere? Volumes have been written concerning the ventilation of homes, and the injury that arises, especially to children and the infirm, from crowding too many people together in closed apartments, and now, with the introduction of oil and gasoline stoves in the household, a new difficulty presents itself which is not easily remedied in the endeavor to provide for health and comfort. These stoves are frequently found with several large burners in full blast, in small kitchens hardly large enough to contain air to supply the healthful requirements of one person.

A DANGEROUS DIET.—The Los Angeles *Herald*, of November 20th, says, "At nearly midnight last night word was brought to the Sheriff's office in this city that a man had been found in the lower part of San Fernando valley in an almost dying condition from having eaten the fruit of the cactus, or tunas. The mouth, tongue and throat were terribly swollen from the poison from the spines, which are as fine as hair and sharp as needles. They are harbed, too, and when once they have penetrated the flesh it is all but impossible to extract them. The Indians eat them, but they are skilled in removing the spines in the most careful manner."

DANGER FROM FIG TREE TWIGS.—The Santa Cruz *Surf* says: A few weeks ago a little child of Seth Blanchard's was playing with some broken twigs from a fig tree and got some of the sap which exuded therefrom in her eyes. Her eyes became badly inflamed and it is reported that for some time the child has been entirely unable to see.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GOOD ROCK.—Amador *Sentinel*, Dec. 9: The Moore mine is said to be turning out some first-class rock. Matters at the Kennedy are moving along smoothly and the mine is being got in working shape as rapidly as possible. Doucet & Co. intend running a tunnel into a hill below Matt Hackney's place near Clinton, with the intention of tapping what is apparently an old river bed and is believed to be rich in gold bearing gravel.

Amador.

FRESH DISCOVERIES.—Amador *Dispatch*, Dec. 12: We are pleased to be able this week to report fresh discoveries of very rich ore in the Moore and Amador Queen mines. In fact all the mines along the gulch are looking very well and other good strikes are expected soon.

TOMBSTONE HOPEFUL.—*Epitaph*, Dec. 12: Since the news of the big strike in the Contention, below water level, was made public, a feeling of renewed confidence in the future of the camp is noticeable among all business men. It is conceded by every one that this strike settles affirmatively the question of the success of deep mining in Tombstone, and consequently its important bearing upon our future prosperity cannot be exaggerated. It assures for Tombstone renewed activity in all branches of business and departments of trade. While the beneficial effects of the strike will not be fully felt at once, there is good grounds for the belief that ultimately it will place this city foremost among the mining camps of the continent.

Butte.

RIVER MINING SCHEME.—Oroville *Mercury*, Dec. 12: Major McLaughlin has rebounded the Lewis mining claim situated in Feather river a few miles above Oroville for the sum of \$2500. The mine embraces 3200 feet of Feather river and has never been mined. There is not the least doubt about the great wealth of this strip of river. When Cape Claim just below it was opened years ago, over \$600,000 were taken out in a run of 42 days, and at Long's Bar in the same vicinity millions were taken out in early days, as 800 or 1000 miners worked for a long time, and no miner worked in those days for less than an ounce or so. The Major thinks there is no doubt but that this mine will be opened up next spring, and if so we may expect a boom in this vicinity. The idea is to build a dam in the river at the upper end of the mine, and flume there by drying the bed of the river the entire length of the mine. The river has sufficient fall to make fluming easy, and there is nothing more plausible than the scheme. If it is undertaken there will be one of the richest developments that has been known in California since the early days. Since the Cherokee Company commenced to prepare for drifting they have within easy reach one of the finest channels of gold-bearing gravel ever found in this State. The tunnel spoken of before in these columns, has tapped an old river channel, containing a solid bed of gravel, that is estimated to be 1000 feet wide. The gravel in the vicinity of this, which has been worked by the hydraulic process, has been rich, every foot of it, and now that they can get at this immense bed, without washing surplus earth, there is no telling how much gold they will take out. Superintendent Glass expects grand results from his drifting scheme.

Calaveras.

BONDED.—Mt. *Echo*, Dec. 9: The Lindsay mine has been bonded to Joseph Ranks, of Angels. This famous quartz mine was discovered about the year 1855, and a large amount of gold taken out the first year. Since then large sums have been extracted by different parties, and it is to-day one of the richest mines in this county.

El Dorado.

IMPROVEMENTS.—Georgetown *Gazette*, Dec. 11: The enterprising owners of the Rip Van Winkle mine on Slate Mountain have made a great many substantial improvements on and around their mine this summer. Everything runs like clock-work, and every man working about the mine and mill seems as happy as if he owned a share of the mine. It is reported that the late clean-up at the Slate Mountain mine was ahead of any yet made. Those acquainted with the mine feel confident that it is the best paying mine in El Dorado county.

Inyo.

THE DEFIANCE.—Inyo *Register*, Dec. 10: We are informed that this mine is showing up magnificently. The tunnel running south on the 184-foot level extends something over 100 feet through an ore body from three to five feet in width, the higher grade of which assays from \$187 to over \$350 per ton in silver and from 50 to 70 per cent lead. P. Reddy, Esq., who has stuck to this mine with such wonderful faith, is in Darwin looking after the mine, and is loading all the returning teams from Panamint with this high-grade ore for shipment to San Francisco. The lower grades will be reduced in the old furnace, and of that class there is now enough to keep it running several months. It will not, however, be started before spring. At present the mine employs ten men.

RILEY MILL.—Inyo *Independent*, Dec. 10: John C. Eddy and Dr. Stevenson have leased the Riley mill. The mill is located between Darwin and Panamint. There is estimated to be between six and eight hundred tons of tailings at the mill; the stuff assays \$22 a ton and the mill will be started up at once to work this over. In the mean time men have already been put to work doing assessment work in the mines, and if the prospect is such as will justify continuing the work it will be kept up.

LOOKOUT.—A few days ago Frank Fitzgerald finished a very successful run at the furnace at Lookout. The run was completed in six days and the value of the bullion is about \$12,000. The grade is higher than any run made at Lookout for some time.

Mono.

BENTON.—Cor. Inyo *Register*, Dec. 10: Mr. J. E. Miller has completed an underground and surface survey of the Borasca mine, and located a point for the sinking of a shaft to secure proper

ventilation for the mine, which continues to show the usual quantity of good ore in the stopes. He has also in view the running of a new tunnel on the ledge to connect with the upper workings. Judge Tucker has struck another fine body of rich ore in the Eastern Star, and is hard at work opening it up, with prospects improving. Pete and Henry McCabe are taking good ore out of the Laura on tribute from the Little Emily M. & Co. The company's mill at Montgomery is running steadily on the ore bought from Mr. McBride, which is paying well. At the south end Kremkow is drifting south on the Kearsarge, and as soon as sufficient timbers and lagging can be secured, intends to sink the shaft 100 feet deeper.

Mariposa.

DILTZ.—Mariposa *Gazette*, Dec. 12: Ore from the large dump on the north side of the hill, which has already been through the washing before piling, and \$14 a ton of free gold realized therefrom, assayed \$30 a ton. This proves that had the whole of the quartz and vein matter been put through a mill, it would have paid \$44 a ton. There is 600 tons of ore in this dump of a suitable fineness, or crushed, all ready to be put through a mill, besides some thousands of tons of the same character of rock in sight, which can be collected with remarkable facility and easily transported to a mill. Captain Diltz will no doubt erect a mill at this point early in the spring, providing he does not sell his mine, as at present is contemplated. Negotiations for the sale of the mine have been going on with several different parties during the past year, and it is highly probable some one of them will purchase the whole property ere another season passes.

Nevada.

WILL SOON START.—*Tidings*, Dec. 12: Arrangements are now about perfected for the immediate working and opening of the Coe mine. Robinson, the great circus manager, had bonded this mine, but recent disasters in the sinking of steamers and the wrecking of railroad trains has so altered Mr. Robinson's business that he cannot come here immediately to attend to the affairs of the mine. Mr. Geo. Murphy, A. D. West and Zeph Mansau have now taken the matter in hand, and it will be but a very short time before the mine will be in full blast.

PAY GRAVEL STRUCK.—*Transcript*, Dec. 12: This week the shaft in the Centennial drift claim, Washington township, struck bedrock in the long-sought channel at a depth of about 250 feet, and developed a fine body of pay gravel. The pumps now in use being of insufficient capacity to handle the large quantity of water coming in were removed shortly after the strike was made, and operations will not be resumed until spring when new and heavier machinery will be put in. The Centennial claim is owned by an incorporation, the stockholders in which principally reside at Gold Hill and Virginia City, Nevada. Prospecting was commenced there in 1875 or perhaps earlier under the superintendence of Major Downie, and has been prosecuted most of the time since then. Long tunnels have been run and shafts put down, the expenditures probably approximating \$75,000. The stockholders have put up assessment after assessment (the 22d one will be delinquent this month) with a promptness that evidenced their implicit faith in the eventual discovery of a rich mine. That their persistence and nerve are now in a fair way to be liberally rewarded is quite certain. The finding of the main channel and pay gravel by the Centennial Company will put new life into that part of the county and give an impetus to gravel mining along the rich and extensive channel that traverses the Centennial and neighboring locations.

THE MINERAL BELT.—Helena *Independent*, Dec. 10: Work on the two tunnels of the Mineral Belt Company is progressing fairly and with the utmost satisfaction to the contractors, superintendent and stockholders. This company is prosecuting work on two tunnels, one 300 feet below the mouth of the first one and 750 feet east of it. The lower tunnel just misses the ground claimed by the Regulator lode, passing by the west end of it within 100 feet. Both of these tunnels are now in over 100 feet, and are being driven at the rate of about four feet every 24 hours, three shifts being worked on each of them. These tunnels are being driven in clear ground, where there are no lodes located at present, but with known lodes close up to them on either side. The first 90 feet through volcanic shale, thrown down from the mountain through countless ages, but both are now in solid formation. It is predicted by the contractors that a lode will be cut in the upper tunnel within the next 25 feet, as the character of the rock now being taken out shows unmistakable signs of a lode being near.

PHOENIX MINE.—Grass Valley *Union*, Dec. 10: A crushing of 23 loads of rock from the Phoenix mine is being crushed at the Rocky Bar mill. It was mostly taken from the shaft, and therefore not all clean quartz, but nevertheless is expected to give a fair result. Recently a double stringer of quartz, being respectively six and eight inches in width, has been found in the north drift on the lower level, which prospects well in gold. The work of sinking the main shaft is going on steadily, and it is expected to turn a drift for a new level about the holidays, when rich rock is expected from the chute coming down from the level above, where fine specimens were taken out a few weeks ago. The prospects of the Phoenix are considered excellent, and the members of the company are all sanguine as to the future of the mine.

ANOTHER GOOD PROSPECT.—Some weeks ago John Trenberth, Wm. Thomas and others started work on a quartz ledge near the old Town Talk gravel mine, opposite George Wilson's ranch, and the outlook is now very encouraging. A shaft was sunk on the ledge, and at a depth of 25 or 30 feet it was found to be about six feet in width, and the rock looking well. The men could do no more work at the present time.

COMMENCED CRUSHING.—*Tidings*, Dec. 9: Teams have been busy for the past several days hauling ore from the Phoenix mine to the Rocky Bar mill, where it will be ground up and the gold taken from it. The rock is a likely looking lot, and will no doubt meet the expectations of its most ardent admirers. It will probably be some time next week before any definite idea of its value can be had.

ORLEANS MINE.—Grass Valley *Union*, Dec. 9: The shaft of the Orleans mine is now down within a few feet of 200 feet below the tunnel level, or 350 from the surface. The ledge in the shaft is small, but prospects in free gold. In a few days the drift will be turned in the direction where the ledge is believed to be much stronger, as shown in the level

above, and which was also of good paying quality. From the amount of water now coming into the shaft it is thought a strong vein is close at hand.

Plumas.

INDIAN VALLEY MINE.—Greenville *Bulletin*, Dec. 9: Work is progressing well. The drift from the bottom of the shaft is in 30 feet. The width of the ledge continues 22 feet, with smooth walls. The ore is of excellent quality and the entire width, as the drift progresses, is being extracted. A stope has been commenced near the face. The stope in the 100-foot level running west from the Indian Valley shaft, is looking well, furnishing its regular proportion of good pay ore. The drift extending toward the Union, will tap that mine 212 feet below its deepest works. It will take about six weeks to complete the task. The rock in this drift is very hard. The opening up of the Union mine to this depth is of very great importance, for when the ore from the deepest part was milled, it paid all the way from \$20 to \$40 per ton. It was a very rich chimney, and it is confidently believed that it will be equally as rich at greater depth. The body of ore thus made available in the Union will be large. In order that the extraction of ore may be more rapid, Mr. Cornell is arranging to put in Burleigh drills. They may be used in the various drifts, also in sinking the Indian Valley shaft. A number of experienced miners have arrived from below. The whole force for the present will embrace from 40 to 45 men. The probabilities are that when the mine is more fully developed, a much larger force will be employed.

Sierra.

CLEAN-UP.—The Bald Mountain Extension Co. cleaned up 167 ounces last week. The principal causes of the falling off from last week were that a flat place in the channel was encountered, and most of the gravel came from the rims in bringing those breasts up with the center workings. The Young America yield for a run of 27 days was between \$18,000 and \$19,000. While the yield was not as large as some had expected, it was large considering the quality of the rock crushed, which was low grade. It was a lot of rock that had to be got out of the way, and while it was known not to be exceedingly rich, it was also known that it was good milling rock, and would pay about \$18 per ton. The run, everything considered, was exceedingly satisfactory.

SIERRA CITY.—The Cleveland mine, situated in Nigger canyon, was started up on Monday for a short time. They are now hauling the rock on sleds, but intend soon to build a chute from the mine to the mill, which will greatly facilitate matters. The company has pushed the work with considerable energy, and it is to be hoped they will have their reward. The rock prospects well.

Siskiyou.

ORO FINO.—Yreka *Union*, Dec. 9: The recent rains have furnished an abundance of water for the mines in this vicinity. Scott river has been very high for the past week but is now subsiding and will soon be in its banks again.

Shasta.

NEW MILL.—Shasta Co. *Democrat*, Dec. 9: Bell & Co.'s new mill at French Gulch will soon be running. Last week Mr. Greer picked up a handsome \$17 nugget in Star gulch. Fred. Simonds, Sr. is up on Squaw creek prospecting. Several other prospecting parties are camped on Backbone. We are informed that a mining man by the name of Hart will erect a mill on Rev. Fleming's mines in Old Diggings district. The latter part of last week three carloads of Iron Mountain machinery were unloaded at Middle Creek and freighted to the mine. Inside of three years Squaw Creek will be the biggest and most productive mining camp in California. There are millions in it. Near Churntown Charles Jones and Vick Seams took \$100 out of a pocket ledge in two days, and are still extracting the "yaller" at the rate of \$20 per day. Reley, Mathews & Co. have got their road leading to their Squaw Creek mines about half completed. The company will endeavor to get their machinery in this winter. Bije Bemis is going to Copper City to assort the machinery he purchased for the custom mill in Old Diggings district. Such an enterprise is what all miners are interested in. Holt & Gregg have ceased operations at their lime quarry for the winter. An analysis of the lime rock shows it to be as pure as any found in the United States, and there is an unlimited quantity in sight. Mr. Carson, principal owner in the Snyder mine, has surely a most excellent showing for a rich mine on Squaw creek. He has just started a tunnel on the vein which will open up a rich body of ore. Prospects on the surface indicate a chimney of several hundred feet in length. Mr. Lindros and Davis, two prospectors recently from Oregon, last week made two valuable locations on Squaw creek. Their find is situated east of north of Whitton & Bassett's mines, and the ore shows up handsomely in free gold. Flunk Warner and John Lowden are interested in the property. Reid & Co. made a clean-up last week of about 50 tons of ore and obtained a result of 81 ounces free gold. The road being in such a bad condition sufficient wood could not be hauled in to keep the mill running and as a consequence work has been suspended for the present but will soon be resumed.

San Diego.

JULIAN DISTRICT.—Los Angeles *Express*, Dec. 14: Col. I. R. Dunkelberger said to an *Express* reporter to-day, "I have just returned from Julian. Fifteen years ago Julian had a big excitement. A reaction has set in. The first great strike was the Stonewall mine, which has plenty of high grade ore, and is running a ten-stamp mill day and night. The Ready Relief and the Redman mines jointly are running a ten-stamp mill day and night. They struck a large body of high grade ore in the Redman. The Hubbard is running a five-stamp mill with good results, and the Owens, leased some two months ago, sunk a perpendicular shaft, expecting to strike the ledge at 300 feet, but struck a ledge of which they knew nothing, at a depth of 100 feet and sunk on it 50 feet, and think they have ore enough on the dump to pay for the mine and their labor. The Shenandoah, Charlot and Ella have been bonded within the last two weeks, and the Hidden Treasure and Antelope have been leased for one year and work has already been commenced on the two latter. Other mines have been sold, among the number the Rowena and the Scott, on the Contact ledge, on which is the Chariot. The Rowena and the Scott I have bought and will work them. The ore is free milling gold. There are eight ounces of silver in the Rowena. The water is fine and the climate is per-

fect. Wood is abundant. The men who first discovered the mines had no capital. The Arizona excitement took them out there. Now capital is taking hold of these mines.

Sacramento.

GRAVEL.—Folsom *Telegraph*, Dec. 12: J. H. Bowman is developing a gravel claim near Robbers' Ravine, and is meeting with good success so far.

Trinity.

NEW RIVER.—Humboldt *Standard*, 12: Arrivals from New River bring the news that placer miners are at work, and that something is being done in the way of quartz mining and prospecting. An abundance of water is the great desideratum, and that the miners this season appear to have. There seems to be a cheerful outlook now in all the mines. Exchanges say the various mines at Deadwood are in a favorable condition; that the miners are contented with the prospect, and that great results in production and discovery are anticipated. The mining outlook in Trinity county is said never to have been better.

Tuolumne.

A STRIKE.—Tuolumne *Independent*, Dec. 12: A rich strike has been made in the old Melone lode belonging to the Carson Hill Company, at Robinson's Ferry. It was known that there was good rock left in the bottom of the shaft—some 300 or 400 feet deep—and lately a donkey engine has been pumping the water out. This was accomplished recently, and prospecting the shafts and drifts commenced. Last Sunday a rich spot was found, and on that day between four and five thousand dollars were taken out. Since then rich ore has been brought to the surface daily. The claim is on the mother lode right at the river. A company has been looking at Thos. Souby's mine at Arastaville, and he will doubtless make a sale of it. The mine is looking well and when further developed will become one of the leading mines of the county.

NEVADA.

Washoe District.

HALE AND NORCROSS.—Enterprise, Dec. 12: On the 3000 level work is being actively prosecuted, upraising and stoping out in the ore body above the deep winze station. This upraise has extended upward about 30 feet, and will be continued to the 2900, stoping out the ore as it progresses. Hoisting the ore which has accumulated in making this opening was commenced day before yesterday, 70 tons being raised, and as much more was taken to the surface yesterday. This will be continued as opportunity offers, and milling will follow in due time. This ore is of a good grade which averages well under the stamps, and samples can easily be picked from the dump which will assay high in the hundreds. On the 3000 level in crosscut No. 3 they have commenced stoping out the ore body with a view to hoisting ore from that point also for milling. The diamond drill being run northeast from the face of the main north lateral drift brought out some rich black sulphur drillings, demonstrating the existence of a good ore body or vein in that direction.

CHOLLAR.—The main lateral drift south, following the west wall of the ledge, is now in 640 feet from the Combination west drift, and having reached the Potosi north line day before yesterday, it was stopped. A small stream or seepage of water was met with at this point, merely three or four inches, and now drain boxes are being put in the entire length of the drift to carry off this water and any more that may be met with in future operations. This will take a couple of weeks, after which it will be decided whether to continue the drift south into Potosi ground or to crosscut east in the fine large ledge developed and lying along the east side of this drift.

CON. CALIFORNIA AND VIRGINIA.—About 125 tons continues to be the regular daily yield from the 1750 level, assaying from battery samples at the Morgan mill \$15 per ton. The northwest drift on the 1650 level being run toward the old bonanza workings is now in 290 feet, having about 260 feet further to go. The Jones lease section, above the 1500 level, is yielding about 180 tons per day, assaying from battery samples at the Eureka mill, \$25 per ton. A large number of men are employed in the mine and the ore is being extracted at a very lively rate.

YELLOW JACKET.—The usual daily amount of about 175 tons continues to be extracted from the old workings above the 1300 level, keeping the Brunswick mill steadily running. The main lateral drift being run on the 1700 level from the Crown Point mine through the Kentuck makes good advancement and will soon reach the point at the north end where good redeveloements are expected to be made by it.

CROWN POINT.—About 360 tons is the regular daily yield, principally from the old upper workings above the 1400 level, with quite a contribution from the 1700 and 1750 levels, where the ore vein is not large but rather better in quality than from the upper levels. About 150 tons daily are being taken from the Belcher through the Crown Point shaft.

SIERRA NEVADA.—On the 520 level the main north lateral drift was extended 73 feet during the week, making a total distance of 1234 feet. Material in face soft vein porphyry, clay and quartz. A few tons of gold-bearing ore are being extracted from the surface croppings and shipped to the mill.

GOULD AND CURRY.—West crosscut No. 2, on the 1000 level, 170 feet south of the north line, is now in 245 feet, 37 feet having been added during the past week. Material in the face dry vein porphyry, with streaks of clay and decomposed quartz.

UNION CONSOLIDATED.—On the 500 level, the crosscut east, 100 feet south of the Sierra Nevada line is now in 335 feet, 28 having been made during the week. The vein matter in which it is running is of a very favorable and promising character.

KENTUCK.—This mine continues its regular yield of a little over 100 tons per day, supplying the Rock Point and Douglas mills. Everything goes right straight along like clockwork from one year's end to another.

OPHIR.—The main north drift on the 400 level, which has been running in low grade ore toward the Con. California and Virginia mine, has been stopped, and the west crosscut from it is progressing well toward the west wall in streaks and bunches of low grade ore. An east crosscut, started from the south drift, is now in about 60 feet, showing some small streaks of low grade ore.

Columbus District.

HOLMES.—*True Fissure*, Dec. 12: From the Cross development we are taking some good ore. At point 18 we are still driving the drift. The ground is a little softer and we are making better progress. The Creer drift looks better than at last report. The ore is fully 12 feet wide and is fine milling ore. It looks like it will prove to be a real bonanza. The fifth level crosscut has attained a total length of 120 feet, with no change in its general appearance.

MOUNT DIAHLO.—The east drift from the north crosscut on the fourth level is in 20 feet and the face shows 18 inches of \$40 ore. The east drift from the No. 6 winze is in 130 feet, and shows some low-grade ore. The raise from the east drift on the second level shows some \$40 ore. The intermediate, above the first level, shows a foot of \$100 ore.

Dun Glen District.

PLACER MINES.—*Silver State*, Dec. 11: Burrell Monroe says the Barber Canyon placer mines, near Dun Glen, are not turning out as well as anticipated. Water is encountered before the bedrock is reached, and the Chinese, who are working the mines, cannot control it. They have ordered pumps, and until they arrive they can accomplish but little, as the gold-bearing gravel is below the water line. Chinese have commenced prospecting in Auburn canyon, this side of the Dun Glen range, but with what success he had not ascertained.

Eureka District.

ACTIVE OPERATIONS.—*Eureka Sentinel*, Dec. 10: Considerable slag from the old K K furnace dump is being hauled to the Eureka Con. works. On Tuesday last two tons of ore were shipped in to the Richmond reduction works from the Summit mine on Prospect mountain. The Kesene mine, in Silverado canyon, keeps up its lick, and from it 18½ tons of good ore were shipped to the Eureka Con. furnaces the past week. Three tons of ore were shipped during the first part of the week from the El Dorado mine No. 2, on the west side of Prospect mountain, to the Richmond works. From the Tacoma mine, on Prospect mountain, one of the Ruby-Dunderberg properties, six tons of good ore were shipped to the Richmond works on Tuesday last. The Continental mine, on White Pine mountain is again among the ore producers, and from it 2½ tons were shipped to the Richmond furnaces the other day. The present competition between our local smelting companies should spur up our prospectors and induce them to push developments and send in their ore before winter sets in. The Lord Byron mine, one of the old stand-bys of Prospect mountain, continues to yield well. During the past week 5½ tons of ore were shipped to the Eureka Con. works. The present fair weather is putting the roads in good condition again. Those miners having ore to ship to the reduction works in town would do well to make their shipments at once. A shipment of ore lately made from the Water Jacket mine, Page canyon, to the Richmond furnaces, gave an average assay value of \$191.12½ per ton, two-thirds of the entire lot assaying over \$350 per ton. Charley Ruden and James Berryman, Jr., are driving ahead the tunnel of the Contention mine, Page canyon, Secret Canyon district. There is a nice lot of ore on the dump at the mine, ready for shipment. The tributaries in the California mine are doing good work and are proving that property to be just what has already been thought—that it is a banger. From it 47 tons of ore were shipped to the Richmond works the past week. The Adams Hill mines are looking and producing well. During the week ending yesterday, shipments of ore were made from that section to the Richmond works as follows: Mimbres mine, 3 tons; King Lear, 6; Oriental and Belmont, 16, and Silver Lick, 66. But little of the ore assays less than \$100 a ton, and it runs high in gold. The recent development in the Geddes and Bertrand mine, Secret Canyon, is looking well, and from it 14 tons of ore were shipped to the Richmond reduction works during the past week. There are seven or eight men at present at work in the property on day's pay. Messrs. Nelson and Anderson are still working on tribute and making very good wages.

Hawthorne District.

THE LAPANTA.—*Cor. Candalaria True Fissure*, Dec. 12: After examining the several prospect holes, tunnels, inclines and drifts, I have come to the conclusion that the theories advanced of the formation of veins, the kind of country rock and the particular direction, dip, etc., which are necessary to insure a true, good and paying lode have been exploded by the discovery of the Lapanta, and that few visitors can realize the immensity of this ore deposit and its value. Everywhere you go or look the ore is to be seen, and in the deepest workings the ore is the richest. It is hardly necessary to speak of the value of the ore. The company have had several hundred tons of ore crushed that is said to have yielded \$80 per ton and upwards. The ore is free, simple and easy to reduce, and is now being worked at the reduction works of Joshua Moss, at Kincaid. It is said by those who know that this concentrator renders the tailings of this rich ore absolutely worthless. The working of the mine is conducted by Billy Baker in a practical common sense method. Instead of sinking a three-compartment shaft somewhere in the vicinity of the ledge and drifting to find it, he has begun where it makes its appearance on the surface and followed it down in its serpentine course, never losing sight of it in the entire depth. No stopping of any consequence has been done, but the ore is being left in the mine until they can have greater facilities for reduction. Without asking any questions one would suppose they were doing this work with a view of the most practical mode of working the mine in the future and to the best advantage. There are numerous other rich mines in the district. The Red Bank mine is spoken of by many as the coming mine. The location is said to be one of the most favorable in Hawthorne district, and, excepting the Lapanta, produces the richest ore in the district.

Jungo District.

LOTTERY.—*Silver State*, Dec. 10: An assay of ore from the Lottery mine, in Jungo district, made in Virginia City, gave a return of \$235.57 to the ton. The Lottery is the property of W. C. Owens, McMillan, Richard Nagle and Geo. Rose. This assay was from their second-class grade of ore, some of the higher grade assaying at a very high figure.

Ophir Canyon District.

MILL.—*Belmont Courier*, Dec. 9: It is expected that the Ophir canyon mill will soon be started up

on ore from the Twin River Co.'s mine. Then look out for lively times in Ophir canyon.

Philadelphia District.

ORE.—*Belmont Courier*, Dec. 9: John Delabar is taking some very nice looking ore out of his mine in Arizona Hill. It is within the range of possibilities that he opens the largest ore body ever discovered in Philadelphia district; and he will do so to a certainty, if powder and muscle count for anything.

Park Canyon District.

NEARLY DONE.—*Belmont Courier*, Dec. 9: The Giant mill in Park Canyon is fast nearing completion, and soon the merry music of the stamps will be heard. We hope the bullion shipments will come up to the fondest expectations of the enterprising owners.

Tuscarora District.

ARGENTA.—*Times-Review*, Dec. 11: The drift on the 400 level has been extended 10 feet during the past week.

NORTH BELLE ISLE.—Fair progress has been made with the work on the 150-foot level.

GRAND PRIZE.—North drift on the 300 level has been extended 22 feet during the week, and raise above the 300 has been connected with the 200, so the ventilation is good now.

NAVAJO.—No. 1 crosscut west, 350-foot level, extended 40 feet. No. 2 crosscut, 250-foot level, extended 11 feet. West crosscut from east lateral vein, same level, extended 7 feet.

MEXICAN.—On the 300 level the lateral drift north from the east crosscut is in 173 feet, and the south lateral drift opposite to it 187 feet. Both continue in promising vein matter.

ALTA.—Some good bunches and streaks of ore continue to be met with in the explorations on the 700 level, near the upraise from the 950 level.

ARIZONA.

MORE ORE.—*Prescott Courier*, Dec. 9: Wm. Jennings, an industrious miner, has just shipped 200 sacks of ore to Pueblo. He has several good mines in Hassayampa district. A considerable addition to the present force on the Sterling mine has been engaged. Several of the men leave here this morning for the mine. The flume, dam, etc., of the Oro Fino hydraulic works are pretty nearly completed, and the quality of the placers will be practically tested by the close of the year. It is asserted by the Phoenix papers, that Messrs. Cook, Church and Gray, of this city, have purchased the Tip Top hoisting works and the Gilette mill, and will remove them to their mines near Tule lake.

BULLION AND BULLION PRODUCERS.—*Prescott Courier*: D. Levy & Co., merchants of this place, shipped, yesterday, to Pueblo, Colorado, about three tons of gold-bearing rock for Mr. Hall, of Hassayampa district; also a lot of silver ore for Lawler Bros. It is expected that the gold rock will yield over \$150 to the ton. The silver ore is also very rich. A pack train laden with silver ore, from the Blue Dick mine, arrived in Prescott yesterday. Mrs. Hughes has discovered what is thought to be a good silver ledge, near the Aztlan mill, Groom Creek district. Dr. Farnham is taking rich rock from the Ironclad mine, Walker district, and is preparing to run it through his steam arrastras. Owners of placer mines are piling up auriferous gravel, so as to be prepared to wash the gold out of it as soon as water comes. A great deal of assessment work is being done in almost every district of the county.

MOHAVE.—*Miner*, Dec. 13: Mr. Shaw has four men working on the Antelope mine at Wallapai mountain. They are running a tunnel to tap the main shaft, and when this is done we may look for large shipments of ore from this mine, which is one of the best in the district. There are about twenty-five men working in the Lost Basin. Stevens & Co.'s new mill is expected to be running in about two weeks. There are four men at work on the American Flag mine, at Wallapai mountain, and from all reports the owners of this valuable property are making money rapidly. W. H. Hardy has three men at work on the infallible mine at Stockton Hill. John K. Mackenzie has struck another good body of ore in the north drift of the Cupel mine.

COLORADO.

REPUBLICAN MOUNTAIN.—*Georgetown Courier*, Dec. 10: A *Courier* representative visited the property of the Republican Mountain Silver Mines Company last Friday, and was surprised at the immensity of the mine and the amount of rich ore exposed. The property is located on Republican mountain, within one mile of Georgetown, and consists of the Everett, Morning Star, South America, Fenian and eight other claims, embracing 10,000 linear feet of veins covered by patents. The location is superb, for unlike many other mines situated so far from ore markets that the expense of transportation greatly lessens the profits or prohibits the working of lodes, or where the snow-fall is so great as to impede or prevent mining during several months of the year, these mines are near the ore markets and transportation charges are small. The Everett tunnel has been driven 800 feet for the development of the property. At 450 feet the Morning Star vein is intersected at a depth of 250 feet from the surface. Over 300 fathoms of ground have been stope out above the east level, and the work of extracting mineral still goes on. The workings are all substantially timbered under the personal supervision of B. C. Catren, and are planned in a manner that renders the work of developing the property systematic and economical. The mine is self-drained, and rock from the upper workings is dumped down the shaft to the tunnel level and trammed to the dump. Some excellent ore bodies are to be seen, and although the work being done is confined almost entirely to development, sufficient ore has been extracted to defray all expenses for the past six months. At present a force of 35 men is employed, with a monthly payroll of over \$3000. The character of the mineral is galena, gray copper and a little native silver, and occurs in veins ranging from one to ten inches wide. The ore mills from 100 to 600 ozs. in silver to the ton and an average of 20 per cent in lead. It is estimated that over 8000 fathoms of ground are opened ready for stopeing, and the amount is being increased daily. In addition to the lodes mentioned, the company owns a valuable mill-site and water power near the mouth of the tunnel upon which a force of men is at present employed in excavating for and laying the

foundation of a mill which the company contemplates erecting this winter, for crushing, sampling and concentrating ores.

IDAHO.

KETCHUM NOTES.—*Keystone*, Dec. 7: The deep tunnel at the Senate mine, Galena, is still being pushed ahead. Hunt's placer claim at Salmon Falls is yielding steadily from \$500 to \$600 per month. A force of six men was put to work on the Japan mine, on Carbonate Hill, under the foremanship of Captain Ritchie. The Vienna Mining & Milling Co. has reduced its force to fifty hands. The prospects are favorable for an all winter's run. The Morison Group of mines at Bullion, including the Nellie, Sim, Vanderbilt, Belle of the West, Mormon Girl and Homestake, have been leased for eight months to Billy Welsh and Thos. Winsted. Pinkham & Lewis' interest in the Carrie Leonard mine, on Little Smoky, was sold on Tuesday, the 1st instant, to Wm. H. Watt and J. O. Swift of Hailey for \$6,500 cash down. The Carrie Leonard has been a dividend-paying mine all season and is at present a fine looking property. The price paid is thought to be low. M. Carrey, lessee of the Tenbroke, shipped to the smelters last week the finest lot of ore that ever came from the hills of Warm Springs Creek. It was nine tons, running 75½ per cent lead and 158 ounces per ton in silver. This is really beyond the custom of that little mine, but quite consistent with Mr. Carrey's usual good fortune. The Irving under his management is looking excellent—a twenty-inch vein of good ore having been struck last week. This mine will probably make the next shipment.

STRUCK IT RICH.—*Idaho World*, Dec. 9: The Silver Chief boys are jubilant over the strike in the air crosscut, some 20 feet north, and a little to the west of the main shaft, at a depth of 72 feet from the surface and 200 feet west of the Banner mine. The character of the ore is similar to that of the Banner, being ruby, native, horn, brittle and antimonial silver. The vein at this point is 10 inches in width, and the ore easy to extract, the hanging wall being quite soft while the foot wall is solid porphyry, which is one of the best formations known for silver. Samples of the rock were assayed by the Elmira Company's assayer, Mr. Preswick, and the result was as follows: No. 1 sample, \$151.26; No. 2, \$49.77; average, \$100. This is considered extra good for this depth. The mine is well supplied with timbers, lumber and provisions to run until next June, by which time a large amount of rich ore will be hoisted to the surface.

MONTANA.

GOLD FIELDS.—*Inter-Mountain*, Dec. 9: A private letter received Sunday from a gentleman for whose word we can vouch, says: "The statement that Billy Edwards and others took out \$30 a day to the man for the past week is true. The claims have paid good wages all summer, but it is only recently that the boys struck it rich. I have a claim there that may prove valuable, but do not allow myself to dream of millions, for as a general thing, a miner's dreams of wealth dissolve in thin air, and he suddenly awakens to find himself confronting the cold question of 'grub.' But it is safe to say that a discovery of great importance has been made that will add many thousands to the wealth of the territory. The benefits derived will be perceptibly felt through out this entire section of the territory. A number of promising leads have been discovered. Prominent among them is the Fair View, which has been developed to some extent. One or two lots were tested at the reduction works and paid a profit over cost of mining, milling and freight charges, but as the owners were well-to-do ranchmen, they were content to patent their claims and wait more favorable conditions for development work than have yet existed. Looking at the matter from the most conservative standpoint, I think it safe to say that the new diggings will pay well, and as a result we will have many bonanza quartz leads added to those already in the territory."

LARGE MINING SALE.—*Helena Independent*, Dec. 11: For some time past negotiations have been pending in regard to the purchase of the Alpha and Omega mines, situated in Stemple District, about 35 miles north of Helena. These mines are located on a high ridge trending east from the main range, and are an extension of the well-known and valuable property known as the Homestake mine. The country rock is slate, and the vein matter is a soft quartz material, carrying a high percentage of gold. The mines are easily worked, requiring very little, if any, blasting, and will no doubt prove valuable when proper facilities for treating the ore are at hand. The Homestake, which is on the same vein, and has the same characteristics, has produced \$10,000 a month for the last seven months with a five-stamp mill, and the tailings run as high as \$30 in gold. Adjoining the Omega mine on the west is the Badger, which has been developed but little. Then comes the Bachelor, a fine property, which joins the Homestake. The Bachelor is developed by a tunnel over 300 feet long, which taps the lead at a depth of 200 feet, showing a good vein of rich ore. The Alpha mine has a tunnel run in at right angles with the lead, 335 feet in length. The perpendicular depth is 150 feet. The vein is small but rich. The country is well timbered, and at the base of the hill on the north runs Virginia creek, affording all the milling facilities that may be required. It is proposed to erect a mill on the ground at once, and prosecute the work of the mine.

NEW MEXICO.

WORK ON THE MINES.—*Socorro Bulletin*, Dec. 6: The Specie mine, owned by Chas. Blanchard, is now the scene of activity, and dumping good grade dry ore. Mike Wallace, last Monday, leased his Iron and George Belle claims in Water canyon to the Graphic Mining and Smelting Co., of this city. Mr. Kone-man, on Tuesday, dispatched a full quota of mineral to his Water canyon mines, with all necessary material, in charge of Mr. Douglas Brown. Bumbaugh & Peterson are working their Carbonate Queen in the Socorro district, and have up this date accomplished 400 feet of tunneling and shaft work, and will continue operations. We hear that Capt. H. M. Day, the well known Black Range miner, who is now in the city, will take charge of the Reserve mine in the Socorro district, and superintend the continuation of the work on that property. He will go some

200 feet further into the mountain. The Sheffield mine, in the Socorro district is dumping an excellent grade of silver chloride ore. The Graphic M. and S. Co., of this city, shipped 90 tons of bullion during the month of November last. The plant is running smoothly, principally on Graphic ore, and has run without interruption since it blew in. The two stacks are in full blast. R. N. Graham this week purchased of W. F. Eichbaum, of Albuquerque, one-half interest in the Modoc, La Luna and La Luna Fraction. These properties are in the Pueblo district, and make a good showing of mineral. The Brittenstene M. and M. Co. made a clean-up at their plant, in the Pueblo district last week, and ran out three gold and silver bricks, which have been expressed to the mint. The hopper of the Merritt stamp mill in Socorro is full of ore, and an immense body of it surmounts the hopper. Teams continue every day to augment this pile of silver ore.

UTAH.

REVIEW.—*Salt Lake Tribune*, Dec. 11: The output of the Ontario for the week was \$14,166.87, making its total yield for this year to date, \$1,521,112.18, out of which twelve dividends of \$75,000 each have been paid, and the thirteenth will come at the end of this month. The Stormont sent up three bars of silver on the 17th, from the Sandstone district, valued at \$4,300. The Horn Silver is reported as showing signs of renewed life, employing more men and apparently getting ready for something better than the restricted and non-productive operations of the past ten months. The Hanauer smelter turned out five cars of bullion during the week, valued at \$15,650; the Germania, five cars, \$11,693.20. Alice bullion, eighteen bars, valued at \$18,327.13, was received during the week. Ore receipts were—of miscellaneous, \$26,436.25; Queen of the Hills, Idaho, \$2,500; Sprucemont, \$4,100; Crescent, \$3,300; Milkmaid, \$241.95.

New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department 10, San Francisco.

NYE MINING CO.—Dec. 12. Location Nye Co., Nev. Capital stock \$500,000 in 100,000 shares. Directors, J. M. English, M. C. Fisher, Wm. J. Donlon, and Wm. D. Johnson.

ANGELS' QUARTZ MINING CO.—Dec. 12. Location, Calaveras Co. Cal., Capital stock \$100,000, in 1,000 shares. Directors, James V. Coleman, C. W. Tozer, H. C. McPike, Sands W. Forman and T. J. Schuyler.

BANKERS AND MERCHANTS' MUTUAL LIFE ASSOCIATION.—Dec. 10. Object: To equalize the risk of death and to pay to the nominees of such members as may die, stipulated sums of money. The corporation has no capital stock. Directors are: Alexander Badlam, W. H. Brown, Thomas R. Hayes, I. B. Thurman, R. W. Murphy.

HOSPITAL FOR CHILDREN AND TRAINING SCHOOL FOR NURSES.—Dec. 9. There is no capital stock; the institution not being organized for profit. Directors are: Irving M. Scott, Andrew S. Hallidie, Pierre B. Cornwall, John F. Merrill and W. Frank Whittier.

BUSH STREET RAILWAY CO.—Dec. 9. Object: Running and operating by wire cables or locomotive engines a railroad commencing at the intersection of Seventh and Channel streets, along Seventh to Market, across Market to the intersection of McAllister and Jones, along Jones to a point northerly to the property under control of the State of California; and also commencing at the intersection of Market and Bush streets, along Bush to Central avenue, along Central avenue to Sacramento, to First avenue, to D, to the ocean beach. Capital stock \$1,000,000 in 10,000 shares. Directors, Abner Doble, William Center, William Hanson, John S. Wright and Adam Grant.

Mining Share Market.

Hale & Norcross has enlivened the market a little, but whether the cause is due to supposed developments, or merely a stock deal, it is hard to say. The *Enterprise* says, however, that it is a fact that the diamond drill did bring forth rich borings indicating a good ore vein or deposit to the northeast from the face of the main north lateral drift on the 3100 level, and the upraising in the ore body above the 3000 level has developed a deposit of ore which assays high and from which a considerable quantity is being raised to the surface for milling. The workings at this point will be extended up to the 2900 level, extracting and milling the ore as the work proceeds. The main south lateral drift in Chollar, on the 3100 level, has reached the Potosi north line, and stopped in order to put in drain boxes the whole length of the drift to carry off what little water has been met with and any further supply that may be encountered. This will take a couple of weeks, after which future operations, whether to continue on into or through the Potosi, or to crosscut east in Chollar, will be decided upon. The usual progress of exploration and development is being made in all the principal working mines.

Bullion Shipments.

Argus, Dec. 12, \$534; Monitor, 5, \$25,570; Richmond Con. 10, \$15,813; Oro Grande Mill, 12, \$3775; Odessa Mill, 12, \$4100; Koebig Bros. Mill, 12, \$1000; Germania, 8, \$2414; Hanauer, 8, \$12,900; Sprucemont, 8, \$4100; Stormont, 8, \$4300; Queen of the Hills, 8, \$1200; Germania, 9, \$2559; Hanauer, 10, \$2750; Crescent, 10, \$3300; Alice, 7, \$8389; Alice, 8, \$6232; Hanauer, 11, \$4940; Nevada, 11, \$2200; Queen of the Hills, 11, \$1100; Alice, 11, \$11,990; Hanauer, 12, \$2500; Germania, 12, \$5662; Hanauer, 13, \$7560; Germania, 13, \$2730; Crescent, 13, \$4200. Following were the ore and bullion shipments from San Lake city for the week ending Dec. 12th. Twenty-one cars of bullion, 521,133 pounds, 18 cars of ore, 529,490 pounds, and two cars of copper ore, 71,350 pounds.

TATUM & BOWEN,

25, 27, 29 and 31 MAIN STREET, SAN FRANCISCO.

91 and 93 FRONT ST., PORTLAND, OREGON.

Manufacturers of

MINING MACHINERY, ENGINES, BOILERS, Etc.

We are manufacturing from Special Designs of the most experienced and successful Practical and Scientific Experts, Complete Plants for all descriptions of Mining Operations, as follows:

CONCENTRATING MACHINERY—Best and Cheapest, Cornish Rolls, all Steel Wearing Parts, Most Practical Styles of Two, Three and Four Compartment Double and Single Jigs, Sizing Screens, Patent Hydraulic Separators, Tables and Concentrators.

STAMP MILLS for Reduction of Gold and Silver Ores, whether free milling or base. Most useful and substantial styles of Single and Double Discharge Mortars, Wet or Dry Crushing.

STEEL SHOES AND DIES, Tappets and Cams, cheapest and best Blake Improved Rock Crushers and Automatic Ore Feeders, Superior Amalgamating Pans with wood or iron sides.

PANS FOR TREATING GOLD ONLY, Settlers, Clean-Up Pans, Retorts, Furnaces, Dump Cars, Hoisting Machinery, Cages, Landing Dogs, etc.

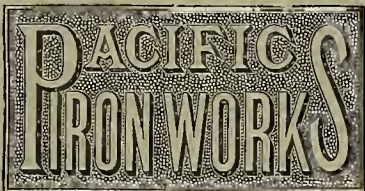
CORLISS, MEYER'S CUT-OFF AND BALL'S PATENT VALVE Engines of extra strength and durability.

STEEL BOILERS of Two Sheets only, Steel Economic Boilers, combining with the safety, durability and economy of the Stationary Boiler, the convenience and portability of the Portable. It occupies but little space, and is the best and cheapest boiler ever made.

WE ALSO MANUFACTURE SAW MILL MACHINERY.

We are also Sole Agents for the Gordon and Maxwell Steam Pumping Machinery, and carry a full stock of all kinds of Mill Supplies, including the

Albany Lubricating Compound and Oils.



1850. 1885.
RANKIN, BRAYTON & CO.,
...BUILDERS OF...
MINING MACHINERY.

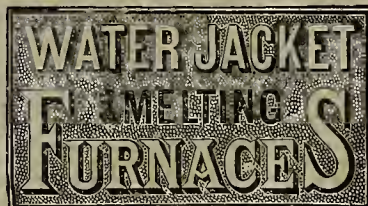
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

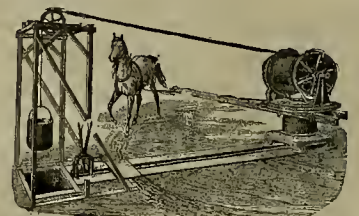
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnaces CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER of INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



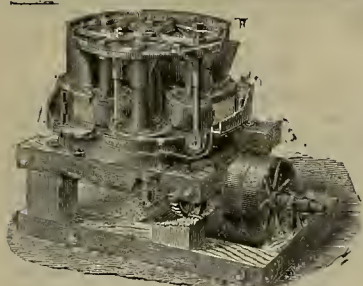
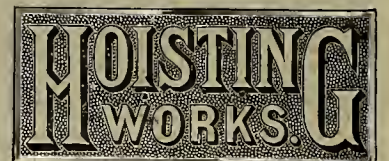
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ore.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY of CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000 pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.



Centrifugal Roller Quartz Mill.

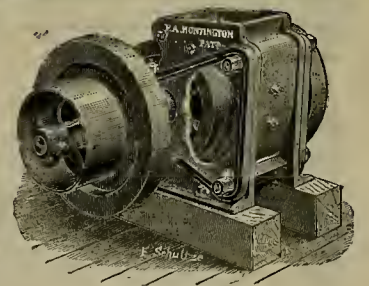
F. A. HUNTINGTON, MANUFACTURER OF

Centrifugal Roller Quartz Mills, CONCENTRATORS AND ORE CRUSHERS,

Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. Note:—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve, Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.
MACHETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.
WILSON'S PATENT GAS-PRODUCER.
STEAM BOILERS of all descriptions.
SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.
STEAMSHIPS—Steam Yachts, Marine Engines and BOLLERS, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

San Francisco Cordage Factory.

Established 1858.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

TUBBS & CO.

611 and 613 Front St., San Francisco.

INVENTORS, TAKE NOTICE!

L. PETERSON, MODEL MAKER,

258 Market St., N. E. cor. Front (up stairs), San Francisco.
Experimental machinery and all kinds of models, Tin, Copper, and Brasswork.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOGGING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AGENTS DYER CANNON BALL QUARTZ MILL
222 & 224 FREMONT STREET, SAN FRANCISCO.

AN EXTRAORDINARY RAZOR

HAS BEEN INVENTED BY THE QUEEN'S OWN COMPANY, of England. The edge and body is so THIN and FLEXIBLE AS NEVER TO REQUIRE GRINDING and hardly ever setting. It slides over the face like a piece of velvet, making shaving quite a luxury. It is CREATING A GREAT EXCITEMENT in Europe among the experts; who pronounce it PERFECTION. Two dollars in buffalo handle; \$3 in ivory. Every razor, to be genuine, must bear on the reverse side the name of NATHAN JOSEPH, 641 Clay street, San Francisco, the only place in the United States where they are obtained. Trade supplied; sent by mail 10c. extra, or C. O. D.

"PHONOGRAPHY as a School Study," sent free to Teachers. Address Prof. Elias Longley, Woodbury's Business College, Los Angeles, Cal.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

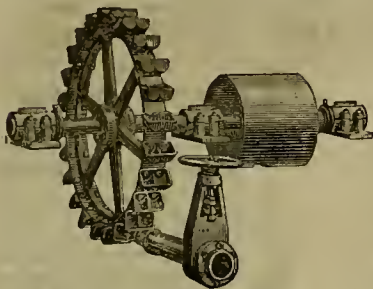
WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 per cent., distancing all competitors. Send for Circulars and guaranteed estimates.

L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

RICHARD C. REMMEY, Agent,

Philadelphia Chemical Stoneware Manufactory,

1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware —FOR— Manufacturing Chemists. Also Chemical Brick for Glover Tower.

THE FAMOUS

The most wonderful Curative Agent in the world. Full Power Belt, for Lady or Gentleman, price \$10.

Cures without the aid of Medicine General Debility, Nervous Prostration, Rheumatism, Neuralgia, Sciatica, Disease of the Liver, Paralysis, Kidney or Bladder, Constipation, Seminal Weakness, Dyspepsia, Female Weakness, Sick Headache, Insipient Catarrh, Insipient Consumption, Lame Back, and many other diseases.

For particulars and Circulars address

GALVANIC BELT SOLE PROPRIETORS,

330 Sutter St., San Francisco.

N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.



SAW MILLS AND MACHINERY

Of all kinds made to order. Send for Descriptive Catalogue. 17 and 19 Fremont St., San Francisco.

PATENT

LIFE-SAVING RESPIRATOR

Entirely Prevents Lead Poisoning and Salivation

The most perfect appliance for people engaged in Smelting, Dry Crushing, Guano Works, Quicksilver Mines, Lead Corroding, and all other occupations where there is dust, poisonous vapor, or bad odor.

In Feeding Threshing Machines, and similar work, they are indispensable, as no foreign substances can be inhaled when they are worn.

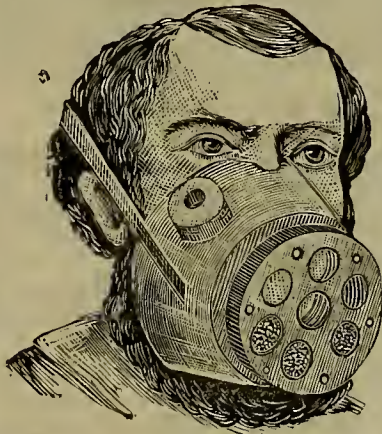
The Respirators are sold subject to approval after trial, and if not satisfactory the price will be refunded. Price, \$3.00 each or \$30.00 per dozen. Sent post-paid to any address on receipt of price.

Address communications and orders to

T. E. JEWELL, Sole Agent,

330 Pine St. (Room 4) San Francisco.

Send for Descriptive Circulars containing Testimonials of well-known parties who are at present using them.



SOLE AGENTS

"HOYT'S" Pure Oak, Short Lap Leather Belt.

WARRANTED.

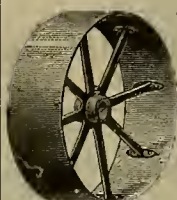
J. W. GIRVIN & CO., No. 24 California Street, San Francisco, Cal.



ALL KINDS OF HOSE.

ROCK DRILL HOSE

Wound with Flat Steel Spring Wire, The BEST ROCK DRILL HOSE Made



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

Send for CIRCULAR AND PRICE LIST.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.

The most Complete Compound manufactured in America.

Far and away ahead of anything in market. A great California invention.

Fire-Proof, Water-Proof, Acid and Alkali-Proof.



Property Owners are interested personally

In seeing that their roofs are painted or repaired only with the

P. & B. Paint Try our Compounds for Water-proofing and Preserving Canvas, Rope, and Leather.

PARAFFINE PAINT CO., Sole Manufacturers and Patentees, No. 310 California Street, San Francisco.

DEWEY & CO., { No. 252 MARKET ST. } PATENT AGENTS. { Elevator, 12 Front. }

Metallurgy and Ores.

SELBY

SMELTING and LEAD CO.,

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

...MANUFACTURERS OF...

BLUESTONE,

LEAD PIPE,

SHEET LEAD,

SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges, Under Chamberlin Patent.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt),

Mining Engineers and Metallurgists.

Pacific Reduction and Metallurgical Works.

SALAZAR & KUSTEL.

Location of Works: Melrose, Alameda Co., Cal.

Office: 318 Pine St., San Francisco.

Gold and silver ores of every description, from \$10 upward per ton; Jewelers' sweepings and scrapings bought or worked for the owners at a fixed rate per ton. Rebellious ores especially solicited. Ores worked and practical working tests made by any process, to wit: Amalgamation in battery and copperplates for free gold ore. Amalgamation in pans for silver and gold ore, with or without roasting. Leaching of silver ore. Chlorination of gold sulphurets. Assaying, Chemical Analyses of Ores, Metals and other substances.

METALLURGICAL WORKS,

STRONG & CO., 10 Stevenson Street, S. F.

ORES SAMPLED, TESTED, ASSAYED.

THOMAS PRICE,

Chemical Laboratory, Assay Office,

BULLION ROOMS & ORE FLOORS,

524 SACRAMENTO STREET,

SAN FRANCISCO, CALIFORNIA.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

Assayers' Materials,

MINE AND MILL SUPPLIES,

CHEMICAL APPARATUS AND CHEMICALS, DRUG

GISTS' GLASSWARE AND SUNDRIES, ETC.

114-118 Pine Street, - San Francisco

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we are confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for Plumbago Crucible Co., London, England.

JOHN TAYLOR & CO.

J. KUSTEL.

H. KUSTEL.

METALLURGICAL WORKS,

318 Pine St. (Basement),

Corner of Leidesdorff Street, - SAN FRANCISCO.

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters. Mines Examined and Reported on.

Practical instruction given in Treating Ores by improved processes.

G. KUSTEL & CO.,

Mining Engineers and Metallurgists.

WM. D. JOHNSTON, ASSAYER AND ANALYTICAL CHEMIST.

118 Leidesdorff Street,

Bet. California and Sacramento Sts., SAN FRANCISCO

ASSAYING TAUGHT.

Personal attention insures Correct Returns.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINES.
Baker Divide M Co.	California.	10.	25.	Oct 29.	Dec 1.	D. M. Kent.	330 Pine St
Buchanan M Co.	California.	14.	15.	Oct 30.	Dec 5.	P. J. Sullivan.	121 Post St
Bulwer Con M Co.	California.	2.	20.	Oct 29.	Dec 10.	W. Willis.	309 Montgomery St
Daisy Cement M Co.	California.	5.	02.	Nov 15.	Dec 23.	J. Collins.	512 Montgomery St
General Lee M Co.	California.	7.	01.	Nov 23.	Dec 31.	S. C. E. Gillet.	313 Montgomery St
Golden Fleece M Co.	California.	4.	20.	Oct 00.	Dec 9.	F. Schmeier.	Phelan Block
Golden Jacket M Co.	Nevada.	1.	05.	Oct 27.	Dec 3.	R. G. McClellan.	331 Montgomery St
Gould and Curry S M Co.	Nevada.	51.	25.	Dec 4.	Jan 8.	A. K. Durbow.	309 Montgomery St
Hathaway Hyd M Co.	California.	1.	45.	Dec 8.	Jan 18.	J. H. Moore.	Montgomery Block
Justie M Co.	Nevada.	43.	10.	Nov 25.	Dec 30.	R. E. Kelley.	419 California St
Julia Con M Co.	Nevada.	21.	10.	Nov 4.	Dec 9.	J. Stefield.	419 California St
Mexican Development Co.	Mexico.	2.	10.	Dec 9.	Jan 17.	A. G. Nunez.	708 Montgomery St
North Gould & Curry M Co.	Nevada.	9.	20.	Nov 23.	Dec 24.	H. C. Mason.	331 Montgomery St
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	H. Deane.	409 Montgomery St
New York Hill M Co.	California.	9.	15.	Oct 30.	Dec 30.	J. B. Leighton.	313 Montgomery St
Navajo M Co.	Nevada.	13.	02.	Nov 20.	Dec 23.	J. W. Pew.	310 Pine St
North Peer M Co.	Arizona.	2.	02.	Nov 7.	Dec 10.	J. H. Deane.	339 Montgomery St
Potosi M Co.	Nevada.	21.	10.	Dec 9.	Jan 17.	A. G. Nunez.	708 Montgomery St
Russell Reduction & M Co.	California.	1.	25.	Oct 15.	Dec 23.	J. Morizo.	328 Montgomery St
Sunmit M Co.	California.	8.	05.	Oct 23.	Nov 30.	G. W. Sessions.	309 Montgomery St
Trinity M Co.	California.	1.	10.	Nov 2.	Dec 8.	G. W. Pearson.	417 Kearny St
Virginia Creek Hyd M Co.	California.	5.	05.	Dec 14.	Jan 19.	J. M. Quay.	406 Montgomery St
Willow Creek M Co.	Nevada.	2.	10.	Oct 15.	Dec 14.	R. E. Eilon.	310 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Equitable Tunnel M Co.	Utah.	C. J. Collins.	512 Montgomery St.	Annual.	Dec 21
Gold Canon M Co.	California.	F. A. Berlin.	419 California St.	Special.	Dec 22
Gorilla M & M Co.	California.	A. Enquist.	328 Montgomery St.	Annual.	Dec 30
Gould & Curry S M Co.	Nevada.	A. K. Durbow.	309 Montgomery St.	Annual.	Dec 21
Ithaca Con M Co.	California.	W. Granger.	Phelan Block.	Annual.	Dec 26
Live Oak Drift M Co.	California.	C. Collichsown.	328 Montgomery St.	Annual.	Dec 25
Mt. Diablo M Co.	W. Nevada.	R. W. Hecox.	316 Pine St.	Special.	Dec 21
Selby Smelting Co.	California.	Called by Directors.	416 Montgomery St.	Special.	Jan 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Calcedonia M Co.	Nevada.	W. L. Oliver.	328 Montgomery St.	10.	Nov 25
Jackson M Co.	California.	D. C. Bates.	419 California St.	10.	Oct 5
Mahattan S M Co.	Nevada.	John Crockett.	419 California St.	25.	Sept 1
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	25.	Dec 15
Syndicate M Co.	Nevada.	J. Stefield Jr.	419 California St.	10.	Dec 21

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 25.	WEEK ENDING Dec. 3.	WEEK ENDING Dec. 10.	WEEK ENDING Dec. 17.
Alpa.	.60	.70	.60	.40
Andes.	.20	.30	.20	.15
Argenta.	.10	.20	.10	.05
Belcher.	1.30	1.35	1.30	1.45
Belding.	1.15	1.25	1.15	1.20
Best & Belcher.	1.15	1.05	1.30	1.15
Bullion.	.35	.30	.35	.25
Bonanza King.	.10	.10	.10	.10
Belle Isle.	.10	.10	.10	.10
Bodie Con.	1.90	2.20	1.75	2.00
Benton.	.10	.10	.10	.10
Bodie Tunnel.	.10	.10	.10	.10
Bulwer.	.30	.35	.30	.35
California.	1.30	1.40	.25	.80
Challenge.	.20	1.25	1.40	.15
Champion.	.50	1.10	.10	.35
Chollar.	.50	1.10	.10	.35
Confidence.	.90	1.05	1.00	.90
Con. Imperial.	1.30	1.40	.10	.35
Con. Virginia.	.70	1.10	.25	1.40
Con. Pacific.	.70	1.10	.25	1.40
Crowa Point.	1.60	1.75	.80	1.00
Day.	.10	1.30	1.60	.25
Eureka Con.	2.50	2.75	.25	2.25
Eureka Tunnel.	.20	.30	2.50	.25
Exchequer.	.25	.25	.25	.20
Grand Prize.	.25	.25	.30	.25
Gould & Curry.	.65	.80	.60	.70
Goldbar.	.10	.10	.10	.05
Hale & Norcross.	3.60	3.90	3.05	3.70
Holmes.	4.00	4.50	5.00	7.50
Independence.	.10	.10	.10	.10
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Martin White.	.10	.10	.10	.10
Mono.	4.70	6.00	5.75	5.75
Mexican.	.70	.80	.65	.75
Mt. Diablo.	2.30	2.60	.10	2.65
Northern Belle.	.25	.35	.10	.50
Navajo.	.35	.10	.50	.50
North Belle Isle.	.10	.10	.10	.10
Occidental.	.10	.10	.10	.10
Ophir.	1.05	.90	1.05	.90
Oreman.	.20	.30	.25	.25
Potosi.	.45	.50	.25	.30
Pinal Con.	1.60	1.60	1.50	1.95
Sage.	.10	.10	.10	.10
Seg. Belcher.	.70	.90	.60	.75
Sierra Nevada.	.70	.90	.60	.75
Silver Hill.	.10	.10	.10	.10
Silver King.	.10	.10	.10	.10
Scorpion.	.10	.10	.10	.10
Syndicate.	.10	.10	.10	.10
Tioga.	.10	.10	.10	.10
Union Con.	.45	.60	.45	.55
Utah.	.65	.60	.50	.65
Yellow Jacket.	1.60	1.80	1.30	1.50

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Dec. 17.	825 Hale & Nor.	3.80@6.85	
200 B. & Belcher.	1.10	10 Holmes.	12.00
80 Bodie Con.	1.65@1.70	100 Justice.	.05
100 Bulwer.	.55c	200 Mexican.	.65c
100 Belcher.	.9c	900 Mono.	4.25@4.40
240 Bullion.	.25@.30	145 Mt. Diablo.	1.00
100 Chollar.	.75@.80c	260 Navajo.	.35c
50 Confidence.	.75c	400 Ophir.	.60c
150 Crown Point.	.70@.75c	200 Potosi.	.15c
100 Con. Pacific.	.55c	350 Savage.	.15c
24 Con. Va. & Cal.	1.25	200 Sierra.	.55c
140 Exchequer.	.15c	50 Union Con.	.40c
100 Gould & Curry.	.55c	50 Yellow Jacket.	.55c

A New Traction Motor.

The Automatic Traction Motor, recently invented by Edward Foskett, is based on the principle of utilizing the power of black powder.

We thus gain high power, rapid motion, quick application, with little weight, compact compass, and widespread distribution of fuel—all being essential elements of a good machine and its use.

The control of our fuel, the power from which we draw our force and store it, to use as required, is gained by a simple combination of plain mechanics. The power is started, increased, slackened, or stopped, by a brake.

The uses in the industrial field are limited only by amount of ingenuity applied.

As a highway motor, the model promises all that the "Puffing Billy" or the "Comet" did in locomotive growth. Recognizing its weight, strength and rapidity, it makes a strong appeal to solve the problem of aerial and circumpolar navigation, including numerous intermediate fields of usefulness, such as propulsion of street cars, etc. By this device, the snappish dictator of uncertain warlike conflict has become the glad protector of peace and the relief of labor. The unerring hand of inventive genius has thus stamped another epoch in progress.

Steam has a pressure of 200 pounds to the square inch; powder, over 60,000 pounds. Time and force are prime factors in overcoming resistance; as force is superabundant, time is decreased and vice versa.

We wish to investigate this force of nature now lying in the palm of enterprise, and develop a traction engine. We ask investigation, and invite capital to lend its assistance and share the rewards of a great improvement.

Those desirous of further information please call on, or address, D. N. DILLA, Adeline, near 34th Street, Oakland, Cal.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

AARON'S TESTING AND WORKING SILVER ORES.—Illustrated, 114 pages. 1876. A useful and practical work from technicians and extremely serviceable for miners' use. Post-paid, \$2. Published and sold by Dewey & Co., S. F.

SHORTHAND TAUGHT BY LETTER.

Prof. Elias Longley, of Woodbury's Business College, Los Angeles, Cal., author of "Electric Manual of Phonography," "Reporters' Guide," "Phonographic Dictionary," etc., gives lessons by letter as well as personally. First lesson free. Address as above.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 600 South 10th St., Philadelphia. Branch Office—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

Phoenix Assurance Company, OF LONDON, ENGLAND, ESTABLISHED 1782.

CASH ASSETS, \$5,364,504.50.

British America Assurance Comp'y, OF TORONTO, CANADA, ESTABLISHED 1833.

CASH ASSETS, \$1,433,400.46.

Western Assurance Company, OF TORONTO, CANADA, ESTABLISHED 1851.

CASH ASSETS, \$1,411,086.29.

BUTLER & HALDAN, Gen'l Ag'ts for Pacific Coast, 413 CALIFORNIA STREET, SAN FRANCISCO.

Chicago Prices Beaten! ESTABLISHED 1860. S. F. PIONEER SCREEN WORKS, 221 & 223 First St., cor. Tehama, S. F. J. W. QUICK, Prop'r. Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chases, Cement and Shot Mills, Separators, Revolving and Shot Screens, Skatup Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.

W. E. CHAMBERLAIN, JR. T. A. ROBINSON.

PACIFIC Business College, 320 POST ST. S. F. CALIF. RETURNED TO NEW BUILDING, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers. LIFE SCHOLARSHIPS.....\$75. Ladies admitted into all departments. Day and Evening Sessions during the entire year. Call, or send for CIRCULAR to CHAMBERLAIN & ROBINSON, Prop'rs.

Returned to new building, former location, 320 Post street, where students have all the advantages of elegant halls, new furniture, first-class facilities, and a full corps of experienced teachers.

LIFE SCHOLARSHIPS.....\$75. Ladies admitted into all departments. Day and Evening Sessions during the entire year. Call, or send for CIRCULAR to CHAMBERLAIN & ROBINSON, Prop'rs.

A COLOSSAL WORK COMPLETED.

A Book for all Persons who Make, Buy, Sell, Use, or Want to Know anything about Tools or Machines, or are curious as to the History and Development of Mechanic Art.

KNIGHT'S American Mechanical Dictionary.

THE RIVERSIDE PRESS, CAMBRIDGE, MASS. For particulars, apply to WM. S. DUNCOMBE, Agent or the Pacific Coast, 211 Post St., San Francisco.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT NO. 51.

Levied.....December 4, 1886
Due in Office.....January 8, 1886
Amount.....25 Cents per Share
Sale Day.....Monday, February 1, 1886
ALFRED K. DURBROW, Secretary.

OFFICE—Room 69, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

C. H. ARRON, ASSAYER AND METALLURGIST,

NOGALES, ARIZONA, Will attend to business in connection with mines in Sonora or Arizona.

California Inventors

Should consult DEWEY & CO., AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as journalists and large practices as Patent attorneys, enable them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PATENT ROYAL PRESS, No. 262 Market S. S. F. Elevator, 12 Front St.

BADGES FOR ALL SOCIETIES,

Police, firemen, etc., presentation prizes or charms, in gold, silver, or metal, sold at society prices by the agents of the Universal Badge Manufacturing Co., NATHAN JOSEPH & CO., 641 Clay St. Workmen and K. of P. badges in gold, \$1 each, sent C. O. D. Trade supplied.

RUPTURE! A New Invention! The "Perfection" Belt Truss, with Universal Joint Movement and Self-adjusting Spiral Spring. Worn with perfect comfort and tightness day and night. Price, \$3.00. Call or send for descriptive circular. Address, J. H. WIDBER, (Druggist) 701 Market Street, cor. Third, San Francisco.

CALIFORNIA HAND ROCK DRILL

—FOR— Drifting and Sinking.

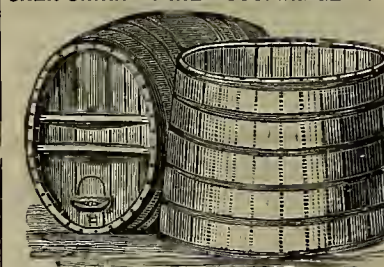
Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 300 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.

Machines on exhibition at No. 32 First St., San Francisco. Send for circulars.

C. O. BARLOW, General Manager.

WATER TANKS! WINE TANKS!

CALIFORNIA WINE COOPERAGE CO.



FULDA BROS., Proprietors, 30 to 40 Spear St., San Francisco.

ALL KINDS OF CASKS, TANKS, Etc.

SHIP, MINING, and WATER TANKS a Specialty.

American Exchange Hotel, SANSOME STREET,

Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.

This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.

Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.

Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.

MONTGOMERY BROS., Proprietors.

MISS BISBEE'S SCHOOL

FOR YOUNG LADIES,

1020 Oak Street, Oakland, Cal.

WILL RE-OPEN

Wednesday, January 6, 1886.

For Mining Share Market, Bullion Shipments, Etc., see page 409.

INSTRUCTIVE: Microscopes for boys at Muller's optical depot, 135 Montgomery St.

THE CELEBRATED Woodbury Oils.

Pure, Perfect, Uniform!

The WOODBURY OILS are in use on the Central and Southern Pacific Railways, and on nearly every railroad and steamship line on the coast.

We are not agents for other manufacturers, but have our own works, and adapt here all our Oils to the requirements of home machinery and our climate. We can show recommendations and records of tests, showing a saving to our customers of 50 per cent on their lubrication last year. Address

CHARLES J. WOODBURY,
123 California St., San Francisco.

WORKS: Cor. Fifth and Townsend Sts



The California
Perforating Screen
Company.

All kinds of Quartz Screens,
slot or round holes; zinc,
copper and brass for

FLOUR AND OTHER MILLS.

Quartz Mill Screens a Specialty.

147 Beale Street, San Francisco.

THE PACIFIC COAST ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.
Frank & Co.'s Woodworking Machinery.
New Haven M'g Co.'s Machinists' Tools.
Bement & Son's Machinists' Tools.
Bickford's Power Drills.
Blake's Improved Steam Pumps.
Perry's Centrifugal Pumps.
Perin Band Saw Blades.
Sturtevant Blowers and Exhausts.
Shimer Matcher Heads.
Brainard Milling Machines.
Turbine Water Wheels.
Bradley Cushioned Hammers.
Massey's Steam Hammers.
Schlenker's Bolt Cutters.
Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.
Atlas Engine Works Engines and Boilers.
Payne's Vertical and Horizontal Engines.
Otto Silent Gas Engines.
Clapp & Jones' Steam Fire Engines.
Pickering Engine Governors.
Judson Engine Governors.
Tanite Co.'s Emery Wheels and Machinery.
Nathan and Dreyfus Oilers.
Korting Injectors and Ejectors.
Disston's Circular Saws.
New York Belting and Packing Company's Rubber Goods.
Lane and Bodley Saw mills.
H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

18 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

A Golden Opportunity in Montana

FOR SALE.

20,000 TONS OF SEDIMENT from the tailings of a Gold Mill. Money in a metallic state; will average, gold, \$9.00; silver, \$7.00. Also 5000 feet of placer ground, which paid to ground sluice in 1886. Also 2 water rights. Apply to

BRAND & O'KEEFE,
Gloster Mine, Lewis & Clark Co., Mont.

H. M. RAYNOR,
No. 25 Bond St.,
NEW YORK.

ESTABLISHED
1858.

PLATINUM

FOR ALL

Laboratory

Manufacturing Purposes.

Wholesale and Retail.

Native Platinum and Scrap purchased.



SEND FOR CIRCULAR.

IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

Old Mining Plates Bought, Replated, or Gold Separated. 3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

NOTICE TO MINING MEN!

Silver Plated AMALGAMATING PLATES for Saving Gold.

STOP PAYING FOR SILVER YOU DO NOT GET!

We Guarantee Full Weight in Silver.

GOLD MEDAL AWARDED.

ALL OUR PLATES ARE ASSAYED. Get our prices before ordering elsewhere. Samples furnished on application.

SAN FRANCISCO NOVELTY AND PLATING CO., 21 Stevenson Street.

JUSTINIAN CAIRE, Dealer in Mining Material, Agent, 521 and 523 Market St., San Francisco, Cal.



Iron and Machine Works.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Praces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

THOMAS THOMPSON

THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

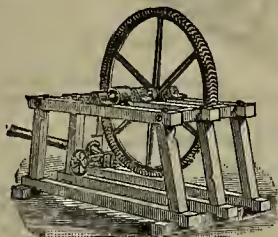
Engineer and Machinist,

119 Beale Street, San Francisco.

— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging MachinesBrodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.Manufacturers of B. E. Henrickson's Patent Automatic
Safety Catches for Elevators. All kinds of machinery
made and repaired. **ORDERS SOLICITED.**

KNIGHT'S WATER WHEEL



For Mills, Pumping and Hoisting.

OVER 300 IN USE!

All Estimates Guaranteed.

SEND FOR CIRCULAR.

EDWARD A. RIX & CO.,

Sole Agent,

18 and 20 Fremont Street, San Francisco.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake. The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,
316 California St., San Francisco.

FULTON IRON WORKS,

HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

San Francisco.

MANUFACTURERS OF



BABCOCK & WILCOX BOILERS.

ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish
Tanks for Salmon Canneries

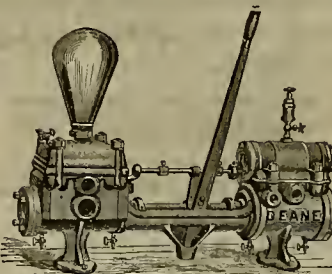
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,
Tustin Ore Pulverizers.

DEANE STEAM PUMP.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought
Iron in any position or for any service.GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MA-
CHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR LOCOMOTIVE AND MARINE FORGINGS.

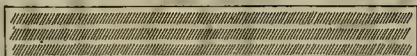
ALSO Steel Rods, from 1/4 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes
Steel Wagon, Buggy, and Truck Tires, Plow Steel, Machinery and Special Shape Steel to size and lengths.
STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled
Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat
Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames,
and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.NEW YORK OFFICE,
ROOM 48,
NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP BATTERIES.

Denver
Office:
No. 248
18th Street,
Denver,
Colo.Mexico
Office:
No. 11
Calle
de Suarez
de Pineda,
Mexico

CLAYTON AIR COMPRESSOR WORKS.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.]
The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

PATENTS. Thousands of Inventors throughout the Pacific Coast can and will willingly test to the promptness, reliability and success of
Lewy & Co's U. S. and Foreign Patent Agency. No. 252
Market St. Elevator, 12 Front St., S. F.



INGERSOLL ROCK DRILLS

...AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large
Ports, will do 20 per cent more work than
the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

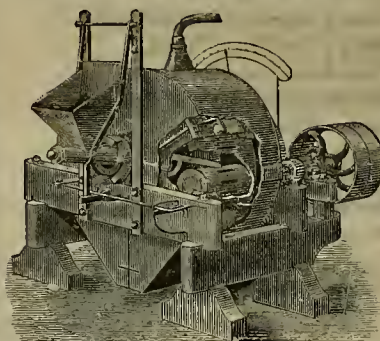
PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

Tustin's Pulverizer

WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.



MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

MACHINE TOOLS,

PRESSES AND DIES,

PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

.....MANUFACTURER OF.....

Canners' and Soap-Makers' Presses and
Dies, 20-inch Engine Lathes,
12-inch Shapers.

Punching and Shearing Machinery for
Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

GOLD MEDAL AWARDED

— AT —

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

For Best Slide Valve Engine
and Boiler Combined.

W. H. OHMEN,

WORKS:

22 Fremont Street,
SAN FRANCISCO.

AUTOMATIC

ENGINES

A Specialty.



SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



Patnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.



Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery
ENGINES and BOILERS.

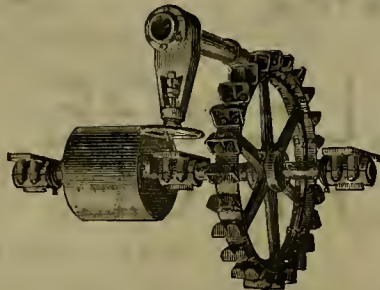
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pumps,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Leffel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE

Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized.
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH.

Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

WIRE FENCING

Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS

For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS

For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON

Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIE, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

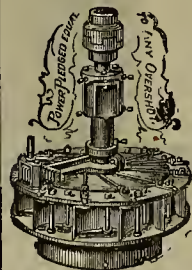
JAS. LEFFEL'S TURBINE WATER WHEEL

"The Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address



JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill. and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.

THE JENKINS STANDARD PACKING



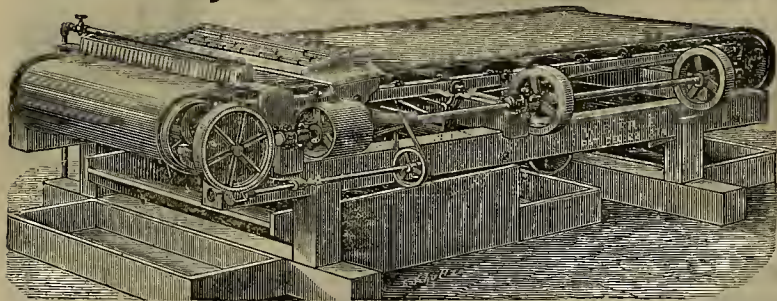
IS ACKNOWLEDGED BY USERS AS THE BEST in the
world. Unlike all other Packings, the Jenkins Standard
Packing can be made any thickness desired in a joint by
placing two or as many thicknesses together as desired, and
following up joint, it vulcanizes in place and becomes a
metal of itself (it is frequently called Jenkins Metal), and
will last for years, as it does not rot or burn out. Avoid all
imitations, as a good article is always subject to cheap imi-
tations. The genuine has stamped on every sheet "Jen-
kins Standard Packing," and is for sale by the Trade
generally.

Manufactured only by

For Sale by
DUNHAM, CARRIGAN & CO., San Francisco, Cal. | **JENKINS BROS., 71 John St. New York.**

DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 220 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

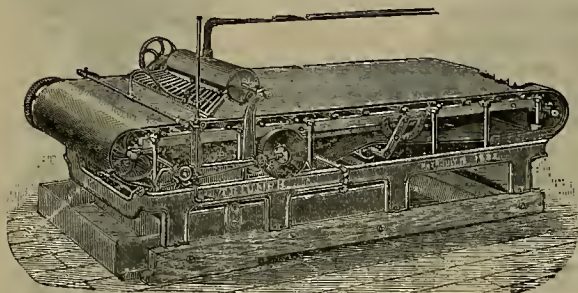
ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.

\$1,000 CHALLENGE ACCEPTED.

PRICE, FIVE HUNDRED AND FIFTY DOLLARS
(\$550.00), F. O. B.



**THE
"TRIUMPH" ORE CONCENTRATOR.**

THE "TRIUMPH" TRIUMPHANT!

In a competitive trial recently had between two of the "Triumph" Ore Concentrators and the same number of "Frue" Vanning Machines, at the mill of the celebrated gold producing Original Empire Mill and Mining Company, in Grass Valley, Nevada County, Cal., the "Triumphs" produced thirteen and fifteen one-hundredths (13.15) per cent more concentrations than did the "Frue" Vanners, during a run of twenty-four consecutive days, or a net gold coin result of \$199.15, or \$8.30 per day, in favor of the two "Triumph" Concentrators.

These returns do not include the value of the amalgam saved by the "Triumphs" during the test; which will add to the net gain. The form of construction of the feed bowl is such that considerable amalgam is necessarily saved, which is lost on the "Frue" Vanners.

This trial was conducted under the personal supervision of the Manager and Superintendent of that Company, in a strictly fair and impartial manner, and with the sole view of determining, in the interest of that Company, the merits and demerits of the respective machines by a thoroughly practical test. A relation of the course of procedure, a concise analysis of assays, and a tabulated statement of the net hullion results, with accurate deductions therefrom, will soon be published in Circular form.

The superiority of the present construction of the "Triumph" over the form originally introduced, together with the demonstrated results of the above, and other trials had with the "Frue" Vanners, induce us to and we hereby accept the Challenge of \$1,000, flaunted by the Agents of the "Frue Vanning Machine Company," and hold ourselves in readiness to enter into a second competitive trial for that sum, at such place and upon such terms and conditions as may hereafter be mutually arranged.

We guarantee purchasers against all costs, expenses or charges incurred by reason of any infringements of any existing patents.

"Put up or shut up," and "Let the Best Machine win!"

JOSHUA HENDY MACHINE WORKS,

Nos. 39 to 51 Fremont St.,

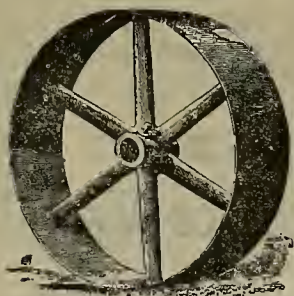
San Francisco, Cal.

JOSHUA HENDY MACHINE WORKS,

Nos. 49 and 51 Fremont Street, San Francisco, Cal.

—DEALERS IN—

NEW AND SECOND HAND BOILERS, ENGINES, AND MACHINERY OF EVERY VARIETY.



PULLEY.

Stationary,
Portable, and
Hoisting Engines
and Boilers.

Improved Single and Double
Circular Sawmills.
SHINGLE MILLS.

Steam Pumps of all Makes.
Centrifugal Pumps.
MINING PUMPS.

BLOWERS

—AND—

Exhaust Fans.
Leather and Rubber

BELTING.



UPRIGHT ENGINE AND BOILER.

MACHINISTS' TOOLS

—COMPRISING—

LATHES,

DRILL PRESSES,

PLANERS, Etc.

WOODWORKING

MACHINERY

—COMPRISING—

Band-Saws,

Sticklers,

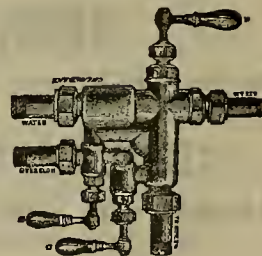
Planers,

Shapers,

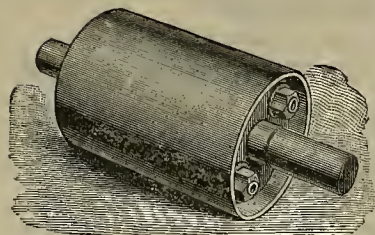
Etc., Etc.



HANGER.



DUPLEX INJECTOR.



PATENT COUPLING.

MINING, QUARTZ, AND SAWMILL MACHINERY.

AUTOMATIC ORE-FEEDERS, HENDY AND TRIUMPH CONCENTRATORS.

—AGENTS FOR THE SALE OF—

Baker Rotary Pressure Blowers, Akron (Ohio) Hot-Polished Shafting,

Wilbraham Rotary Piston Pumps, Blaisdell & Co.'s Machinists' Tools.

WANTED.

Situation by a Competent Chemist,

Graduate of the Imperial Polytechnic Institute at Graz Austria. Expert analyst, assayer, technologist and metallurgist. Would also go to Spanish America. Address care of F. SUSTERLID, Big Spring, Howard County, Texas.

A. T. DEWEY.
W. B. EWER.
GEO. H. STRONG.

Dewey & Co.'s Scientific Press Patent Agency { ESTABLISHED 1860.

INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enabled us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 252 Market St., S. F.

HALF SHARE IN GOLD MINE FOR SALE.

Three full claims; one claim developed; 400 feet shafts and tunnels. Mill test 31 tons gave 25 ounces gold, 3 ounces silver per ton; 100 tons gave \$20 gold per ton on plates and \$20 in tailings; 14 tons gave \$7 per ton on plates. Custom mill within 6 miles of mine. For further particulars apply to G. W. SPAWFORTE, Lang Station, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 26, 1885.

VOLUME LI
Number 26.

Shipments of Gold.

Very heavy shipments of gold are now being made from New York to Europe. It is stated that the most direct cause of this is to be found in the extremely light shipment of grain to Europe, especially wheat, while the visible supply of wheat in this country is far in excess of previous years. Merchants who are familiar with the subject also say that a considerable quantity of cotton was sold last July by planters, deliverable in 90 days, and that when the delivery way made there was a considerable advance in the price of spot cotton, which gave dissatisfaction to planters, and led them to hold the stock on hand for higher prices. United States Treasurer Jordao in giving his opinion on the subject, said that the reason gold was going abroad was that American exports were much lighter at this season of the year. Gold is now on a shipping basis, when the rate of exchange is at its lowest. This is due to the unusually light exports. And again, foreign holders of American securities

may be realizing, and that would take a good deal of gold from our shores. These foreign investors bought our securities at very low figures, and it may be they have concluded that this is the time to realize.

Whatever the reason, this gold is evidently wanted abroad. It may be that the owners who have had it here are afraid lest the banks would pay them in silver, and therefore they carry it to England. This view of the matter is taken by some of the Eastern journals. There is one thing sure, the scarcer gold gets in this country the more anxious will people be to get hold of gold mines and work them. California has the most extensive gold mining fields in the world, and there are plenty of claims that need capital for development, so the sooner investors come here and get hold of mines the better it will be for themselves and for our California miners.

The experiment of extracting or collecting the soda contained in the water of Owens Lake by pumping it into large vats excavated along the shore and allowing it to evaporate is said to have resulted satisfactorily. Mr. Yerrington is having more vats prepared, and operations will be conducted on an extensive scale next spring.

On the Mohave desert among the yuccas, grass is six inches high, a hitherto almost unprecedented occurrence.

U. S. of Colombia Mines.

In the PRESS of August 15, 1885, was an account of the mines in the U. S. of Colombia, which a correspondent in Honda, Estado Tolima, writes us is the first one he has seen in print concerning the country, which is without exaggeration. The mining outlook there is just now is very good in spite of the row which was kicked up by the radical party against the Government. Some of the gravel mines worked by English companies even made profits, although very little work could be done, (as the case was at Malpaso), as frequently the hands were pressed into the army. Some more gravel and silver mines have been

Endless Bed Double Surface.

The illustration on this page is that of an improvement in wood working machinery in the shape of an endless bed double surfacer. This is an improved design and has been adopted by the California Door Company and others in this State. It is designed for heavy, rapid and smooth work, being capable of double-surfacing 6000 feet of stock boards in ten hours. The bed is held upon four, large screws, thus having the firmness and durability of a solid bed machine.

The device for raising and lowering the bed, which is done by hand or power are placed on top; thus doing away with the inconvenience

Prehistoric Implements.

In prosecuting the work of gravel mining in this State several curious things have been found. The bones of mammoths and animals of past ages, tools and implements of nations which now have no place in the world, etc., have been found. At the last meeting of the California Academy of Sciences a stone cylindrical pestle was presented by Thos. N. Hosmer, of Bath, Placer Co. This cylindrical granite pestle is two and one-eighth inches in diameter and four and five-eighths inches long. It was found in one of Mr. Hosmer's claims in Volcano canyon. He was not actually present when it was found, but there is no doubt of its authenticity.

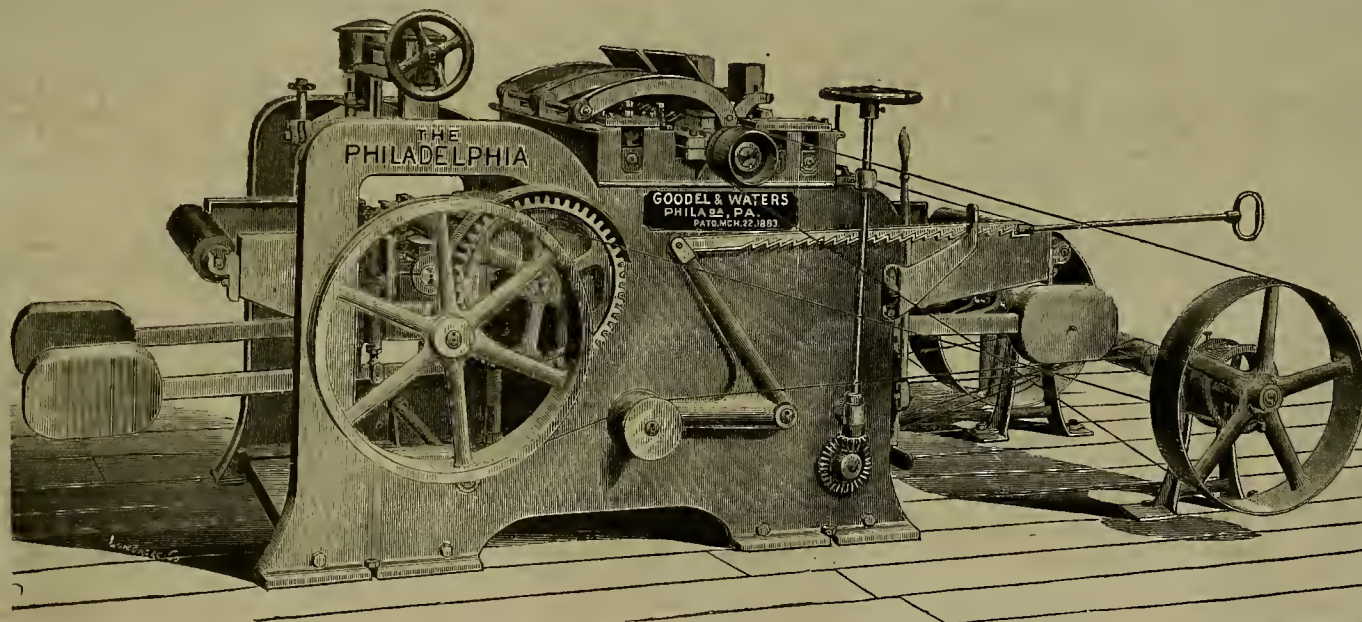
Volcano canyon has been worked and reworked for the last 30 or more years. The position where the pestle was found was in a deep place or gouge-hole, deeper than the surrounding bed-rock. The top earth and gravel had been long since worked off. This hole was filled with hard cement, gravel and boulders; the bed-rock had only

been reached in one place, as the gravel prospected poorly, and it was abandoned until they took hold of it this season and worked the hole out from end to end.

The pestle was found near the bed-rock imbedded in the hard cement gravel and the pick shows its mark. Although the implement is of granite, Mr. Hosmer says there is no granite in that section of country where it was found. Professor Davidson, who has given some attention to the finds of implements in this State, says if this stone really was used as a pestle, as appears likely, it is different from any of the many hundreds he has seen, in its purely cylindrical form, length and thickness.

CAMPBELL, Rigby and Dehere, of Smartsville, have been served with papers for an alleged contempt of the Superior Court of Yuba county for violating a debris injunction. The parties have been retaining all the debris by a system of dams and are trying to comply with the decision of the Supreme Court.

THE Virginia Chronicle says: It is rumored that a smelting furnace will be erected at Reno next spring to reduce the extensive deposits of carbonate ore in Washoe county and the refractory ores of the Comstock lode, providing Congress does not pass any law to further depreciate the value of silver.



THE "PHILADELPHIA" ENDLESS DOUBLE SURFACING MACHINE.

started up also of late, of which the most prominent are the Orita, Pompona, Maravilla, etc., and the silver mines of Calamonte, Rosio and La Maria, (new ones), make a very good showing. These mines are situated in the Department of Ambalema, State of Tolima. Our correspondent promises to give us a detailed account of this and other mines which will show that this section isn't very much out of the way to be known elsewhere. The great thing that is lacking in Colombia is capital, but that is the case everywhere. All the other old mines, of which there are many, are hard at work to make a good showing before the year is up.

CONGRESSMAN McKENNA will introduce a bill in the House at the first opportunity to encourage the manufacture of steel for modern army ordnance and other army purposes, and to provide heavy ordnance adapted to modern army warfare. The bill will provide for two plants for the manufacture of this ordnance, one on the Pacific coast and the other on the Atlantic.

It is rumored that the English syndicate that recently purchased the Blasdel group of mines, at Aurora, have paid up and deposited in the bank a cash capital of \$2,500,000.

THE Houserins mine, of Utah, has paid \$62,500 in dividends this year so far.

of getting down to the floor and reaching through running belts. They are near the scale and under full command of the operator. Quick and accurate changes of thickness can be adjusted without stopping the machine. The Goodell patent sectional pressure rolls and improved hinged, sectional pressure bars are used on this machine. These bars can be moving entirely clear of the knives while sharpening, and are as near the cutting edge as possible when the machine is in operation. These are practicable devices for feeding two or more unevenly sawed boards at the same time, and working all equally well.

The sectional rolls and pressure bars are the most important improvements in surfacing machines which have as yet been produced. The pressure bars for the lower cylinder are of special design, self-acting and adjustable. The under cylinder is of easy access for adjusting or sharpening the knives. The machine will surface up to 12 inches thick, and 20 or 30 inches wide, as may be ordered. The machine is called the "Philadelphia," and the sole agency for this coast is in the hands of the Berry & Place Machine Company (Parke & Lacy, proprietors), No. 12 California St., in this city.

THE Squaw Creek mines are "looking up," and many regard them as among the richest of Shasta county.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—*Eds.*

Montana Mines.

Meagher and Jefferson Counties.

[Written for PRESS by Our Traveling Correspondent, R. G. Huston.]

White Sulphur Springs, the present county seat of Meagher county, is situated 75 miles northeast from Helena and is near the head of Smith River valley. The hot sulphur springs from which the town derives its name are within the town limits and are considered among the best of this kind in the West. There is no doubt that they are very beneficial to parties suffering with rheumatism and many other diseases that flesh is heir to. The springs are reached by two lines of stages, one running direct from Helena via Canyon Ferry, White's Gulch, Fort Logan, and the other is by rail from Helena to Townsend and thence by stage up Deep Creek and across the valley to the springs. My trip was made by private conveyance to Canyon Ferry. From there I diverged from the direct road and visited the old placer mining camp of New York Gulch, taking in Oregon and Cave Gulches on the trip, but their greatness has virtually departed. Only a few men are now at work in these old diggings.

The present owners of the old Marshall ditch have been doing very well on Gurwell's Bar the past season and have a large quantity of the same class of ground ahead of them. Messrs. DeBoard and Black are at work in Clark's gulch, using water from the same ditch with satisfactory results. Following down Clark's gulch to junction we find Messrs. Woodward & Co., who are well satisfied with their past season's work in the foothills. They use the water from Oregon gulch, reserving it and running a pipe for three or four hours a day. Further down towards the ferry are Messrs. Vancamp and Boswell, who have been putting in a hydroelectric flume in Cooper gulch. They have not reached bedrock in the deep channel yet, but are sanguine that when they do once reach bedrock they will have as good a gold mine as they want.

Canyon Ferry, with its store and hotel, is run by an old timer, who seems to be the right man in the right place. Court Sheriff seems to know a man's wants and provide for them in good style.

The next camp we came to is Maggie gulch, the main creek of which has been a regular Waterloo to miners. Drain companies, one after another, have gone in there and spent time and money and have never yet discovered anything rich enough to pay to drift, but Marshall & Co. are having some good pay on the bars on the south side of the gulch, and have a large amount of ground patented. From all present appearances have a gold mine that will last an ordinary lifetime and then not be worked out.

At the mouth of Avalanches gulch is located J. V. Stafford's ranch, who has as fine a country home as you would find in older and more closely settled communities. Apples and plums, and Siberian crab, gooseberries, currants, strawberries, raspberries and blackberries are in abundance. There are about 300 acres under cultivation in wheat, oats, barley, etc., all of which yield abundantly with the aid of irrigation. He has also an unlimited range for stock in the mountains north of his ranch.

Passing on seven miles further we came to White's gulch, one of the old-time placer mines, the best of which has been worked out and the fortunate ones who amassed small fortunes have had ample time to spend them and to return to look for more; yet a dozen or two men still work around there and make an easy living.

Six miles further east we came to Old Confederate gulch, which at one time was the king of mountain placers. Mountain Bar is a place noted for the gigantic fortunes made in one season. Two parties who did not have credit for a sack of flour on Christmas drove out of the gulch during the next September with one ton of clear gold dust, and many others made handsome fortunes in the same place. At present there are only a few men there. There are two bedrock flumes. One is owned by Stafford, Buckingham and Nanno. The other is owned by Jas. King, and it is, without doubt, one of the best paying mining properties in the Territory to-day, as they are now at the end of Montana Bar, which was worked with short flumes. These tailings are a rich find for a flume company. There were some quartz discoveries a long time ago on some of the tributaries of Confederate, and a ten-stamp mill was erected on one of these properties some 16 years ago, but about the time the mill was finished there was a disagreement between the partners and the mill has never turned a wheel to this day. It stands a monument to some stubborn individual's "cussedness."

Meagher county, notwithstanding the decline of her placer mining interests, has experienced a continuous era of prosperity that is unparalleled in the western country. Two years ago her total assessed valuation did not reach \$600,000, and to-day it is \$6,000,000. This enormous increase is due to the immense stock interests. On the decline of Diamond City, the county seat was removed to White Sulphur

Springs, as it is more of a central point. The merchandise is confined to two houses, each of which carry mammoth stocks of everything that is needed in a well-regulated household, or that may be wanted by the festive cowboy, or the machinery and agricultural implements that are necessary to carry on a first-class farm. An old friend and patron of former Montana business days is the senior member of the firm of Spencer, Mayne & H. man, who are also lessees of the springs, hotel and baths, managed by Mr. Spencer, who is ably seconded by Mrs. S., under whose watchful care no patron will be neglected.

There is a move on foot to divide this county, and from the size and increase of wealth in the last ten years I think it is particularly desirable, as it will make a double number of offices to fill, and as that is a kind of a national poorhouse we have for men who are unable to cope with the world in other lines.

The town of White Sulphur Springs may yet be a very favorably located town in regard to mines. The Neihart mines are 40 miles north. The Yogo mines are about the same distance east, and there are some fine prospects in the Crazy mountains south of them, with the old placer mines of Thompson, Thomas and Benton gulches west. There is yet an opportunity for the county to develop. The smelter in Neihart was to start up last week and if that proves a success why the future is assured of that district.

Their heavy freight is all shipped into Livingston, 75 miles south. They have a railroad station 40 miles, but the road is so much better they ship entirely to Livingston. The *Husbandman*, whose interests are ably looked after by the Sutherland brothers, is a live country journal and they are pleasant affable gentlemen and deserving of the success that seems to be following their efforts. Townsend is a railroad town built up in the last three or four years and is favorably located for farmers of Missouri valley to get to for their general shipping point and also for their supplies. It has a number of fine large stores. The principal one is that of Messrs. Tierney & Co., who carry a large and varied stock of general merchandises. The old Indian creek ferry near this place is run by another old timer, J. L. Moore, who has laid aside the pick, shovel and pan, for the retired life of ferryman and stock dealer, and seems to be well satisfied with the change. Bedford is the next point of interest, being a railroad station located near the old Hogem placer diggings. They are still being worked some by two or three companies who are all doing well. Radersburgh, formerly the county seat of Jefferson county, and at one time the center of a fine shallow placer mining district, is now only a ghost of its former self, but they still live in hopes that their quartz interests will bring them out. One location, the Keating lead, has very rich and free milling ore at the surface and the owners made plenty of money out of it, but when they sunk down the vein ran into sulphurets so much that they could not save enough to make it profitable. But after lying idle for five or six years they are about to start up again and with the late appliances will be able to work it profitably. There are a number of other leads in this vicinity, but all have trouble in working on account of the large quantity of pyrites.

Indian Creek is eight miles north of Radersburgh and the old town of St. Louis has about disappeared. The gulch mining is about played out. The Little Giant quartz lead, located half mile above St. Louis, is still being worked with satisfactory results. It has been worked for about 16 years, and while it is not a fortune in a day it is regular pay. The rock runs from \$50 to \$75 per ton, the ledge varying in size from 4 to 10 inches. This lower tunnel is in some 1500 feet. They are now stopping from the upper tunnel, which is in some 900 feet. It is free milling gold, and the owners have a five-stamp mill over on Crow creek to which they transport their quartz and mill it. The owners are R. Roberts, J. Colhergh and Seiterly of Radersburgh.

Cost of Moving Railroad Trains.

EDITORS PRESS:—There is in the United States an association of scientists, artists and architects numbering among its members many names of the most eminent constructors and engineers in the world. These gentlemen call themselves the American Society of Civil Engineers. They meet periodically and listen to addresses delivered or read upon all matters pertaining to works of engineering. When they approve any paper which may be read before them they cause it to be printed for general circulation. No statement could emanate from or receive the endorsement of higher scientific authority than that of the American Society of Civil Engineers. On June 23, 1885, there was read before that society carefully prepared addresses upon canals and railroads, ship canals and ship railways, by E. Sweet and by E. L. Corthell, both members of that society, which have been published and since distributed and from which I take the liberty of making a few quotations for the information of the public through your valuable columns and in support of some of my previous statements.

I said that freight could be moved at a profit at half a cent per ton per mile; passengers at 2½ cents per 100 miles, or overland for \$1.00, and that the cost of moving trains in the United

States varied from 10 cents to 50 cents per mile run, according to condition of track, amount of grade, kind of fuel, number of cars in train, whether empty or full, rate of wages paid, and number of highly paid and unnecessary officials employed under the present competitive system. I think these quotations from the remarks of those gentlemen will go very far toward satisfying most minds that I speak within bounds when I say that the general average cost of moving trains one mile in the United States to-day is about 17½ cents, or less, per train per mile, everything included, and counting every locomotive moved as a train whether it pulls only a tender or 130 cars, and that the National Government could move all trains at very much less rates and make a profit where competing corporations would make a loss. That the United States Government could pay men much higher wages than any corporation and still move all passengers and freight for less than any corporation can ever be made to do.

The authorities referred to say, "In 1865 the cost per 100 miles run on the Pennsylvania railroad was \$16.48, and in 1881, \$6.02." "On the Pennsylvania R. R. main division and on the Philadelphia and Erie division the average cost (of moving freight) is about four mills (that is four-tenths of one cent) per ton per mile, including all expenses except interest on capital. This expense includes the transportation of local as well as through freights, handling at terminals and local stations, maintenance of permanent way, motive power and all the incidental and general expenses connected with the operation of the railroad." "On the same railroad, Susquehanna division, the actual cost of hauling (average of five consolidated locomotives on \$16,115 car miles) was 0.6 of a mill (that is six-tenths of a mill or six-hundredths of a cent) per ton per mile, including repairs to locomotives, fuel, stores and wages of train hands." "The average running time of railroads (trains) is at least 15 miles per hour."

"Ordinary sea-going steamers transport freight at a cost of about 0.5 (five-tenths) of a mill (or five-one hundredths of a cent) per ton per mile, expenses alone considered and not including interest, insurance, depreciation of steamer and profit, or three-tenths of a mill (or three-one hundredths of a cent) by the best examples of sea-going steamers." "The cost on a ship canal at two miles per hour (the economical speed) is against 12 miles per hour on the ocean, and with the same power required would increase the cost six times, or to three mills per ton per mile."

It may be stated broadly that railroad transportation in this country has been so far reduced in cost as to make it possible to haul freight at about four mills per ton per mile, including all expenses, even the terminal and other handlings of local and through freights; also, expenses and renewals, general expenses of management and the many other charges that go to make up the details of the cost of railroad transportation. The cost of handling freight is not perhaps appreciated by even railroad managers, for while immense and continual reductions are being made in the cost of hauling, but little advance has been made in reducing the cost at terminals and stations. It costs as much to handle a ton of goods at the New York terminal as it costs to haul it to Albany or Philadelphia. "Another important item in the cost of ordinary railway transportation is the labor." "An army of employees is required for all the various duties devolving upon railroads. Hundreds of returns and reports require a large clerical force." "The relations and connections with other roads in cars, goods, hack charges, etc., make a large amount of work necessary." "The assorting of goods for different destinations, the handling of cars on sidings and in terminal and division yards require not only a variety of labor but expensive power also." "The expenses of doing all this work is, however, so systematically performed and recorded on the best railroads that the cost of the various items is fully known." "The cost per mile on the best railroads is three mills per ton for through freight."

"All items for cost appear on page 81 Pennsylvania Railroad Report of 1885." "Deducting irrelevant items (such as handling and terminal expenses) we can properly reduce the cost 48 per cent, or to 1.56 mills, but a still further reduction is proper. Much larger loads are carried now—the ratio of paying to non-paying loads is greater." (There would be no non-paying loads on Government railways.)

"The above favorable conditions allow us to reduce the cost to one mill per ton per mile" (on ship railway). "The cost of towing sailing vessels * * * will be considerably more expensive than hauling them on the ship railway, and the cost of propelling a steamer by her own power will be, as has been previously shown, 3.0 mills per ton per mile, as against 0.5 mills per ton per mile by ship railway."

"The reasons for the reduced cost in railway transportation of late years are, improvements in the condition of railroads by better construction, better maintenance of track and in more economical administration; also, in the increase of the amount of freight hauled on one train, which is made possible by the increase in locomotive power and in the capacity of cars." "The trainload has increased about 75 per cent." "The capacity of cars has increased from 20,000 lbs. in 1855 to 1876 to 40,000 lbs. in 1882, and to 50,000 lbs. in 1885, and the master car builders have recently decided upon a standard car to carry 60,000 lbs." "The weight of cars on the Pennsylvania railroad in-

creased from 20,500 lbs. to 22,000 only from 1870 to 1881, but the load capacity increased from 20,000 lbs. to 40,000 lbs."

In making the foregoing quotations I have inserted some remarks of my own in parenthesis to make them more simple and easily understood for all, or more applicable to my subject. I will now repeat some of the more important items, and then begin my statements and arguments in another letter. From the foregoing we see that the freight-car of the past moved only ten tons, while that of the future now constructing will move 30 tons each. That on the best railways now in operation, everything included, the cost of through freight is three mills per ton per mile, and roads being continually improved and cost of hauling being annually reduced. A vast field for improvements of roads and reduction of costs will be opened up when the Government owns and operates the railways. We see that the cost of moving vessels through ship canals is three mills per ton per mile. Vessels moved on ship railway five-tenths of one mill per ton per mile. That in 1865 the cost of moving trains 100 miles was \$16.48. That in 1881 that cost had been reduced to \$6.02 "per train per 100 miles." That the actual cost of hauling freight on railways, without counting handling, has been six-tenths of a mill per ton per mile, and will be soon reduced by enlarging cars and using more powerful locomotives. That the average running time for freight trains in the United States is about fifteen miles per hour. That the cost of moving freight on the ocean in steamships is for ordinary ships five-tenths of a mill per ton per mile. First-class steamers, three-tenths of a mill per ton per mile. On ship canals, three mills per ton per mile. That on railways the average cost for moving all kinds of freight, local and through, has been about six-tenths of one mill per ton per mile, and including handling, terminal expenses and everything possible to think of, the cost has heretofore been only about four mills per ton per mile, and will hereafter be continually and steadily reduced.

These authorities prove that my statements are within bounds when I say the National Government can carry passengers at a profit from San Francisco to New York for 75 cents, or from Seattle, Washington Territory to Key West, Florida, or between the transcontinental stations most distant from one another within the United States "overland for \$1.00, and freight for one half a cent per ton per mile."

WILL D. SOUTHWORTH.

Mineral and Metalliferous Veins.

EDITORS PRESS:—I had just laid aside the excellent article on "Popular Fallacies Regarding Precious Metal Ore Deposits," contributed by Albert Williams, Jr., to the Fourth Annual Report of the U. S. Geological Survey (1882-83), this evening, when your edition of the PRESS for December 5th came to me, containing upon its second page an elaborate communication from Chas. F. Blackburn, who signs his address as Blackburn mining district, Idaho Territory, upon the subject which I have copied at the head of this letter to you: "Mineral and Metalliferous Veins." A portion of Mr. Williams' contribution which had made especial impression upon my mind was the following: "The work of the mining geologist in large part consists of demolition; in clearing away the rubbish of overthrown errors to obtain foundation room on which slowly to build a sound structure; in sifting and weighing a mass of speculations in the search for material. Some one puts forth a suggestion; it may be the sheerest piece of guesswork, but it finds its way into print, floats with the current literature of the subject, and by virtue of iteration becomes accepted as fact without perhaps ever having been seriously scrutinized." I was doubly impressed with the truth of the foregoing after I read Mr. Blackburn's effusion. The writer begins with the astonishing remark: "Most metals occur in veins associated with certain minerals." As I perused the article further, I was surprised to find a familiar paragraph. This puzzled me. I turned to my geological shelf in the library, took down several books, and in Le Conte's Elements of Geology, pp. 225 to 236, inclusive, edition of 1879, I found *verbatim et literatim* a large portion of what appears in Mr. Blackburn's dissertation. It is bad enough to have would-be mining experts forcing their own honest, although possibly unfortunate, convictions upon this people, to say nothing of that class of writers who are guilty of malpractice upon really good reading.

WALTER C. HADLEY.

Silver City, New Mexico, Dec. 10, 1885.

THE Newport Coal Mining Co. has made an assignment. The assets of the company are in the shape of the Oregon mine, which pays a monthly dividend of 50 cents per share, its surplus fund and the new steamer Arago. These are said to be worth a sum in excess of the liabilities.

THE heaviest dividend paying mine in the United States at present is the Calumet & Hecla, of Michigan, a copper mine. For the past ten months of this year it has paid \$1,200,000. The Ontario, a silver mine in Utah, comes second, with \$825,000 during the same period.

FOUR quartz mills are running now in Yuma.

MECHANICAL PROGRESS.

Working Iron and Steel.

Jersmiah Heed, in a recent number of *Iron and Steel*, says: When a certain range of temperature, steel can be more successfully worked than iron; but that range is narrower. Thus, at the temperatures familiarly known as cherry red, a good steel plate can be bent double and then redoubled crosswise. An iron boiler plate is considered good if it bends double with the fiber and at a right angle across, at a full red heat. Steel plates are best worked at a low heat, iron ones at a somewhat higher heat. At a welding heat, steel plates require the utmost care to avoid burning or fusing, after which they become quite brittle. A number of steel plates which I saw lately being dished out to a very awkward form between two dies under a steam hammer were mostly failing. The men were advised to lower the temperature to cherry red, and the remaining plates all stood the test.

Steel is less easily welded than iron. Thus, the blow holes, or piping, which occasionally occur in ingots are never welded up in subsequent rolling. They become enlarged, and are the cause of the lamination which is not unfrequently found in steel plates.

Mr. Adamson, in the course of his paper read at Paris, in 1878, gave it as his experience that some steel could be welded, but not all. He believed that for this purpose the carbon contained should not exceed 0.125 per cent. It is still true that all steel will not weld with ease and certainty; and it is not yet quite clear wherein the difference lies. It must not be forgotten that there are welds and welds. A good weld is one where the welded pieces will afterwards bear the same cold bending through the weld as through the neighboring solid part. Probably there are very few welds, though to all appearances perfect, which would stand this test.

As an instance of good practice in welding steel, I may mention that at Messrs. R. & W. Hawthorn's works at St. Peter's, Newcastle, marine boiler flues, seven feet long, are soundly welded at one heat. A V-groove joint, carefully planed out, is adopted; and certain fluxes are used to fuse the scale, which would otherwise prevent adhesion of the surfaces. Flue rings, conical tubes, and other details of boiler work, involving welding and subsequent flanging, can now be made of suitable steel almost as easily as of iron; and when made they are incomparably better. For to make a welded and flanged tube of iron not more than 5-16 inch thick, a very high quality of iron must be used; and even then the tube will be unable to stand subsequent rough usage, such as setting cold to snit deviations in the dimensions of the flues. The repeated heatings undergone during welding and flanging have indeed taken the "nature" out of the iron, and left it brittle. But steel tubes, when finished and annealed will stand battering about cold, without any fear of damage whatever.

The Tempering of Metals by Cold Flow.

The tempering of metals during the operations of drawing and spinning are well known to all conversant with the details of such work. Cartridge tubes must be annealed between the several operations. Ward's process of making bolts by the cold flow of iron also requires that such bolts be annealed before the threads are cut; even in flat plates it is known that the roll temper of thin flat plates of brass or steel is very uniform. It is stated that when Mr. A. H. Emery, of New York, was engaged in making his testing machine for the United States Government, the result of exhaustive experiments upon this subject showed that the temper of steel plates as they are rolled is more uniform than is possible by any later tempering. According to *Van Nostrand's Magazine*, some recent experiments on the substitution of low steel for copper and brass in the manufacture of cold-drawn tubing have shown that, in the process of drawing, the steel becomes very hard and of increased tensile strength. This new feature is extending the uses to which low steel can be applied. A cannon has been made from such metal by drawing a six-inch tube with walls one-half inch thick; a seven-inch tube was drawn cold, and, when warmed, was forced over the first tube; a third tube was fashioned in like manner eight inches in diameter, and, when forced over the other two, completed a six-inch gun, with walls one and a half inch thick, and cylindrical in outline. It is claimed that a gun of this dimension, which has been submitted to the United States Ordnance Board for examination, has sustained a water pressure of 75,000 pounds per square inch. This corresponds to a tensile stress of 100,000 pounds per square inch of metal. Admitting, however, that the gun did withstand such a pressure once, it is no measure of the resistance which can be relied on as a safe working pressure of the impact of explosion of powder.

TEMPERING SPRINGS.—A good way to temper small coiled wire springs, as practised in factories where many have to be done, is to heat an iron pot filled with lead so that the lead is a full red, or sufficiently hot to heat an immersed spring to the requisite temperature for harden-

ing, which can be done by quickly immersing the hot spring in water or lard oil. Then, for drawing to a spring temper, heat a small vessel of linseed oil to its boiling point. Dip the springs in the boiling oil for a few seconds—time according to thickness—and then into cold oil.

Sharpening Miners' Drills.

A correspondent to the *American Machinist*, replying to an inquirer through the columns of that journal, relative to tempering miners' rock drills, writes as follows:

He will find his drills to stand all right if he uses good steel and cuts off from one-half of an inch to one inch each time the drill is repaired.

I have personally sharpened drills for a steam drilling machine, and noticed that a new drill made from a fresh bar of steel would stand admirably, but when I renewed it by hammering the edges sharp, it did not stand quite as well. The next time it was renewed by hammering it was still poorer, until finally, when thus renewed four or five times, it did not stand at all. Sharpening by filing did about the same.

I had noticed that at the Hoosac Tunnel, about an inch was cut off from the cutting end each time a drill was sharpened; and the whole work of forming the drill bit gone through with. I regarded this as extremely foolish at the time I observed it. A year later, when I came to repair rock drills, I said I would have no such fooling and wasting of steel and labor, and so did not cut off any at first. But I soon found that the Hoosac Tunnel practice was correct, for when my drills began to fail to do good service after being renewed several times, I studied the matter some, and thought I would try cutting off. As soon as I commenced this, my drills were all as good as if first formed on a fresh bar.

I then studied this matter more and soon came to the following conclusions:

1st. Each time a piece of tool steel is hardened it loses about one tenth of its life and goodness.

2d. That the strength of the steel, as well as the wearing quality, are both injured about in the same proportion by repeated hardening.

3d. That a tool requiring repeated dressing and hardening, such as rock drills, cold chisels, lathe tools, etc., should be each time hardened for as short a portion of the length as possible, so that at any given time the steel at the point of such tool should have been hardened as few times as possible, and that in many cases it is advisable to cut away a portion of steel to bring the cutting edge down to the first hardening.

These facts should be kept in view by all tool-makers. A tap, for instance, which has been hardened and drawn a little too low, is about the same as ruined, because to try again by re-hardening, etc., takes another tenth of the goodness of the steel away, and this cannot be spared from a tap, because at the best the tap is none too strong.

If the old Hoosac Tunnel drill department could be brought in to testify, it probably could give us a great deal of valuable information on how steel is affected by repeated hardening.

Molecular Change in Iron.

The *Locomotive*, which chronicles the experience of the Hartford Boiler Inspection and Insurance Company, in a late issue, under the heading of "Crystallization of Iron," points out that if a boiler be well made, of good material and properly cared for, there need be no fear of its becoming unsafe through molecular change in the plates during the ordinary lifetimes of the boiler. Any such change it attributes to over heating of originally bad material, or of good material when the scale or sediment deposited by the feed water is not properly cleaned out.

In the same issue that journal illustrates a properly designed arrangement of steam connections for a battery of boilers, so that the effects of expansion, and any settling of the boilers after they have run a short time, will not cause rupture. It advocates the use of wrought-iron pipes, as in every way better than cast-iron. The plan illustrated shows vertical risers, not less than three feet high, attached to the nozzles by means of flanges, and from the upper ends of these risers, pipes are led horizontally backwards into the main steam pipe, which runs parallel to the plane of the risers. In the horizontal pipes connecting the risers and main steam pipe, the stop-valves, one to each boiler, are placed, and these have flanged ends, so that they may, when necessary, be easily removed, without disturbing any other portion of the piping. By this arrangement the spring of the pipes will compensate for any movement of the boilers. We have in our own experience seen not a few batteries of boilers connected directly to the main steam pipe by vertical pipes, and there was constant trouble, until a change was made in accordance with plans resembling closely those described above.

FORGING BRASS.—A correspondent of the *Scientific American* asks: "Can brass be worked in a drop at all? That is, can it be drop-forged the same as iron can?" The journal mentioned replies that soft brass can be worked very well in a deep press, but not to the same extent as hot iron or steel.

SCIENTIFIC PROGRESS.

How Some Soils are Formed.

Mr. Ernest Ingersoll in *Science*, of November 27th, describes the plains of British America as follows: Striking contrasts present themselves to the experienced eye between the plains of British America, through which the lately finished Canadian Pacific railroad runs, and those crossed by the transcontinental lines in the United States. In the first place, they are larger. It is more than 1000 miles from where the forested granites of Keweenaw dip under the silurian prairie-floor in the Red River valley to the first escarpment of the Rocky mountains. In Kansas it is hardly half as far between the wooded regions and the foothills of Pike's Peak.

Another feature is the prim-like look of it all, save certain far-western tracts. The grass is dense and long. Flowering herbage is profuse. West and south of the South Saskatchewan this gives place to a greater, more "plains"-like scantiness of vegetation, to be sure, but nowhere is the barrenness and aridity of the southern plains equaled.

This is due to the greater moisture in earth and air, and to the extraordinary fertility of the soil. Manitoba produces an average of 22 bushels of wheat to the acre—four to five bushels in excess of the average of any other similar space on the continent. The soil is coal-black and declares its richness at first sight. Dr. Robert Bell, of the Canadian Geological Survey, discussed the causes of this fertility before the Canadian Royal Society, May 23, 1883. He pointed out that the materials were the best possible, having been derived from the glacial drift of the North, mingling sand and gravel with the cretaceous marls spread over all British America. Having this favorable constitution, Dr. Bell assigns to the moraine this chief agency in the formation of the thick top-layer of vegetable mould which is now the joy of the farmer.

In the Assiniboine valley the moles have thrown up almost every foot of the soil into little hillocks, each containing a large shovelful of earth, and burying completely the grass and vegetation over a space a foot or more square. The vegetable matter thus buried decays, and becomes incorporated with the soil, so that this process is analogous to plowing under the soil. In making their burrows they select the finer material and cast it up to the surface, leaving behind the coarser. The effect of this is similar to that alluded to by Darwin of the earthworms (which do not exist in the northwest territories), since, in the course of time, all the stones are buried. Their labor is supplemented by the gophers, spermophiles and badgers, the last named digging deeply and heaving up large quantities of gravelly subsoil, which the moles work into and improve, while all bury much vegetable rubbish, as nests and food. This beneficent animal agency nearly ceases when the elevated "third steppe," called the Grand Coteau du Missouri, is reached, and when the mountains are approached the soil is clayey.

FALSIFYING HISTORY.—Volume 19, page 326, of the new edition of the "Encyclopedia Britannica" contains an article entitled "Polar Regions," by Clements R. Markham, in which reference is made to the geographical work of the Greely Arctic expedition, as follows: "Lieut. Lockwood made a journey along the north coast of Greenland, and reached a small island in 83° 24' [N. Lat.] and 40° 05' [W. Gr.]. Dr. Pavy and another went a short distance beyond the winter quarters of the Alert, and a trip was made into the interior of Grinnell Land. But all this region had been explored and exhaustively examined by the English expedition in 1875-76." The italics are our own. Attention has recently been called to this statement by the author, Charles Lanman, of a little memorial volume on his life and arctic work of Lieut. James E. Lockwood. It is a matter of no little astonishment that any writer or publisher of a standard work like the one referred to, should allow haste or international feeling, or any other impulse to lead to such a palpable falsification of history or do such gross injustices to a scientific explorer who lost his life from privation in the field of his labor. No act connected with polar exploration is better substantiated than the fact that Lockwood not only reached the highest latitude ever attained by any explorer, but went fully 100 geographical miles further north than any other explorer of any nation ever reached. It is furthermore well known that no "English expedition" ever "mapped, explored and exhaustively examined" the region alluded to.

THE CHANGE OF FOLIAGE.—The immediate cause of the change in the foliage during the fall lies in the lessened action of the breathing organs or pores of the leaves, resulting from a loss of warmth and light due to the shorter days. The natural stimulants to vegetation are withdrawn. Shortly before the fall of the leaf, a very delicate layer of cellulose starts from the side of the stem and grows downward, completely separating the leaf from any participation in the life circulation of the plant. This explains the smooth surface exposed on separating a mature leaf from its branch. With the cessation of the circulation of the sap, the leaves no longer absorb carbonic acid gas and give off oxygen. The great natural process of deoxidation is arrested, and finally reversed—oxygen

is absorbed. The chlorophyll, or leaf green, which gave color to the leaves during the earlier part of the season, is now oxidized and changed to xanthophyll, or leaf yellow, and erythrophyll, or leaf red.

These new salts contribute nothing to the nourishment of the leaf. No carbonic acid is absorbed from the atmosphere, and the leaf soon dies and falls to the ground. This difference in the coloring of the leaves depends upon the local conditions, which hasten, modify, or retard this chemical reaction. In the so-called evergreens, no transverse cell formation takes place, and the leaf is never separated from the circulation of the main tree. They also evaporate less in proportion to their leaf surface than ordinary trees. Their more sluggish circulation is less dependent upon climatic influences.

A THINKING MACHINE.—ALMOST.—A cultivated gentleman of French descent residing at Gallipolis, O., who has been an invalid for several years, has just received a patent for an invention of more than ordinary merit and of peculiar character. It excites the wonder and admiration of all who behold it. Many declare it the equal in general utility of the sewing machine or telephone. It is perfectly wonderful in its operation, and yet so simple in its action that a child can learn to use it in a few minutes. It consists of a pair of scales which announce with unerring accuracy the value of any number of tons, pounds or ounces at any price. For instance, a ham is placed on the scales. It weighs 12½ pounds and the price is 12½ cents per pound. A sliding weight is moved along the scale beam until the ham is balanced. In this notch where this weight stops will be found the worth of the meat in dollars and cents to a fraction. Again, suppose a grocer is asked for 50 pounds of tea. This price is 78 cents. One indicator is set at 50, the amount wanted, the other at 78, the price of the tea. Tea is poured into the scoop until this scale is balanced, when the quantity of tea is found to be correct as if several minutes time had been consumed in making this calculation.

A PERFECTED SEWAGE SYSTEM.—Shewsbury, England, has solved the sewage problem to perfection. As the sewage enters the works, clay, charcoal and blood are added as decolorizers, and after thorough mixing a solution of sulphate of alumina is added, by which the dissolved and suspended impurities are quickly precipitated in one or the other of the settling tanks, from the fourth of which the water runs without further treatment into the river. The sewage as it enters the works contains about 37 per cent of suspended organic and inorganic matter, but in the effluent water there are found only the merest traces of either. By experiment it has been found that in this water fish will live for months. This deposit is then removed from the tank, and by means of pressure and artificial heat is deprived of its moisture till it attains this consistency and appearance of dry earth, in which condition it meets a ready sale as "guano."—*Manufacturers' Gazette*.

ICE FROM THE SOIL.—Many of our readers have no doubt seen and admired that beautiful appearance which is often presented in the early morning after a cold and freezing night, when the ground is seen covered with little filaments of ice from a half an inch to two inches in length. This phenomenon most frequently occurs after the first frost succeeding a heavy rain, when the ground is thoroughly saturated with water. In viewing it many have no doubt wondered how they were formed, without being able to solve the problem. It is explained as follows: The little filaments are pressed out from the soil through small openings by the expansion of water in the ground as freezing proceeds. The size of the filaments depends upon the size of the openings through which they have been forced by expansion from behind, and the flutings with which they are covered correspond with irregularities in the walls of the openings through which they are forced.

HOW TREES EFFECT THE RAINFALL.—In the official report of the geological survey of Wisconsin, is an account of the determinations made by Dr. J. M. Anders, of the amount of water pumped from the earth by trees. He finds that the average exhalation from soft, thin-leaved plants in clear weather amounts to about one and a quarter ounces troy per day of 12 hours for every square foot of surface. Hence, a moderate sized elm raises and throws off seven and three-quarters tons of water per day. In the report the facts are applied to what is going on in America, where certain inland fertile districts are becoming converted into deserts by wholesale clearings, and in other places, such as the plains of Colorado, where five or six years of irrigation and planting have already produced a measurable increase of rainfall. It is maintained that the deserts of Syria and Africa are the results of cutting down trees, and that original luxuriance may be restored by skillful replanting.

NATURE EVER THOUGHTFUL.—The utility of tears to animals in general, and particularly to those which are exposed much to the dust, such as birds which live amid the wind, is easy to understand. The eye would soon be dirtied and blocked up had not nature provided this friendly everflowing stream to wash and refresh it. A very little fluid is necessary to keep the eye always clear and clean.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

Office 252 Market St., N. E. corner Front St.
Take the Elevator, No. 12 Front St.

W. B. EWER.....SENIOR EDITOR.

Subscription and Advertising Rates.

Subscriptions—Six months, \$1.75; 1 year, \$3, payable in advance. Delayed payments, \$4 a year. Single copies, 10 cents. Agents wanted.

ADVERTISING RATES. 1 week. 1 month. 3 mos. 12 mos
Per line (agate)..... .25 .80 \$2.20 \$5.00
Half inch (1 square)..... \$1.50 \$4.00 10.00 24.00
One inch..... 2.00 5.00 14.00 45.00

Large advertisements at favorable rates. Special or reading notices, legal advertisements, notices appearing in extraordinary type or in particular parts of the paper, at special rates. Four insertions are rated in a month.

Address all literary and business correspondence and drafts for this paper in the name of the firm.

Our latest forms go to press on Thursday evening.

Entered at S. F. Post Office as Second-Class Mail Matter.

SCIENTIFIC PRESS PATENT AGENCY.

DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, Dec. 26, 1885.

TABLE OF CONTENTS.

EDITORIALS.—Shipments of Gold; U. S. of Columbia Mines; Endless Red Double Surface; Prehistoric Implements; 417. Passing Events; Close of the Volume; The Amoor Gold Fields; Manganese; A Science Fund; Lead Smelting—No. 3, 420. Intermittent Furnace; California Petroleum, 421.

ILLUSTRATIONS.—The "Philadelphia" Endless Double Surfacing Machine, 417. Intermittent Quick-silver Furnace, 421.

CORRESPONDENCE.—Montana Mines; Cost of Moving Railroad Trains; Mineral and Metalliferous Veins, 418.

MECHANICAL PROGRESS.—Working Iron and Steel; The Tempering of Metals by Cold Flow; Tempering Springs; Sharpening Miners' Drills; Molecular Change in Iron; Forging Brass, 419.

SCIENTIFIC PROGRESS.—How Some Soils are Formed; Falsifying History; The Chance of Follage; A Thinking Machine; A Perfected Sewage System; Ice from the Soil; How Trees Effect the Rainfall; Nature Ever Thoughtful, 419.

ENGINEERING NOTES.—The Davis Island Dam at Pittsburg; A New Railway Cable Device; The New Brunswick Sub-Sea Tunnel, 423.

USEFUL INFORMATION.—To Prevent the Tarnishing of Silver Hats; Possibly Poisonous Lard Oil; Phosphorene; Beef; Substitute for Buffalo Hides; Leather and Rubber Belts; Saving from Soap Waste; How Watches are Demagnetized; A Welding Heat; Color in Photography, 423.

GOOD HEALTH.—An Over-Susceptible Stomach Not Such a Bad Thing to Have After All; Suggestions for Winter; Contaminated Drinking Water; The Soil as a Filter; Water in Fattening; Falling Off of Hair, 423.

MISCELLANEOUS.—Practical Hydraulics, 422. MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Montana, New Mexico, Oregon, and Utah, 424-25.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 428.

Business Announcements.

National Surgical Institute.
Dividend Notice—San Francisco Savings Union.
Dividend Notice—German Savings and Loan Society.
Assessment Notice—Fine Tree Mining Co.
Duplex Galvanic Belts—Dr. Emory L. Willard.

See Advertising Columns.

Passing Events.

With this number of the PRESS the volume is concluded, and we are ready to start in again on a new one with the expectation of constantly improving the paper.

During the past week very heavy rains have fallen over a large area in this State, in some places causing serious damage. In this city, on Monday morning, between two and three inches of water fell within a few hours, hursting the sewers, flooding cellars, and causing considerable inconvenience and loss. It was the heaviest rainfall ever experienced in this city while it lasted.

The transfer of the control of the South Pacific Coast Railroad to Jamee G. Fair, which occurred this week, will probably cause the building of two or more extensive cable railroads in Oakland.

The silver question is being vigorously agitated just now, and Congress will soon deal with the subject. Wm. M. Evarts has taken the side of the advocates of silver, and will take issue with the views of the administration on the subject.

Large shipments of gold are being made out of this country to Europe just now.

These are holiday times, and the storekeepers are reaping their harvest, but general business and labor interests continue depressed.

Close of the Volume.

This number is the final one of Volume LI of the MINING AND SCIENTIFIC PRESS. The paper is the oldest one devoted to the interests of mining in the United States. It has, since its establishment over a quarter of a century ago, constantly devoted its columns to the advancement of the legitimate mining industry and kindred interests, and to popular science, mechanics and inventions.

The very full and carefully prepared index which occupies the last page of this number is an indication of the scope and variety of the contents of the volume and shows the trouble we have taken to collate technical and general information of all kinds likely to be of value to our special class of readers.

Most of the inventions of note, originating on this coast, we have described accurately, making a specialty of this as we always have done. The index gives a complete list of all Pacific Coast inventors and patents for the six month's time covered by the volume.

With regard to mining matters we have, each week, given a condensed summary of current news of mine, mill and smelter. The news we have gathered from all Pacific Coast States and Territories, and given it in such a form that the reader could tell at a glance the state of affairs in the various camps and mining centers, and watch the progress of development in any particular mine. We have also kept close watch on all improvements in the mechanical appliances of mining, describing and illustrating in detail those that we thought had merit. In metallurgical matters we have been specially anxious to describe all that was new. New processes, methods and plans, and new metallurgical appliances, etc., have been described for the benefit of those of our readers interested in those subjects. These features alone make the PRESS worth more than its subscription price to its mining readers. Unless a man takes a paper of this character he will find that many improvements are constantly being made in his line of business about which he is ignorant. We obtain information of this kind from home and foreign sources as well, and in this way get the experience of others to benefit our own people.

The PRESS is certainly worthy the support and encouragement of the industrial progressive classes of this coast. Our endeavors should be seconded with subscriptions and correspondence. The long experience in this class of journalism of the proprietors and editors is a guarantee that the interests of those we serve will be conscientiously and intelligently guarded. Our advertisers now comprise the best firms in special lines, and many of them have been in our columns for many successive years; a proof that their enterprise has brought its due reward.

We have several traveling correspondents who are constantly gathering material of interest to our readers from the various camps, and our other correspondents are many and increasing. The PRESS may be considered a necessity to persons engaged in mining on this coast.

In the coming year we hope to make the PRESS even more interesting and valuable than ever, and it behooves those who are not already on our lists to add their names at the commencement of the volume.

The Amoor Gold Fields.

Not long since we gave an account of the discovery of somewhat extensive gold fields on the Chinese side of the Amoor river. Naturally the Russians who had been working the gold claims on their own side of the river crossed over into Chinese territory and started to prospect there. At first there was no objection made by the Chinese, but numbers of foreigners, attracted by the reports of the gold finds, began to move into the region, until the Governor of the Amoor provinces began to consider their presence a source of danger. Now the foreign colony has been broken up, and the Russians and others have been driven across the river again by the Chinese. Several thousand miners were expelled.

The wealth of the region in question is not doubted. The gold fields of the Amoor on the Russian side have yielded largely, and the new ones on the Chinese side are reputed equally as good and more extensive. There are coal veins in the mountains thereabouts also, but restrictions have been placed upon them as

well, and foreigners are forbidden to work them without official permission, which means the payment of money.

Manganese.

Manganese is found in heavy deposits in California and Nevada, and occurs in greater or less quantity in the Rocky Mountain region. The only deposit that has been worked to any extent is that on Red Rock, in the bay of San Francisco, but that has not been worked since 1866, as the ore cost more than it came to. The following comprise the other localities in this State where the mineral has been observed: Near Angel's Camp and at Redroad Flat, Calaveras county; abundantly at Corral Hollow, Contra Costa county; near Saucileto and Tomales, Marin county; Sweetland, Nevada county; Mt. St. Helena, Napa Co.; Argentine and Mariposa Hill, Plumas county; near Colton, San Bernardino county; Bernal Heights, near this city; at several places in Santa Clara and Sonoma counties, and near Columbia, Tuolumne county, where pieces of ore weighing over 100 pounds have been picked up on the surface of the ground.

The chief use of manganese ores is as a ready and easily available source of oxygen. For this reason the dioxide is the only valuable constituent, because it can be made to give up its oxygen by several means. Advantage is taken of this oxidizing power of the dioxide in the preparation of chlorine and bromine. It is extremely difficult to separate these elements from other elements with which they are ordinarily in combination. It is a simple matter, however, to obtain hydrochloric acid, and when manganese dioxide is added to this, its oxygen unites with the hydrogen, forming water, and leaves part of the chlorine free. As it is very difficult to transport chlorine in its ordinary gaseous state, it is passed over slaked lime, and thus made into "bleaching powder," which is a mixture of chloride and hypochlorite of calcium. Bromine is made by a similar process, but as it is a liquid it is not necessary to convert it into a substance analogous to bleaching powder. These processes, which consume probably three-quarters of the manganese mined in this country, are carried on at several places near Pomroy, on the Ohio river, and at a few other points in the United States. When manganese ore richer than 70 per cent is obtained, it is usually found profitable to send it to England for the manufacture of bleaching powder, and a small proportion of the yearly supply is thus annually exported. This is the only case of the exportation of manganese. Manganese ore is also used as an oxidizing agent in boiling linseed oil and varnish. When linseed oil is boiled with powdered manganese dioxide, the oil takes up a certain amount of oxygen and becomes thick, drying rapidly. Manganese dioxide is also used in the preparation of oxygen, but only when mixed with chlorate of potassium; because manganese dioxide requires a very high temperature when heated alone before it will give up its oxygen. When heated with potassium chlorate the latter yields its oxygen at a comparatively low temperature, the dioxide serving only to distribute the heat through the mass.

So far as can be ascertained, these are the only uses for which the native ores of the United States are at present available. There are two or three uses into which the manganese itself enters, but for these foreign ores are used altogether. Considerable quantities of manganese iron ore are imported, principally from Carthagena, Spain. The ore is brought as ballast in sailing vessels and steamers coming to American ports in search of cargoes. Probably the largest amount comes to Baltimore, but some is also received in Philadelphia and New York.

THE Mechanics' Institute Trustees have decided to have the rooms on the upper floor of the building on Post street, now occupied by private parties, vacated, and appropriate them to the drawing and mechanical classes.

THE output of Leadville is expected to reach \$12,000,000 for 1885. The place has about 100 producing mines, producing about 1000 tons per day of the value of \$40,000.

GRANITE CREEK, British Columbia, where there is now a gold excitement, we learn is in the Similakeen region, one of the eastern districts in the interior.

Lead Smelting—No. 3.

Ores.

The ores of Leadville are remarkably pure argentiferous lead ores. They are locally divided into two general classes: the "sand carbonates", which are loose, sandy masses of carbonate of lead with chloride of silver, and "hard carbonate", which are masses of porous siliceous material with a varying proportion of hydrated oxides of iron and manganese, carrying carbonate of lead and chloride of silver, and sometimes containing a considerable proportion of unaltered argentiferous galena. As a rule, with the exception of mechanical mixtures of clay and varying proportions of iron and silica; they contain but few foreign ingredients. Intimately associated with the carbonates is generally a little pyromorphite or chlorophosphate of lead, amounting in one exceptional case to 10 and in another to 30 per cent of the whole. Sulphate of lead also occurs in small quantity, with small and variable amounts of oxidized compounds of copper, arsenic, antimony, and manganese. The latter is often abundant, and is associated with or replaces iron oxide. Ores which are rich in manganese are generally poor in silver. The galena is frequently covered by a coating of carbonate showing clearly the alteration of the sulphide, first to sulphate, and then to carbonate. In some few mines bismuth and vanadium ores have been found. But a small proportion of the ores melted is furnished by districts outside of Leadville. Of this the greater part comes from Ten-Mile district, in Summit county, and especially from the Robinson mine, whose deposits carry much pyrite and zincblende. The silver in the oxidized ores is present in combination with chlorine, bromine, and iodide, either as chloride, chloro-bromide, or chloro-hydro-iodide, as the analyses of specimens from several mines made in the laboratory of the United States geological survey at Denver show.

	R. E. Lee Mine.	Amie Mine.	Big Pittsburg Mine
Chloride of silver.	21,589	15,755	99,985
Bromide of silver.	77,986	84,091	None.
Iodide of silver.	0.425	0.154	0.035

Large masses of chloride of silver, or horn-silver, have been found, and on several occasions tons of ore have been taken from the R. E. Lee mine assaying from 6,000 to 15,000 ounces of silver to the ton and almost entirely free from lead. According to Mr. Guyard, sulphide of silver is sometimes present in small quantity.

The Leadville ores in general contain little or no gold, its presence not being easily detected in the ore itself, but only being shown in the final product. The average daily output of the mines in 1880 is placed by Mr. Guyard at from 700 to 800 tons, and the total smelting capacity of the furnaces 700 tons per diem.

A Science Fund.

A fund has been established by Mrs. Elizabeth Thompson, of Stamford, Conn., "for the advancement and prosecution of scientific research in its broadest sense." The fund now amounts to \$25,000. As the income is now available the Trustees are desirous of receiving applications in aid of scientific work. This endowment is not for the benefit of any one department of science, but it is the intention of the Trustees to give the preference to those investigations not already otherwise provided for, which have for their object the advancement of human knowledge, or the benefit of mankind, in general, rather than to researches directed to the solution of questions of merely local importance. The Trustees are H. P. Bowditch, Wm. Minot, Jr., Francis A. Walker, Edward C. Pickering and Chas. Sedgwick Minot, the last named being Secretary, with address at 25 Mt. Vernon St., Boston, Mass. Applications for assistance from this fund should be accompanied by a full statement of the nature of the investigation, of the conditions under which it is to be prosecuted, and of the manner in which the appropriation asked for is to be expended. The first grant will probably be made early in January, 1886. Here is an opportunity for those engaged in scientific research to receive pecuniary assistance in their labors, provided the object meets the approval of the Trustees of the fund.

THE State Line mill at Gold Mountain is running twenty stamps steadily, and the enterprise is said to be prospering every way.

Intermittent Furnaces.

The accompanying engravings show the last survival of the old intermittent quicksilver furnace in its most perfect form, as in use at the New Almaden quicksilver mines, Santa Clara county, in this State. The horizontal and vertical longitudinal sections show the furnace proper. In the left end of these figures (in the former), A to B is also shown the first condenser, and combined ore-drier.

The ore-chamber which forms the main body of the furnace is also shown in cross-section C D. It is separated from the fire-place on the right and the vapor-chamber on the left by pigeon-hole walls. These walls have in plan the form of an arch with the convexity towards the ore-chamber, as they serve to keep the ore from the vapor and fire-chambers.

Mr. S. B. Christy, in a paper read before the American Institute of Mining Engineers, described the details of this furnace. The ore is charged into the ore-chamber through the top of the furnace, being lowered in a Mexican ore-basket by hand. A series of "channels" or flues is built along the bottom across the ore-chamber, in continuation of the apertures in the pigeon-hole wall, with lumps of coarse ore. In former times adobes were used for this purpose. When the first series of channels has been built, a layer of coarse ore two or three feet thick, according to the size of the fragments, is charged into the furnace; then another series of channels is built, and so on to the top of the furnace. To counteract the natural tendency of hot air to roast the upper rather than the lower layers of ore, the channels are made smaller and farther apart in the upper layers of ore, and a certain amount of tierras and soot from the condensers is added to the coarse ore for the same reason. The ore-chamber is 12 feet long by 9 feet wide, and 17 feet six inches high, inside measures; and the charge of ore is 80 to 100 tons. The discharge-ports or draw-holes are four in number, two on each side of the furnace. They are bricked up during the roasting of a charge, except a peep-hole, kept tight by a luted brick. It will be noticed that the final discharge-opening for the fumes has its bottom on a level with that of the ore-chamber, and its top at a height of six feet nine inches above the floor. This is to counteract the upward tendency of the gases already mentioned.

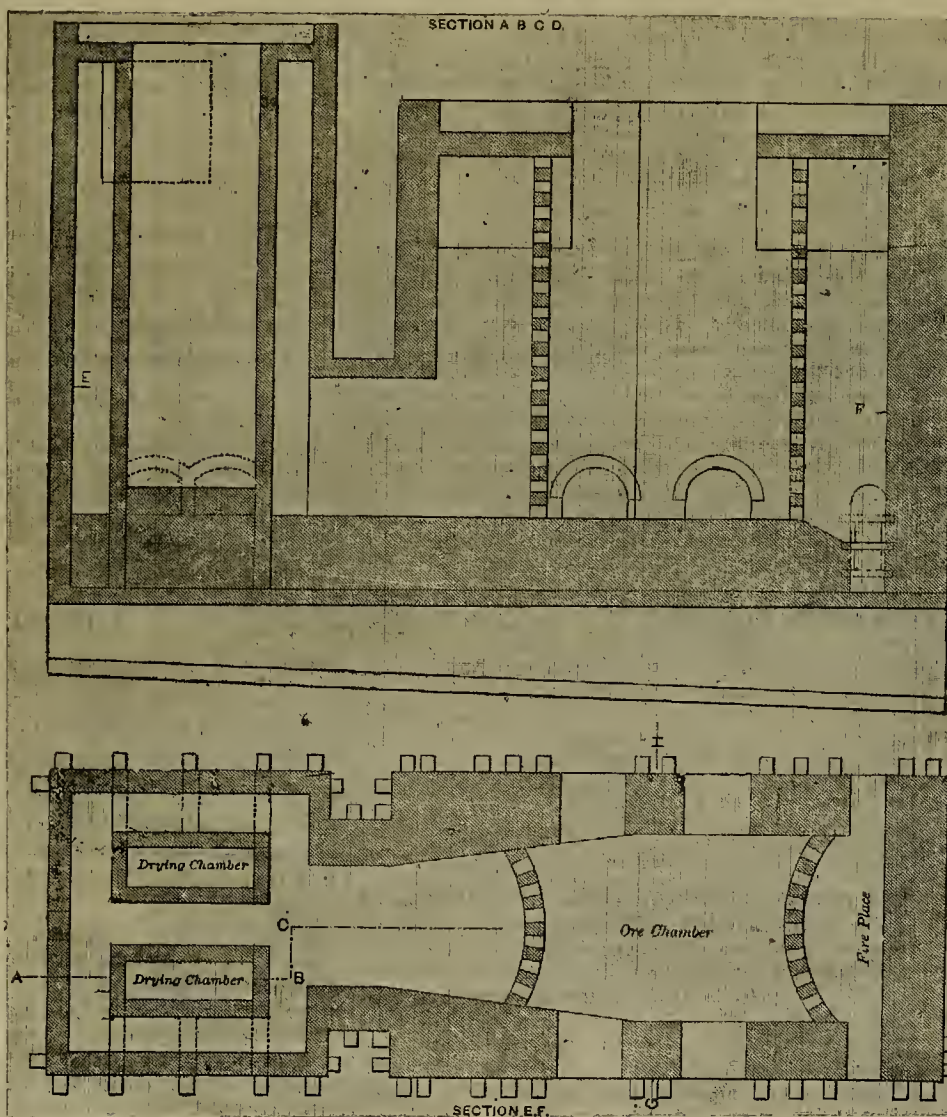
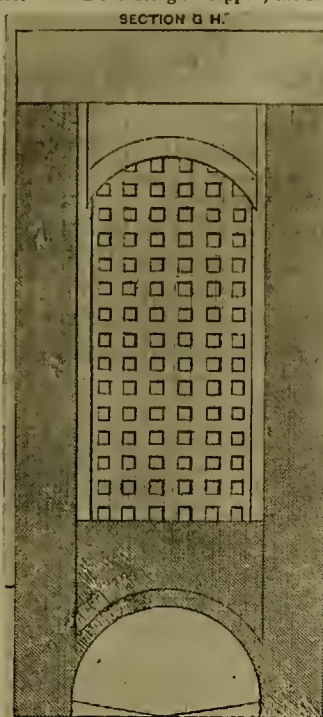
The operation of these furnaces as now managed (without adobes) is as follows:

1. Charging.—This takes the labor of 8 men for one day. As already described, the coarse ores (*granza* and *terrero*) are used to build channels, the coarse ores are next piled in indiscriminately, then another series of channels, and so on, till a layer of soot and *tierras* fills the furnace to the top. The draw-ports are then bricked up; on top of the charge, pieces of old sheet-iron are laid; on these is placed a two or three-inch layer of straw manure, and on the latter, a layer of moist clay of about the same thickness. The furnace is then ready for the second period.

2. Roasting.—This requires, in most cases, the labor of one man per shift of 12 hours for five days and four nights. Besides attending to the firing, the man in charge of the furnace lutes any cracks that may appear in the peep-hole doors, and from time to time sifts ashes

over any cracks that may form in the clay luting that covers the top of the furnace.

3. Cooling.—This, of course, requires no labor. When the firing is stopped, the furnace



INTERMITTENT QUICKSILVER FURNACE.

is allowed to cool for three days and three nights, the air passing through it into the condensers all the time, removing any quicksilver that may be still retained in it, and cooling the ore so that it may be handled by the men.

4. Discharging.—For this the labor of four men for one day is necessary. The top is removed to create an upward draft through the furnace; the discharge-ports are broken open; and the men draw the spent ore through the ports into the slag-cars.

In this manner a charge of ore is finished in just ten days; so that three such charges may

be put through in one month. Formerly, when the intermittent furnaces only were used, less time was given to the roasting and cooling periods in order to increase the production. As a consequence, the ore was not always thoroughly roasted; and the men who charged and discharged these furnaces suffered considerably from the heat and the fumes of the mercury. The time of roasting and cooling such a furnace should, of course, be greater with rich than poor ores; and the fact brought out by the present management that sufficient time was not allowed to roast rich ores in these furnaces explains in large part the losses and evils formerly connected with their use. Thanks to the Huttner and Scott furnace, it is no longer necessary to treat tierras in the intermittent furnace. If it were necessary to treat a full charge of adobes, this would, according to the results for 1875, add 95 cents per ton to the present cost of \$1.37, or nearly 70 per cent to the present cost of roasting in the intermittent furnace.

PATTERSON MINING DISTRICT.—A correspondent writes us that in this Mono county camp little work has been done in prospecting, on account of the late severe storm which occurred on November 21st, the snow rendering it impossible to ship ore to the mill. The only work of any note done in the camp was that by the Patterson Con. Co., their work being confined to two of their claims, the "P. & C." and Monte Christo. On the above mentioned mines a joint tunnel has been run, crosscutting the ledge from the surface at a depth of 75 feet.

List of U. S. Patents for Pacific Coast Inventors.

From the official list of U. S. Patents in Dewey & Co.'s SCIENTIFIC PRESS PATENT AGENCY, 262 Market St., S. F.

FOR WEEK ENDING DECEMBER 8, 1885.

- 331,759.—TIME DETECTOR—E. Bernaa, Los Angeles, Cal.
 331,861.—ROTARY CUTTER FOR DREDGERS—J. H. Bolles, S. F.
 331,865.—LOST MOTION DEVICE—W. J. Butler, Salinas, Cal.
 331,871.—HORSE COLLAR—S. B. Davis, Eureka, Cal.
 331,775.—FOOD COMPOUND—A. A. De Puy, S. F.
 331,873.—BALING PRESS—M. W. Dursi, Wheatland, Cal.
 331,967.—TWO WHEELED VEHICLE—J. A. Gallagher, Stockton, Cal.
 331,877.—SAW SET—R. F. Gibbs, S. F.
 331,891.—CARTRIDGE PACK—J. C. Kelton, S. F.
 331,892.—CHECK REIN ATTACHMENT—J. C. Kelton, S. F.
 332,157.—JOURNAL BOX—Geo. H. Kinzer, Grants Pass, Or.
 331,902.—CABLE GRIP—W. H. Milliken, S. F.
 332,167.—MAP OR CHART ATTACHMENT—Geo. F. Schild, Vallejo, Cal.
 331,917.—FEED WATER PURIFIER—A. J. Stevens, Sacramento, Cal.
 331,929.—DREDGER—J. N. S. Williams, S. F.

FOR WEEK ENDING DECEMBER 15, 1885.

- 332,473.—AMALGAMATOR—M. J. Amick, Portland, Oregon.
 332,479.—SUSPENDERS—Geo. H. Boyd, Marysville, Cal.
 332,373.—CAR TRUCK—W. T. Browne, Stockton, Cal.
 332,327.—BOOKMARK—W. F. Clark, S. F.
 332,590.—EXTENSION TABLE—S. E. Claussen, Portland, Or.
 332,640.—BOTTLE COVER MACHINE—E. K. Cooley, S. F.
 332,648.—SAFETY KEY FOR GAS BURNERS—J. & J. H. Dutton, S. F.
 332,333.—DEVICE FOR FLUSHING SEWERS—A. T. Eilford, S. F.
 332,507.—LADY'S COLLAR—Estelle Fiske, S. F.
 332,508.—BEER DRAWING APPARATUS—P. F. Gardner, Hill's Ferry, Cal.
 332,397.—CUT-OFF VALVE GEAR—J. J. Holland, S. F.
 332,261.—WINDMILL—A. W. Lane, Janesville, Cal.
 332,403.—OYSTER OPENING MACHINE—Constant Leduc, Denver, Col.
 332,418.—HYDRAULIC ELEVATOR—P. F. Morey, Portland, Or.
 332,554.—FIRE ESCAPE—I. D. Pasco, Belmont, Nev.
 332,434.—BRAKE LEVER—T. Pinard, Butteville, Or.
 332,455.—KNOB ATTACHMENT—Wm. B. Smith, S. F.
 332,685.—DYNAMO ELECTRIC MACHINE—F. G. Waterhouse, Sac.
 332,467.—ELECTRIC BELT—Chas. N. West, S. F.
 332,470.—AUTOMATIC FANNING MILL—H. S. Zink, Sac.
 332,366.—DRAFT YOKE OR BAR FOR DOUBLE TEAMS—Stockton & Phelps, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise), at the lowest rates. American and Foreign patents obtained, and all patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

California Petroleum.

The California petroleum deposits which have been largely developed of late years, are now attracting considerable attention East. Capt. Wallace Moore, of Pittsburgh, Pa., an old-time operator, who recently visited this coast, speaks of our oil industry as follows: "I visited the California oil field while away. The operators have got hold of valuable territory. In the Coast Range mountains it covers an area of 200 miles. It costs twice as much to sink a well 1000 feet as it does in Pennsylvania, but a 50 barrel well in California is worth five times as much as a well of the same capacity in Pennsylvania."

Our California wells are gradually but rapidly increasing their production. The following table shows the product of petroleum in California since 1879:

Years.	Barrels.
1879.....	13,543
1880.....	40,552
1881.....	99,882
1882.....	128,636
1883.....	142,557
1884.....	252,600

The statistics of 1885 have not yet been compiled, but it is certain that a further marked increase will be shown. In the past this State has depended largely upon importations for our supply. It formerly all came by sea, but afterwards much of it by rail. Between 1864 and 1883, we imported 35,682 barrels and 3,605,124 cases, equal to 1,752,408 barrels, of 42 gallons each. We now make a great deal of the oil consumed at home, from our home product. The wells are being opened in all directions, and the petroleum industry is becoming one of the most important ones in Southern California. At the extensive refineries in Alameda county most of the product is manufactured, but the facilities for this purpose will gradually be increased with the increase of product of crude petroleum.

THE Virginia Chronicle says: It is rumored that a smelting furnace will be erected at Reno next spring, to reduce the extensive deposits of carbonate ore in Washoe county and the refractory ores of the Comstock lode, providing Congress does not pass any law to further depreciate the value of silver.

PRACTICAL HYDRAULICS.

NUMBER 10.

PRINCIPLES OF HYDRAULICS.

[Written for MINING AND SCIENTIFIC PRESS by P. M. RANDALL.]
[COPYRIGHTED.]

Ex. 49.—A rectangular orifice being 1 foot wide, 6 inches high, and the head 10 feet, what is the coefficient of discharge if the contraction at one end be suppressed?

Cal.—By Table 7, coefficient of perfect contraction for the given head and given orifice is $=.601$.

Part suppressed $=6$ inches $=.5$ feet.

Entire perimeter $=1+1+.5+.5=3$ feet.

Ratio of entire perimeter to part suppressed $=\frac{3}{.5}=6$.
0.143 times this ratio; $0.143 \times 6 = .858$.

Sum of 1 and this product $=1.858$.

This sum, multiplied by .601, the coefficient of perfect contraction, $.601 \times 1.858 = .615$, the coefficient of partial contraction. — *Ans.*

Ex. 50.—A rectangular orifice being 1 foot wide, 6 inches high, and the head 10 feet, what is the coefficient of partial contraction if the contraction at both ends be suppressed?

Cal.—By Table 7, the coefficient of perfect contraction, for the given head and given orifice, is $=.601$.

Part suppressed $6''+6''=12''=1$ foot.

Entire perimeter, $1+1+.5+.5=3$ feet.

Ratio of entire perimeter to part suppressed $=\frac{3}{1}=3$.
0.143 times the ratio; $0.143 \times 3 = .429$.

Sum of 1 and this product $=1.429$.

This sum, multiplied by .601, the coefficient of perfect contraction, $.601 \times 1.429 = .630$, the coefficient of partial contraction. — *Ans.*

.601 \times 1.048 $=$.630, the coefficient of partial contraction. — *Ans.*

TO DETERMINE THE COEFFICIENT OF CONTRACTION FOR A GIVEN ORIFICE AND GIVEN HEAD OF WATER.

Let a = the height of orifice; b = the breadth of orifice; h = head of water.

And let c , c_n , n , p , and x have the same offices as assigned them under the heading, "Partial Contraction;" c_b = the coefficient of contraction due the breadth.

In Table 7, the heights of the orifice vary from 4 feet to 0.125 feet, while the breadth of each orifice is 1 foot. It is evident, if the contraction be suppressed at both ends of any orifice given in Table 7, the contraction due the horizontal lips only, each 1 foot in length, will obtain. Now if the lips be increased any given number of times 1 foot, the contraction will be proportionately increased. This being done, if the contraction due the ends be restored, and the result divided by the length of the elongated orifice, or by the given number of times that the lips were increased in length, the quotient will express the mean contraction due 1 foot breadth of the given orifice.

For an orifice in Table 7, whose height is a , and whose head of water is h , if the contraction of both ends be suppressed, the ratio $n = \frac{p}{a} = \frac{2a}{2+a}$, and the coefficient of partial contraction:

$$c_n = c + \frac{2ax}{2+a} \quad (96)$$

Multiplying both sides of Eq. (96) by b , the breadth of the given orifice, restoring the end contraction, $\frac{2ax}{2+a}$, dividing the result by the breadth b , substituting c_b for left hand member, and reducing,

$$c_b = c \left(1 + \frac{2ax}{2(a+x)} \right) - \frac{2cax}{2b(1+a)} \quad (97)$$

Substituting in (97) the values of $x = 0.143$, and $n = \frac{2a}{2(1+a)}$,

$$c_b = c \left(1 + 0.143n \right) - \frac{0.143cn}{b} \quad (98)$$

Rule 29.—Find, as by Rule 28, the value of the coefficient of partial contraction for an orifice of the given height, 1 foot wide, and having the contraction at both ends suppressed.

From the value so found deduct the quotient arising from dividing 0.143 times the product of the coefficient of perfect contraction, and the ratio of the entire perimeter of the orifice 1 foot wide, to the part suppressed, by the breadth of the given orifice. The remainder will be the coefficient of contraction due the given orifice. Rule 29 is derived from formula (98).

Ex. 51.—A rectangular orifice being 5 feet wide, 3

inches high, and the head of water 3 feet, what is the coefficient of contraction?

Cal.—By Table 9, the coefficient of perfect contraction, for an orifice 1 foot wide, 3 inches high, under a head of 3 feet, is $=.607$.

Part suppressed $=3''+3''=6''=.5$ feet.

Entire perimeter $=1+1+.5+.5=2.5$ feet.

Ratio of entire perimeter to part suppressed $=\frac{2.5}{.5}=5$.
0.143 times this ratio; $0.143 \times 5 = .715$.

Sum of 1 and this product $=1.715$.

This sum, multiplied by .607, the coefficient of perfect contraction, gives the value of the coefficient of partial contraction, when the contraction of both ends is suppressed,

$$c_n = 1.0286 \times .607 = .6244.$$

By Rule 29, 0.143 times the product of the coefficient of perfect contraction, and the ratio of the entire perimeter of the orifice 1 foot wide, to the part suppressed, divided by the breadth of the given orifice, $0.143 \times 2 \times .607 \div 5 = .0035$,

$$c_b = .6244 - .0035 = .621. — \text{Ans.}$$

Ex. 52.—A rectangular orifice being 2 feet wide, 4 feet high, and under a head on center of 2.5 feet, what is the coefficient of discharge?

Cal.—By Table 7, the coefficient of perfect contraction, as determined by experiment, for an orifice 1 foot wide, and otherwise conforming to the given conditions, is $=.629$.

Part suppressed (both ends) $4+4=8$ feet.

Entire perimeter, $1+1+8=10$ feet.

Ratio of entire perimeter to part suppressed $=\frac{10}{8}=1.25$.
0.143 times this ratio; $0.143 \times 1.25 = .179$.

Sum of 1 and this product $=1.179$.

This sum multiplied by .629: $1.179 \times .629 = .701$.

By Rule 29, 0.143 times the product of the coefficient of perfect contraction, and the ratio of the entire perimeter of the orifice 1 foot wide, to the part suppressed, divided by the breadth of the given orifice; $0.143 \times 8 \times .629 \div 2 = 0.036$,

$$c_b = .701 - .036 = .665. — \text{Ans.}$$

Formulas (95) and (98), and Rules 28 and 29, based upon the mean results of the experiments of Bidone and Weisbach, give but approximations to the true coefficients sought. They are, however, sufficiently accurate, for most cases, occurring in practice. Example 52 is an extreme case. Yet the coefficient .665, determined from its solution, seems practically correct, or not too large, in presence of the fact that the area of the given orifice is twice as great as that of the tabulated orifice whose coefficient of discharge is .629; while the perimeter or contracting boundary of the former is to that of the latter as 12 is to 10. Still it is to be admitted that, in determining the coefficient for a given orifice, the result is more satisfactory when the height of the tabulated orifice employed does not much exceed its breadth.

IMPERFECT CONTRACTION.

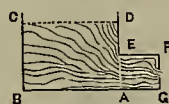


FIG. 16.

In the flow of a stream from an orifice, the head of water being nominally still, and the orifice small, in relation to the side of the vessel in which it lies, the contraction is called perfect; the water arriving with considerable velocity at the orifice, as through a conduit, A G F E, Fig. 16, which cross section varies from 1 to 20 times that of the orifice, the contraction thence is termed imperfect.

Let c = coefficient of perfect contraction; c_n = coefficient of imperfect contraction; n = ratio of the cross section of the conduit, A G F E, Fig. 16, through A E, to the area of the orifice O; A = area of orifice; A_c = area cross section of conduit.

The values of imperfect contraction given by Weisbach, as determined by his experiments and calculations, are:

1st.—For circular orifices:

$$c_n = c [1 + 0.04564 (14.821^n - 1)] \quad (99)$$

2d.—For rectangular orifices:

$$c_n = c [1 + 0.76 (9^n - 1)] \quad (100)$$

Equation (99) for circular orifices is readily resolved into this form:

$$\frac{c_n - c}{c} = 0.04564 (14.821^n - 1), \quad (101)$$

And equation for rectangular orifices into this:

$$\frac{c_n - c}{c} = 0.076 (9^n - 1). \quad (102)$$

The length of the conduit or adjunct is assumed to be three times its diameter, or not sufficiently great for the flow of water to be sensibly affected by side friction, as occurs in long pipes.

By giving fractional values to $n = \frac{A}{A_c}$, or values not greater than 1, numerical values corresponding, are found for the expression $\frac{c_n - c}{c}$ in equations (101) and (102).

In illustration: assume the areas of the orifice equal to 1 square foot, and the area of the cross section of the conduit, A G F E, equal to 2 square feet; then $n = \frac{A}{A_c} = \frac{1}{2}$.

Substituting the value of n in Eq. 102,

$$\frac{c_n - c}{c} = 0.076 (9^{\frac{1}{2}} - 1). \quad (103)$$

Now the $\frac{1}{2}$ power of 9, in other words the square root of 9 $= 3$; $3 - 1 = 2$; hence $\frac{c_n - c}{c} = 0.076 \times 2 = .152$, correction found for $n = \frac{1}{2} = 0.5$, in Table 2.

In the computation of Tables 10 and 11, different values from $n = .05$ —the common difference being .05—to $n = 1$, are employed.

TABLE 10.

Corrections of the Coefficients of Flow for Circular Orifices. Weisbach.

$n \dots$	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
$\frac{c_n - c}{c}$	0.007	0.014	0.023	0.034	0.045	0.059	0.075	0.092	0.112	0.134
$n \dots$	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
$\frac{c_n - c}{c}$	0.161	0.189	0.223	0.260	0.303	0.351	0.408	0.471	0.546	0.613

If n has any value not found in Table 10 or Table 11, substitute such value in equation 99 in case the given orifice is circular, or in equation (100) in case the orifice is rectangular, and solve by means of logarithms.

TABLE 11.

Corrections of the Coefficients of Flow for Rectangular Orifices.—Weisbach.

$n \dots$	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
$\frac{c_n - c}{c}$	0.009	0.019	0.030	0.042	0.056	0.071	0.088	0.107	0.128	0.152
$n \dots$	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
$\frac{c_n - c}{c}$	0.178	0.208	0.241	0.278	0.319	0.365	0.416	0.473	0.537	0.608

EXAMPLES AND CALCULATIONS ILLUSTRATING THE TABLES 10 AND 11.

Ex. 53.—The diameter of a circular orifice being 6 inches $=.5$ feet, the head on center 9.06 feet, the area of the orifice one-fourth (.25), that of the cross section of the conduit A G F E, Fig. 16, what is the coefficient of discharge?

Cal.—By Table 9, the coefficient of discharge through a circular orifice 6 inches diameter $=.5$ feet in a thin partition under a head of 9.06 feet of water, nominally still, as observed by Gen. Ellis, is $=.60191$; say $c = .602$.

By Table 10, the value corresponding to $n = .25$, the given ratio, is:

$$\frac{c_n - c}{c} = 0.045,$$

Solving this equation for c_n ,

$$c_n = 1.045c.$$

Substituting the value of $c = .602$ in the last equation, there results:

$$c_n = 1.045 \times .602 = .629. — \text{Ans.}$$

ENGINEERING NOTES.

The Davis Island Dam at Pittsburg.

One of the most important engineering enterprises successfully accomplished during the current year is the completion of the Davis Island dam, five miles below Pittsburg, Pa., to secure the uninterrupted navigation of the Ohio river up to that important shipping point.

The dam was formally opened October 8th. The general idea of the system is the conception of a French engineer, Chanoine, from whom the system takes its name. It has been in successful operation for more than 20 years on several streams in France. In the building of a dam on the Ohio river, however, many problems arose that had never presented themselves in France; nevertheless, the question was largely a matter of experience, with the weight of judgment largely in favor of its success. Captain Mahan, acting under the orders of Colonel Merrill, was placed in charge of the work. Its cost has been about \$900,000; but had it not have been for certain unnecessary hindrances, growing out of the tardy action of Congressional applications, it might have been built for about two-thirds of the sum.

It is impossible to give any very intelligent description of the work without elaborate diagrams. Suffice it for the present to say that the dam's distinctive feature is its movability. It is in reality 300 little dams, each so hinged that it can lie prone upon the river bed. This line of movable dams, or "wickets," extends the entire distance across the river, 1223 feet. Of this distance, 559 feet only is the navigable pass or pathway for all craft when the lock is not used. The rest of the dam is designated as "weirs," of which there are three, divided by solid piers of masonry. To raise the wickets of the navigable pass, a "maneuvering boat" is used; to raise the "weir" wickets, a "surface bridge" is called into play.

Like the wickets, this bridge lies upon the bed of the river when not in use, and is raised and joined section by section. To raise the wickets and tilt them into position, where they are retained by a prop, calls into play an ingenious device, the Pasqueau "harrier." A deft pull upon the prop dislodges it, and permits the wicket to recline upon the bed wrested from the river. Between each wicket is a space of an inch or two which can be batted if desired, but which will probably be left open to permit the passage of surplus water.

The monster gates of the lock are closed by force generated in a turbine wheel fed by water stored in huge tanks. Each gate rolls upon its track, and when in position they form the upper and lower extremes of a lock 110 feet wide and 600 feet long; a space sufficient to accommodate a tow boat and average tow of canal boats and barges. To fill the lock requires but four minutes' time; to empty it, the same.

To the hydraulic engineer, especially this is an interesting work. It is invaluable to the industries of Pittsburg, as it keeps up the year round, a competitive means of transportation to the west with the railroads. When the stage of water does not require its use, it lays prone upon the bed of the stream, and the boats pass over it.

Thus far the dam has answered all that could be expected from it, and if the same degree of success continues through the low water season of the river, other improvements of a like nature will be set on foot, wherever practicable in all localities where the demands of commerce may call for the same.

A NEW RAILWAY CABLE DEVICE.—The directors of the Brooklyn City Railroad Co. have under consideration a plan for using a cable for the motive power of surface cars in Fulton street. President Hazard recommends the adoption of a system of twin cables, a few inches apart and joined to each other by steel bars at short intervals. These will make a sort of endless chain of the cable, and the grip wheel will have projecting cogs, so as to revolve with the cable when the car is stopped, and to draw the car when the motion of the wheel is stopped by a brake.

A SYSTEM OF AUTOMATIC BRAKES has been patented in England in which the weight of the cars sets the brakes. When it is required to move the train this weight is lifted from the brake blocks by hydraulic or other power, a set of pistons being attached to each car. It is claimed that with this system the breaking or retarding force is exactly proportioned to the momentum weight of the car, as an empty car will exert less force upon the brake blocks than a loaded one. An automatic regulator is also a part of the system by which the braking force is controlled to prevent "skidding" or sliding.

THE NEW BRUNSWICK SUB-SEA TUNNEL.—Notice has been given that an application will be made to the Dominion Parliament for authority to construct a submarine tunnel under the Northumberland straits to connect New Brunswick with Prince Edward's Island.

ARSENIC IN THE SOIL.—A German writer, in an article published in the *Comptes Rendus*, on June 2d, on arsenic in the soil of cemeteries, from a toxicological point of view, confirms the observation of Orfila in 1847, and proves the possibility of arsenic being conveyed by the soil into a corpse.

USEFUL INFORMATION.

TO PREVENT THE TARNISHING OF SILVER PLATE.—Many efforts have been made to devise a method of preventing the tarnishing of silver and silver-plated ware upon exposure to the atmosphere. The blackening which such articles speedily suffer is due principally to the formation of a superficial film of silver sulphide by the action of the sulphurous vapors in the atmosphere, especially in cities where the large consumption of coal and coal gas charges the atmosphere with sulphur and sulphur compounds. Of all the suggestions that have been made, none appear to have given as satisfactory results as a varnish of collodion—a solution of gun-cotton in a mixture of alcohol and ether. All other varnishes appear to impart a yellowish tinge to the silver or plated wares, but collodion varnish is quite colorless. The articles should be carefully brushed with the varnish with an elastic brush, making sure that the entire surface is covered. The film of collodion will protect the underlying metal surface for a long time. Where silver plate is laid aside and not often used, a prepared cloth or paper is sometimes used as a wrapper, which, if carefully placed around the article, will prevent, or at least greatly retard the tarnishing. These protective wrappers are easily prepared and at small expense. Caustic soda is dissolved in water until the hydrometer shows 20° Beaume. To this mixture is added oxide of zinc until the amount reaches about two-thirds the quantity of caustic soda, and the mixture is boiled until perfect solution is effected. Water is then added gradually to reduce the solution to 10° Beaume. Into this solution muslin or paper is dipped, and when dry is ready for use.

POSSIBLY POISONOUS LARD OIL.—A correspondent of the *Scientific American*, writes that journal from Syracuse, N. Y., as follows: A recent experiment with what is termed low grade lard oil, or bolt oil, has convinced me that machinists and others cannot be too careful to keep it from any slight abrasion of the skin, as the following will prove. Having to fit some new dies to my bolt cutter, and testing their operation, my hands became covered with this so-called lard oil. A slight and almost unnoticed abrasion of the skin below the nail of my left thumb allowed it to come in contact with the flesh beneath; in about an hour it became, first red and painful, then tumid, and finally black, showing unmistakable signs of blood poisoning, which resisted all remedies until cauterized with caustic potash.

Upon this becoming partially healed, I returned to my experiments, having taken the precaution to well protect the injured part by wrappings; but some of the oil found entrance under the edge, and remained in contact with the skin all day, the consequence of which was that the animal poison was again absorbed by the sound but tender skin, and became diffused all over the thumb and as far as the wrist. It could only be checked by further cauterization and poulticing, bathing the wrist and arm with iodine and aconite, and at every renewal of poultices bathing the broken skin with a tepid weak solution of carbolic acid, viz., three drops saturated solution (20 per cent water to crystals) to 1 pint of soft water. The skin has separated from nail to wrist, and after intense suffering for two weeks is slowly healing under a covering of old linen dipped in "cosmoline." Query: Was this oil made from the fat of diseased animals, that is, "honeyard oil"?

PHOSPHORESCENT BEEF.—A gentleman in New York, a few days ago, became greatly alarmed at finding a choice piece of beef, which he had purchased for his Sunday dinner, emitting light when placed in the dark. He sent it to Dr. Edson, of the Board of Health, for examination. Dr. Edson called in the meat inspectors and they shook their sides with mirth because a man had given away an extra fine tenderloin roast. "Why," said one of the inspectors, "when a piece of beef has been kept in an ice box just long enough to be fit for the oven it has a phosphorescent coating which gives out a faint glow in the dark. That is one of the sweetest and tenderest chunks of meat that I ever saw." Dr. Edson sent the beef to his own house, with orders to have it cooked for dinner. He told his assistants the next day that he had enjoyed dining at Colonel Jussen's expense, and had written to the purchaser that the beef was prime.

SUBSTITUTE FOR BUFFALO HIDES.—Since the buffalo has been undergoing its recent rapid process of extermination, substitutes for the old-time buffalo robe are eagerly sought for. The Russian dog skin for a while came into high favor; but of late that has been thrown aside for the hide of the Galloway cattle, which, aside from the unsightly effects of the branding iron, is said to be nearly equal in appearance and service to the far-famed buffalo hide. The two animals have also a striking resemblance to each other in life, and have an advantage over the buffalo in color and texture of fur.

LEATHER AND RUBBER BELTS.—In putting on leather belts always place the rivet head side to the pulley, and for rubber belts place the seam side out or away from the pulleys. Never put resin on a rubber belt. If it is a new one, it will cause the rubber to stick and accumulate on the pulleys, and eventually ruin

the belt, and further, when resin has been applied for some time it will form a glazed, hard surface, causing the belt to slip out more than it did before the application was made. If a leather belt gets too dry, use tallow, or a mixture of castor oil and tallow. Watch the lacings closely, and when you find one giving way replace it immediately.

SAVING FROM SOAP WASTE.—According to Professor Lunge, about 55 to 60 per cent of the fatty acid originally contained in the soap are now recovered in the Swiss works out of the waste soap liquors, which, in former time, were allowed to run away without utilization. The waste soap baths are treated with sulphuric acid, when a pasty precipitate is formed consisting of the fatty acids, pigments, and nitrogenous products. It is decanted, and then the paste is placed at once in a Winterthur separation machine. The water is first of all pressed out, then the pressure is increased while the heat is applied at the same time, finally the remaining mass is extracted with bisulphide of carbon or petroleum spirit. The fatty acids obtained are of good appearance, and, of course, can be used again in the manufacture of soap. There is a large amount of valuable material allowed to pass off with the waste waters of our California works.

HOW WATCHES ARE DEMAGNETIZED.—A watch which has been often brought in near contact with a "dynamo" is very likely to have its steel parts become magnetized to such an extent as to be useless as a timekeeper. It was a long time before any method could be devised to remove the trouble. But it is said that watches are now readily demagnetized by the following simple method: Suspend the watch by a cord or chain in a powerful magnetic field—as in proximity to the pole pieces of a dynamo-electro machine—twisting the cord between the fingers to cause the watch to rotate rapidly, and at the same time gradually move it away from the magnetic influence. By this simple means—the rapid reversal of magnetization and its weakening by gradual withdrawal—the parts become demagnetized.

A WELDING HEAT.—A correspondent of the *Blacksmith and Wheelwright* writes to that journal as follows: I would like to suggest to blacksmiths that they use anvil dust as a flux in welding oblique tires. The result will be likely to surprise those who have never tried it.

COLOR IN PHOTOGRAPHY.—It is said that the medium mulatto makes the finest photograph in the world.

GOOD HEALTH.

An Over-Susceptible Stomach Not Such a Bad Thing to Have After All.

How very powerful a human stomach may sometimes be, and how large a task in the way of digestion it may sometimes perform without complaint, is known to those who have had the opportunity of observing what certain persons with exceptional power are accustomed to take as food, and do take for a long time apparently with impunity, remarks Sir H. Thompson, in the *Nineteenth Century*. But these are stomachs endowed with great extraordinary energy, and woe be to the individual with a digestive apparatus of moderate power who attempts to emulate the performance of a neighbor at table who, perchance, may be furnished with such an effective digestive apparatus!

But, after all, let not the weaker man grieve overmuch at the uneven lot which seems to have been provided for mortals here below in regard to this function of digestion. There is a compensation for him which he has not considered, or perhaps even heard of, although he is so moderately endowed with peptic force. A delicate stomach which can just do needful work for the system and no more, by necessity performs the function of a careful door porter at the entrance to the system, and like a jealous guardian inspects with discernment all who aspire to enter the interior, rejecting the unfit and unbidden, and all the common herd.

On the other hand, a stomach with superfluous power, of whom its master boastfully declares that it can "digest tenpenny nails," and that he is unaccustomed to consult its likes and dislikes, if it have any, is like a careless hall porter who admits all comers, every pretender, and among the motley visitors many whose presence is damaging to the interior. These powerful feeders after a time suffer from the unexpended surplus, and pay for their hardy temerity in becoming amenable to penalty, often suddenly declared by the onset of some serious attack, demanding complete change in regimen, a condition more or less grave. On the other hand the owner of the delicate stomach, a man perhaps with a habit frequently complaining of slight troubles and always careful, will probably in the race of life, as regards the preceding pilgrim, take the place of the tortoise against the hare. It is an old proverb that "the creaking wheel lasts longest," and one that is true as regards a not powerful but nevertheless healthy stomach which is carefully treated by its owner, to whom this fact may be acceptable as a small consolation for the possession of a delicate organ.

For it is a kind of a stomach which not seldom

accompanies a fine organization. The difference is central, not local—a difference in the nervous system chiefly; the impressionable mental structure, the instrument of strong emotions must necessarily be allied to a stomach to which the supply of nerve-power for digestion is sometimes temporarily deficient and always perhaps capricious. There are more sources than one of compensation to the owner of an active, impressionable brain, with a susceptible stomach, possessing only moderate digestive capabilities—sources altogether beyond the imagination of many a coarse feeder and capable digester.

SUGGESTIONS FOR WINTER.—The maintenance of good health is always of first importance to insure success in any undertaking. Suggestions to this end are now especially seasonable. The statistics of mortality show a heavy increase in the death rate every year on the approach of cold weather, and this curiously holds true of the deaths by what are popularly known as summer diseases. When the outside temperature falls the animal heat is lessened, and this decreases the ability of the digestive and other internal organs to fulfill their usual functions. Warmth is life. Cold is death. There is a widespread popular delusion that cold weather, and especially cold winters, are mostly healthful. For the man who keeps himself warm it matters little how the outside temperature may go. There is perhaps an advantage to those disposed to consumption in any healthy cold air, provided always the temperature of the body is maintained by plentiful food and warm clothing. Cold air expands in the lungs, and thus expands them. It furnishes a greater supply of oxygen than warm air does or can. Yet so sensitive is the consumptive to the cold air surrounding his body, that the approach of cold weather is always considered a critical time for him. It ought not to be so, and would not be so, if the temperature of the body was maintained by sufficient clothing.

CONTAMINATED DRINKING WATER.—Contaminated drinking water is the cause of so much sickness that every man and woman grown should know good water when they see it, and have the means of testing it. Water may to all appearance be clear and sparkling and yet contain the germs of foul diseases. The presence of chlorine tells the story. This substance is never found in the soil, and when discovered in water must have come from the human system. In our daily food we use salt—the chloride of sodium. After passing from the human body it becomes separated, and the chlorine makes its appearance in the contaminated water. As much as thirty or forty grains to the gallon is often found in water drawn from wells near where people live. Let it be understood—the more chlorine in the water the more danger, and, also, that no water is really fit to drink which has any of this foreign substance. This is not a pleasant subject to discuss, but people who are too dainty to pay attention to it endanger their health and that of the community they live in. —*Iron Review*.

THE SOIL AS A FILTER.—The conclusions from experiments made by the National Board of Health of New York, and conducted by Raphael Pumpelly, corroborate the opinion of every sanitarian in this country, that though natural soil is an excellent filter for impure air that may pass through it, it is a poor filter for infected water. The experimenters say: "From these results it appears that sand interposes absolutely no barrier between wells and the bacterial infection from cesspools, cemeteries, etc., lying even at great distances in the lower wet stratum of sand. And it appears probable that a dry gravel or possibly a dry very coarse sand interposes no barrier to the free entrance into houses built upon them of these organisms, which swarm in the ground air around leaky drains," etc. Other experiments have shown that ground air will take up infectious germs from water that is disturbed.

Water is Fattening.—It has been observed that water is fattening, that those who drink large quantities of water have a tendency to fullness and rotundity. That there is considerable truth in this observation the *Medical and Surgical Reporter* fully substantiates. That excessive inhibition of very cold (iced) water (especially when one is very warm) is not to be commended, yet we have reason to believe that the unlimited use of pure spring water, at its natural temperature, is not only very conducive to health, but has an actual tendency to favor a fullness and roundness of body. Whether this is the result of a better action on the part of the digestive, assimilative, and depurative functions, owing to the internal cleanliness or flushing of the human sewers produced by large quantities of water, or whether water has some specific action in producing this fullness, we do not know, neither does it signify, since observation confirms as a fact that the free use of water does have this effect.

FALLING OFF OF HAIR.—R. P. Henderson advises in the *Herald of Health*, use directly on the scalp every night before retiring, a preparation of one part of crude white birch oil and five parts of alcohol; the latter will evaporate at once, leaving the oil on the scalp. Do not use too much. Follow up the treatment about six weeks, then discontinue; go bare-headed all you can; use a light, well ventilated hat when you must wear one; cut the hair short; invigorate your health by living more out of doors.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CON, AMADOR.—*Sentinel*, Dec. 16: There is talk that the old shaft of the Con. Amador mine of Sutter will be opened soon, in the belief that the mine can be made to pay through the old works. The Mahoney is working a surface lead with some degree of success. Periodically the owners of this mine come up from the city, walk around the town, take a look at the mine, and assume an air of mystery, which causes the Sutter Creek people to remark, things are going to boom sure this time. They are still hoping. Sam Stewart is crushing rock from a surface lead on the Lincoln ground, which runs toward the Mahoney. Mr. Knight is having a rigging put in at the Zelle mill to enable him to test his water wheels, and there is talk that Pelton will put in a wheel here and have a public test of the merits of the two wheels. We have heard it suggested that if the Kennedy mine should be worked successfully that fact might induce the starting up of the Oneida. The Mahoney mill was shut down Monday and the water is being pumped out of the mine for the purpose of letting the parties who have been talking of buying see it.

MOORE.—Amador *Ledger*, Dec 16: This mine continues to develop finely. The shaft is down over 300 feet. The ledge is reported over 10 feet wide; nearly the whole of it of paying grade, and four feet of it is exceedingly rich, showing free gold to the naked eye in abundance. It is confidently asserted that this ore will yield from \$30 to \$40 per ton. The prospects are so encouraging that the 10-stamp mill is to be put in repair and started up as soon as possible. D. Donnelly of Sutter Creek was over Wednesday last in consultation with W. A. Nevills regarding the overhauling of the mill.

DOYLE.—William Doyle, the owner of the quartz mine in Hunts gulch which bears his name, has just finished a test crushing of ore from his claim at the Kelly mill. He took 25 tons of ore from the dump, which he considered of average quality. The rock yielded \$6 per ton in free gold. The sulphurets, of which the ore carries from 2 to 3 per cent, were not saved. And as the assay value of the sulphurets runs over \$500 per ton, the rock, including sulphurets ought to yield from \$7 to \$8 a ton. The ore body is of vast dimensions, and the result of the test is of such an encouraging character that the mine is well worthy the attention of capitalists on the lookout for profitable investments. Doyle is a poor man, and conscious of his inability to operate a mine such as his. The whole or a portion of the claim may be secured on very liberal terms.

MISCELLANEOUS.—The South Spring Hill mill is now running steadily to its full capacity of 20 stamps. Everything runs smoothly and satisfactorily. It is one of the finest mills in the county. A clean-up at the Gover mine was made last week—the first since the resumption of work. We are not able to give the yield per ton, further than that it reached a paying figure. The ore is low-grade, but sufficient to pay something over expenses. At the Loyal Lead mine north of the Gover, affairs have a prosperous look. The ledge, we are told, is 30 feet wide, and of good quality. The big tunnel at Middle Bar has now reached a total length of 3200 feet. Small stringers of quartz are frequently met with, and occasionally bunches of rich black metal. The header is yet 200 feet from the spot where the rich deposits of the Mammoth mine are likely to be met with. W. A. Nevills & Co., completed the purchase of the Moore mine on Wednesday, paying the balance of the purchase money of \$15,000. The bond did not expire until spring, but the prospects of the mine are so flattering that they deemed it advisable to redeem it at once.

Mariposa.

DILTZ MINE.—*Mariposa Gazette*, Dec. 16: Captain Diltz says the rainy season stopped so short that it did him but little good. But when there is no water to wash he continues excavating and wheeling out from the large crosscut, which is 40 feet wide and from 15 to 50 feet deep. This crosscut passes through numerous strata of quartz, each of which are inlaid with a casing of red ochre, decomposed quartz and dirt, which principally carries the gold that is saved from the wash. Free gold is frequently observed and occasionally a small nugget is picked out, but the whole mass is taken to the front, assorted and piled. The hard quartz is piled for milling. The decomposed quartz and casing, which carries the free gold, is piled to itself and the great mass of dirt and vein matter is put in another pile, which makes three heaps in all.

Nevada.

FINE PROSPECT.—*Foothill Tidings*, Dec. 18: This morning Hank J. Snow took about half a pound of rock from a quartz ledge which he owns and which is situated on Deer creek, pounded up the rock in a hand mortar and the result was a yield of about 98 cents in gold and some sulphurets. The ledge is large, and the rock pounded up was just taken from the croppings.

Placer.

CLEANUP.—Placer Co., *Republican*, Dec. 16: Last Saturday was pay-day at the Big Oak Tree mine at Colfax. The pay-roll aggregated \$6,000, \$15,000 was cleaned up for the first run, and the miners who work there say the quartz continues as good as ever. The French company has bonded the Forks House Consolidated, the Cape Horn, and the Alameda Consolidated claims between Damascus and Indian Springs. They have also entered into an arrangement to purchase the Mountain Gate mine at Damascus on payment of a certain percentage of the stipulated price. The prospects of the Palmer & Floyd tunnel, down Auburn ravine, are more encouraging every day. The rock found so far is rich both in gold and silver. They are at present at work on a winze. Two assays of the rock have been made, one yielding \$50 in silver and \$19 in gold, the other, of selected rock, yielding \$600 in silver and \$15 in gold. The mine has been named the St. Anthony.

DEBRIS DAM.—The dam constructed on Bear river to restrain the debris from the Liberty Hill mine has stood through the late storms, and is pronounced by competent miners as very satisfactory.

Shasta.

DEADWOOD AND FRENCH GULCH.—*Redding Independent*, Dec. 16: There is considerable mining going on in the gulches between Shasta and Deadwood. It was pay-day Sunday for the employees of the Niagara mine, owned by W. T. Coleman. T. Plumb, one of the leading merchants of that place, informed us that over \$3400 was distributed among the boys. Tom Green employs over 20 men in his mine, and he informed us that he is taking out some very rich rock at present. The Scorpion mine is running full-handed and the returns from the ore are good. The McDonald boys are taking out some splendid ore at their mine near Deadwood, and the deeper they go down the richer it gets. Chinamen own and run all the large placer claims in and about French Gulch. They have several Giant monitors in operation, and the farmers along the Sacramento river never make any pretensions to serve an injunction on their claims.

San Bernardino.

SODA LAKE ITEMS.—*Calico Print*, Dec. 20: Last Thursday Mr. H. B. Stevens returned from Soda Lake, where he has been prospecting and attending to his mining interests. He says he is very favorably impressed with the prospects of that section, and considers it a good mineral country, but it will require time and hard work to determine whether the mines will be permanent. New ore deposits are being discovered every day, and it is expected that considerable work will be accomplished after the first of January. Two districts have been organized, the Sullivan camp being included in what is now called Five Points district, and Riggs' camp in Solo district. The last name is very inappropriate, and the public may think it was chosen by a singing school class. The name of Soda Lake is more appropriate, because it has always been associated with that section by the public. We understand that the organization of the "Solo" district is not complete, and we suggest that the old name of Soda Lake be retained, unless the reasons for the change are conclusive. H. E. Evans' well in the Riggs camp is now down 40 feet, and he expects, according to the "water witch," which has directed him to water several times, to reach water at a depth of 65 feet. Mr. Stevens was informed by the owner of the gold mine, near Cadiz, that he had sold the same to a San Francisco capitalist, and in due course of time a mill would be erected there. This is the mine that J. L. Porter, of Waterman, had bonded and spent about \$12,000 in developments. Mr. Stevens intends in a few weeks to do some work at his mines near Bagdad.

Sierra.

CLEANUP.—*Mountain Messenger*, Dec. 19: The cleanup at the Bald Mt. Extension, last Sunday, at Forest City, was 199½ ounces of gold. The miners over north have a good flow of water, and are busy at work in their claims. Aaron Todd last week cleaned up 20 ounces of gold at his drift claim in Fotosi. The Forbes & Taylor mill is crushing ore at the Belmont ledge, Poker Flat, with good results. The Union Gold Mining Co., at Gibsonville, is having large weekly yields of gold. David McDonald, Thos. Castello and Wm. Cosker, of Howland Flat, called on us Thursday, and reported snow two and a half ft. deep in that mining camp; no snow at Poker Flat; two ft. at Deadwood; two and a half ft. at Fir Cap.

FOREST CITY.—Evans Johns and Wm. Feezy have taken the contract for running 326 ft. of sluice tunnel for the Extension Co. Mike Wylie and Bert Bradbury have a contract of 800 ft. of tunnel to run for the South Fork, and have already commenced operations. The company have put up a fine building to be used as a carpenter shop, blacksmith shop and timber shed.

Tuolumne.

MINE SOLD.—*Union Democrat*, Dec. 19: The Hyde mine and ranch property has been sold to A. P. Hotaling, Henry Allen and John W. C. Maxwell. A bond was placed in the Recorder's office Wednesday to the effect that M. H. Hyde will give a clear title upon compliance with an agreement on the part of the purchasers, and the final payment of \$16,000 a year hence. In the meantime the mine will be worked by the new parties. It has been regarded as a valuable property, but lack of means has prevented development heretofore. During the year if experts are not mistaken it will make a fine showing among paying mines.

Trinity.

AT WORK.—*Trinity Journal*, Dec. 16: Miners throughout Trinity county are all at work with an ample supply of water; it is stated on authority that more work will be done in hydraulic mines before January 1, 1886, than was done during the entire season of 1884-85. It is further predicted that the gold yield of Trinity for the current season will be greater than ever before known.

BIG PAY.—Newman & Hurlbut made a cleanup in their arastra on Eastman gulch this week, and we learned that the ore crushed averaged \$115 per ton. This is away up, and they have more of the same kind on the dump and in the mine.

NEVADA.

Washoe District.

HALE & NORCROSS.—*Enterprise*, Dec. 19: On the 300 level, the main lateral drift north is steadily advanced, following the diamond drill hole which was sent in a due north and not northeast direction toward the Savage line. This drill hole was about 100 feet in length, reaching to and a little into the Savage mine. It tapped no water and showed no rich sulphurets, and will be steadily continued through to and into the Savage ground, as it can be done with the most perfect facility and safety, after which crosscuts will be made east toward the good ore body developed in driving the diamond drill to the northeast, where the drill demonstrated that water might be found as well as ore. On the 300 level, upraising in the ore body above the deep winze station has attained a height of 40 feet. The ore body has widened out considerably and is showing well. It is not a solid mass of rich ore, but streaks and bunches of it assay up in the hundreds. Some of this ore reminds one of the very rich black sulphuret and chloride ore of bonanza days, when Fair and Mackey and Flood and O'Brien were getting rich tolerably fast. The ore is good enough, and all that is required is plenty of it. It is being stopped out and hoisted to the surface as opportunity offers.

UNION CONSOLIDATED.—On the 500 level the crosscut east, 100 feet south of the Sierra Nevada

line, is in 365 feet; material, favorable, same as last week.

KENTUCK.—The regular milling supply is kept good from the old upper workings, with plenty of ore in sight to last for many months.

BEST AND BELCHER.—On the 1000 level west crosscut No. 3 is in 332 feet; material, vein porphyry, clay and quartz.

MONTE CRISTO.—Ore enough is being extracted to keep the mill steadily running.

Hawthorne District.

THE DICTATOR.—*Walker Lake Bulletin*, Dec. 19: A development was made in the Dictator last week, which will almost immediately place it on the list of paying mines. A large vein of free gold quartz has been uncovered, the assays being from \$30 to \$40. As this is on the large and strong ledge of Hawthorne district, and right at the crest of the slope to the railroad, the value of the discovery can be easily seen. Extraction will be easy and the cost of hauling to the mill at Kinkead will be but light. If there is no sudden change for the worse, Moss will soon have to enlarge his mill.

THE PAMILCO.—The Pamlico mill is still showing ore which is really astonishing in value. Instead of rock, some of the pieces may be described as gold having a little quartz mixed with it. Of course, there is no immense ledge of this kind of material, but a little goes some distance, and the six inches that now show are about as opulent inches as can be found in this part of the country.

ARIZONA.

TO SHIP ORE.—*Prescott Courier*, Dec. 14: Frank Alters proposes to put a blast or two in his Catocin mine and knock down twenty or thirty tons of high grade silver ore which he will ship to Pueblo. His ventures in this line have paid him well. The expense of shipping and treating ore runs, we believe from \$60 to \$100 a ton. Mr. Alters thinks that when the railroad shall be built to Prescott, there will be a profit in shipping ores that assay \$25 a ton. When that time shall have come there will be thousands of miners in the country around Prescott. The Sterling mill is running and paying. The men were paid off a few days ago. B. T. Riggs & Co. have their hydraulic diggings on Lower Lynx creek in good fix, and are praying for a downpour of rain or snow. They have a great many acres of gravel that will pay to pipe. Mr. Tracy, of Hassayampa creek, recently found a piece of gold that weighed an ounce, and another which is worth \$10. He has taken several pounds of nuggets out of his claim and expects to take out twenty times as much. The chlorides of Humburg, Turkey creek and some more districts are hoisting a great deal of rich silver ore and shipping it to various smelters. Miners are anxiously waiting for the erection of sampling works in Prescott. They would be of great convenience, and all our people hope the parties who talk of erecting them will do so as speedily as possible.

COLORADO.

NOTES.—*Colorado Miner*: The last mill-run from the Mint lode returned 180 ounces silver to the ton. Work has been closed down for the winter. The machinery to be placed on the Nyanza lode, on Democrat mountain, is now on the ground, and Capt. McCassey is engaged in placing it in position. Work is now being done on the Surprise lode, on Keith mountain. If a certain project is consummated, a prospecting tunnel will soon be underway at or near the base of Democrat mountain. Report reaches us that a sale has been made of the Virginia lode, in Spring gulch. The Beecher lode, on Democrat mountain, is now being worked with remunerative results. Messrs. George Shavalia and Wm. Perrin have been working the property under lease for a short time. The percentage in silver is small, but in lead it returns handsomely, and with the present price for that metal the lode can be worked profitably.

IDAHO.

WISWELL MILL.—*Wood River Times*, Dec. 16: The Wiswell mill was cleaned up yesterday by Frank Wiswell, General Agent of the Wiswell Electric Machinery Company. The amalgamator in charge of the mill stated that it had run close on to 22 hours, and that 12 to 14 tons of ore had been put through. The result was a ball of hard amalgam weighing about eight ounces, which would yield about two and a half ounces of fine gold. It was locked up to await the next cleanup, which will be made in about one week. J. C. Conklin, who came up from Salt Lake on purpose to see the cleanup, was present. He examined every working part most critically, and with the exception of the gearing, which he thinks, is rather weak from so much effective work, he considers the mill a perfect success. Captain Lusk was also present, as were a number of miners and old millmen, and all pronounced the machine built on correct principles, and evidently capable of doing excellent work. Superintendent Ole Rorem, of the Donovan Company, expressed it as his conviction that the mill would work closer than any gold mill he ever saw, and that it would do the work of 15 stamps. He said that in a short time, the company would doubtless require one or two more.

MONTANA.

SHUT DOWN.—*Inter-Mountain*, Dec. 15: Acting Superintendent Muller, of the Mountain Copper Company, has received peremptory orders to close down the smelters as soon as the ore already taken out has been reduced. Since Sunday no ore has been hoisted from the mines and none will be until orders to the contrary are received. There is only ore enough on hand to keep the works running for about five or six days, which will be the date for closing down. About 150 men will be thrown out of employment. While no more ore will be taken from the mine, the force of miners continues as before, their operations being directed to the development and prospecting work.

LIQUIDATOR.—*Inter-Mountain*, Dec. 16: One hundred tons a day are worked which yield 40 ton of concentrates, running from 22 per cent to 30 per cent. copper. The higher grades of concentrates are shipped direct to Liverpool, while the lower grade is sent to the Bell smelter, where it is reduced to matte and shipped to Liverpool. At present the company are not working their mine, and will not

open it up until the ore on the dump is exhausted. It is also their intention shortly to erect a furnace and smelt their own product. This, however, will not be done until operations are again begun on the mine. The Liquidator mine adjoins Clark's Colusa, and has already proven itself to be a large producer. The vein is from 30 to 50 feet in width, and there is an immense reserve of ore in all the levels which has never yet been touched. With a furnace added to its plant the Liquidator will take rank among the largest and most permanent producers in this district.

The Alice Mining Company own and operate four mines, namely, the Alice, Magna Charta, Valdemere and Rising Star, all on the Rainbow lode. In the Alice the main shaft is down 800, on the Magna Charta 700, and Rising Star 500. The workings in the Alice are from the 600-foot level upward, no ore having been taken from lower points. Their mines produce 100 tons of ore daily of an average value of \$40 a ton.

The Moulton also located on the Rainbow lode is sinking the main shaft to a depth of 700 feet. No ore has been extracted below the 500-foot level. The average value of the ore is \$40 a ton.

The Union Consolidated consists of a group of mines occupying a tract a mile in length and half a mile in width. The company is sinking on mines Nos. 1, 2 and 3. The property is being rapidly developed under the able management of the superintendent, Patrick Clark.

Goldsmith No. 1, the property of Mr. George Tong, is producing a quantity of the richest ore in the camp. The shaft is down to a depth of 265 feet.

The North Star and Salisbury are the most northern mines operated in the district, and are being worked under bond and lease by George Tong. They yield quantities of low-grade free milling ore.

The Black Rock is worked under lease by George Stoner. It produces manganese ore, which is very desirable in all mills, as it readily amalgamates with baser ores. The mine is making good returns to the owners and lessees. The ore averages about 50 ounces to the ton.

The Elm Orlu, owned by Hon. W. A. Clark, produces ore similar to the Black Rock, which is treated at Clark's smelter, and is used to make high-grade silver copper matte. It is one of the profitable mines of the camp.

NEW MEXICO.

MINERAL.—*Socorro Bulletin*, Dec. 16: The Graphic and Georgia Bell are steadily dumping good mineral under the superintendence of Capt. Day, and shipping to the Graphic Mining and Smelting Company of this city. H. G. May has completed a number of assessments, and on Thursday returned to his old camp in Water canyon, where he will commence several mining contracts and also work his own properties. The Graphic M. & S. Co. are working the Greyhound under the eye of Superintendent Day, and ship three carloads of the ore to Socorro per week for treatment. The mineral runs high in lead and gives a good percentage of silver. Work on the Morning Star in the Socorro district will soon be resumed. The tunnel is now in 500 feet, and 225 feet of work will be added by Capt. Day, the superintendent of the property. It is the opinion of the best mining authorities that he will strike ore in place. The May Cooper and White Rock claims, in the Iron Mountain mining district, are dumping mineral, the former from a 100-foot ore body and the latter from a four-foot vein. Arthur Radcliff a few days since discovered and located what will probably prove on development to be one of the most important claims in Water canyon. The discovery is in the north branch of the canyon, and he named it the Mugwump. Just below the surface the vein is eight feet wide and assays 50 ozs. of silver per ton. The mineral bears a great resemblance to that from the Jane Bowman, J. S. Sniffen and R. N. Sniffen have purchased the Rowena mine, in the Pueblo district, from T. M. Holmes. The property has a 110-foot shaft.

OREGON.

PLACERS.—*Jacksonville Times*, Dec. 10: Placer miners want more water at once. Gin Lin has had a full head of water for the past month at his Uniontown diggings and is making the most of it. Messrs. Willis and Gregory, two experienced miners, propose commencing mining operations on Forest creek soon. Supt. Ennis was over to the Sterling mines this week and reports operations progressing finely with plenty of water. John Miller of Farmer's Flat and Logg & McDonnell of Forest creek have already done some pipping, but have not enough water to work continuously. Both have first-class mines, Chas. Kearns has been awarded the contract for hauling 300 tons of quartz from Geo. Schump's ledge in Willow Springs precinct to this place. The hauling will be commenced soon. Tim Smith was up from Galice creek a few days ago. He informs us that quartz mining is about suspended in that camp, but that work on the Yank ledge will probably be resumed in the near future. Since it has become a settled fact that a fine quartz mill will be put up in this place, a great deal more prospecting is being done. Work has been commenced on a number of ledges which have been lying dormant for many years. A Footh creek correspondent writes the *Times* as follows under a late date: All the miners here are ready for water, and the new prospectors of the middle fork of Footh creek have their cabins built, roads dug and reservoirs made, and by the gold they pick up once in a while they feel quite hopeful. Thos. Mee is taking up his flume and relaying another one with better grade. Duffell, Lance & Co. have remodeled their reservoir, with hopes of doing better work this winter. We are informed that Brown & Co. have given orders for the construction of the quartz mill to be put up at this place and the machinery will be on the ground at the earliest possible moment. It will be a first-class mill in every particular, having all the latest improvements and capable of dealing with our rebellious ores in a rapid and efficient manner.

RICH STRIKE.—*Oregon Sentinel*, Dec. 12: Dick Cook, the well known, experienced quartz miner of this section, was sent to Galice creek last week by California capitalists to investigate that region in regard to quartz. On his return he informed us that the Yank ledge was not being worked at present, but tunneling would be resumed before long. While he was there a new strike of immense richness was made in Green Bros' ledge that will surely prove a bonanza to the owners if the new vein holds out as

it now shows. This mine has been successfully worked for many years, but not having the late improvements for saving sulphurates, probably not one-half of the gold was saved.

UTAH.

THE LEACHING WORKS.—Southern Utah Times, Dec. 14: The new leaching works, now almost completed, will begin operations next week. They are situated a mile southwest of town, and the plant, occupying the greater part of the building, is the most perfect of any in the Territory. A brief description of the works and process is of deep interest to our readers. The ore, after passing through a rock breaker, runs down through a hopper to a pair of Cornish rolls 14 inches wide by 18 inches in diameter where it is reduced to pulp fine enough to pass through a twenty-mesh screen where it is received by an elevator and emptied into bins above the leaching tanks. The bins are provided with chutes, so that the tanks may be charged by pressing a lever. The tanks, 10 in number, are 4x10 feet, and are of about ten ton capacity. The pulp is first treated to a bath of sulphate of copper; after standing six hours it is covered with a solution of hyposulphite of soda; six hours more completes the leaching and the second liquor is drawn off and the solvent conducted through pipes to the precipitating pans; these pans have perforated false bottoms above the real bottom, that permits the solvent to escape, but retains the pulp. After the solvent is drawn off, a stream of water under a twenty-foot pressure, is turned into the pans, a valve opening into a sluice at the bottom of each is opened and the tailings are sluiced out. The precipitating pans, three in number, are of considerable capacity. When the solvent is in these pans the sulphate of calcium is added which precipitates the silver in form of sulphides; after doing its work, it runs into a reservoir from which it is pumped back to the solvent tank above the rolls and used again; next is the drying and pressing of the sulphides for market. The entire process requires about eighteen hours. The company has 30,000 tons of tailings on hand. The machinery is run by a forty-horse-power engine. The best of material has been used and the works constructed in a most substantial manner indicating that the projectors of the enterprise, Messrs. G. L. Harding & Co., have an abiding faith in its success. The managers are reticent as to the terms they will offer chlorides but it is their intention to buy the ore they work. We are authorized to say that fifteen-ounce ore can be worked at a profit to the miner, as from sixty to seventy-five tons can be reduced every twenty-four hours.

PACK NOTES.—Record, Dec. 19: The Ontario mill shut down this week to put a patch on the big gear and for other miscellaneous repairs. The Corner Stone, the promising property, owned by Andrew Lundin, located about 600 feet north of the Daly, will have work resumed upon it the beginning of the year. The developments at present consist of an incline shaft 35 feet deep. Good ore has been struck, which carries a fair showing of high-grade yellow chlorides. It will most likely turn out to be a good mine. Some 20 miners were laid off at the Sampson this week on account of the scarcity of ore in the stopes. The large ore body that was struck the latter part of the summer proved to be a large pocket, and it is very nearly all dug out, but the ore in the rest of the mine is still as plentiful as before. This large body was struck and quite a number of men are still working in the stopes. In the east drift a force of men are working contract work, driving the drifts, and another force are at work in the tunnel running a drift to the west as a prospector. The company expect to cut the ledge and drain off the water from the lower levels some time in February. A number of men from the Sampson have left the camp for South Pass, Wyoming, to work on the Carisa mine, at that place.

Please Remit.

We would call the attention of Patrons who have not yet remitted their subscription for 1886 to the fact that we are not only in need of that which is due to date, in making settlements, but can use to great advantage, remittances for the next year, in making improvements and better arrangements for the future.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JARED C. HOAG—California.
J. J. BARTLETT—Amador and Calaveras Co's.
F. H. HORN—Nevada (State).
G. W. INGALLS—Arizona.
E. L. RICHARDS—San Diego Co.
R. G. HUSTON—Idaho and Montana.
GEO. McDOWELL—Santa Clara and Santa Cruz Co's.
HUGH ELIAS—Nevada Co.
J. WINKLER, Alameda Co.
M. L. DENNY, Yuba and Nevada Co's.
J. B. PATCH, Nevada and Utah.
L. D. CLARK, Tehama and Shasta Co's.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Bulwer Con M Co.	California.	2.	20, Oct 25, Dec 10.	Jan 20.	W Willis.	309 Montgomery St	
Daly Cement M Co.	California.	5.	02, Nov 19.	Dec 23.	Jan 12.	G J Collins.	512 Montgomery St
General L M Co.	Arizona.	7.	01, Nov 28.	Jan 9.	Feb 3.	R C Gillet.	628 Montgomery St
Golden Place M Co.	California.	4.	20, Dec 9.	Jan 15.	Feb 5.	F Schriener.	419 California St
Golden Jacket M Co.	Nevada.	1.	05, Oct 27.	Dec 3.	Dec 26.	R G McCellan.	331 Montgomery St
Gould and Curry M Co.	Nevada.	51.	25, Dec 4.	Jan 3.	Feb 1.	A K Darbow.	309 Montgomery St
Hathaway Hyd M Co.	California.	8.	45, Dec 8.	Jan 13.	Feb 8.	J H Moore.	Montgomery Block
Justic M Co.	Nevada.	45.	10, Nov 25.	Dec 30.	Jan 19.	R M Kelley.	419 California St
Julia Con M Co.	Nevada.	21.	10, Nov 4.	Dec 9.	Dec 30.	J Steinfeld.	419 California St
Mexican Development Co.	Mexico.	2.	10, Dec 9.	Jan 17.	Feb 1.	A G Nunez.	708 Montgomery St
Manhattan M Co.	California.	15.	10, Dec 10.	Jan 12.	Jan 30.	A B Brady.	Grass Valley
North Hammer M Co.	California.	8.	01, Dec 6.	Jan 9.	Jan 27.	T J Welch.	Grass Valley
North Gould & Curry M Co.	Nevada.	9.	20, Nov 23.	Dec 10.	Jan 27.	C D Mason.	331 Montgomery St
North Peer M Co.	Arizona.	2.	02, Nov 7.	Dec 10.	Jan 4.	H Deas.	309 Montgomery St
North Peer M Co.	Arizona.	2.	02, Nov 7.	Dec 10.	Jan 4.	H Deas.	309 Montg nery St
Transylvania Con M Co.	California.	3.	01, Dec 8.	Jan 8.	Jan 25.	M Byrne Jr.	Grass Valley
Plue Tree M Co.	California.	1.	15, Dec 22.	Jan 27.	Feb 15.	C A Sullivan.	309 California St
Potosi M Co.	Nevada.	21.	30, Dec 1.	Jan 7.	Jan 29.	F Elliott.	328 Montgomery St
Russel Reduction & M Co.	California.	1.	25, Oct 15.	Dec 29.	Jan 19.	J Morizo.	328 Montgomery St
Virginia Creek Hyd M Co.	California.	5.	05, Dec 14.	Jan 19.	Feb 11.	J M Quay.	406 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Gorilla M & M Co.	California.	A A Enquist.	430 Montgomery St.	Annual.	Dec 30
Utah Con M Co.	California.	W Granger.	Phelan Block.	Annual.	Dec 26
Selly Smelting Co.	California.	Called by Directors.	416 Montgomery St.	Special.	Jan 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Cladonit M Co.	Nevada.	W L Oliver.	328 Montgomery St.	10.	Dec 24
Jackson M Co.	California.	D O Bates.	416 California St.	10.	Oct 5
Manhattan S M Co.	Nevada.	John Crocker.	416 California St.	25.	Sept 1
Silver King M Co.	Arizona.	J Nash.	328 Montgomery St.	25.	Dec 15
Syndicate M Co.	Nevada.	J Stadfield Jr.	419 California St.	10.	Dec 21

Sales at San Francisco Stock Exchange.

THURSDAY A. M., Dec. 24.	1600	Hale & Nor.	3,900	95
50 Alpha.	400	120 Holmes.	11,500	50
100 Alta.	130	120 Justice.	130	50
130 B. & B.	140	140 Keutuck.	500	50
275 Bodie Con.	1,600	70 Mexican.	750	50
135 Bulwer.	900	60 Mono.	4,200	50
200 Chollar.	150	150 Navajo.	350	50
70 Crown.	500	100 Nevada.	1,000	50
150 Con. Pacific.	500	150 Potosi.	150	50
237 Con Va & Cal.	1,400	50 Savage.	1,150	50
50 Eureka Con.	1,110	50 Sierra Nevada.	550	50
100 Exchequer.	150	275 Union Con.	400	50
400 Gould & Curry.	500	10 Yellow Jacket.	300	50

San Francisco Metal Market.

[WHOLESALE.]

THURSDAY, Dec. 24, 1885.		
ANTIMONY—Per pound.	12	00
Hall's.	12	00
Cookson's.	12	00
Borax—Refined.	60	84
IRON—Clenagruock ton.	23	00
Eglinton, ton.	22	00
American Soft, ton.	24	00
Clippert Gap, Nos.	22	00
Olay Lane White.	24	00
Shotts, No. 1.	24	00
STEEL—English, lb.	16	25
Black Diamond, ordinary sizes.	13	00
Flow.	8	00
Machinery.	8	00
Sanderson Bros.	13	00
COPPER—		
Brass sizes.	20	00
Fire-box sheets.	20	00
Bolt.	20	00
Yellow Metal.	12	00
Ingot.	12	00
Lead—Fig. ton.	4	40
Bar.	4	50
Pipe.	7	00
Sheet.	8	00
Shot, discount 10% on 500 bag.	1	00
Shot, 9 bag.	2	00
Chilled, do.	2	25
ZINC—German.	9	00
Sheet, 7x3 ft. 7 to 10 lb. less the case.	7	00
QUICKSILVER—By the flask.	29	00
Flask, new.	1	00
Flask, old.	85	00
TINPLATE—Coke.	5	15
Orchard.	6	15
NEW YORK PRICES.		
California Borax.	70	00
Pig Iron, American.	17	00
Quicksilver.	44	00
Bar Silver.	1	00
Lead.	4	10
Copper.	11	25

Mining Share Market.

There is very little of interest going on at present in the mining share market. The working miners on the Comstock are all digging away and developing their claims, in the search for good paying ore. Wherever this is struck the stock market will feel it, but until something definite shows up in that region there is not much chance of improvement in the general market. The bonanza hopes and prospects of the middle mines still hold good, and in fact extra good at the present time, in view of what has been and is being developed in the ore vein or deposit in the upraise above the 3000 level. Sundry rumors of changes in the executive administration of the Yellow Jacket mine, also that the recent 75-cents assessment was levied for the purpose of putting a big new pump into the Yellow Jacket new shaft, to pump out and drain the Gold Hill section of the Comstock, also that the Bullion combination shaft was going to be sunk 700 feet deeper, in order to intercept and assist the drift coming south on the 3000 level of the Potosi ground, were all humbugs.

Bullion Shipments.

Argus, Dec. 16, \$8534; Richmond Con., 16, \$12,485; Oro Grande Mill, 18, \$3271; Koebeig Mill, 18, \$2500; Lexington, 12, \$18,056; Moulton, 12, \$21,760; Alice, 12, \$35,088; Allen Hayes, 12, \$2032; Hanauer, 15, \$6,700; Stormont, 15, \$3350; Queen of the Hills, 15, \$1400; Germania, 16, \$5758; Hanauer, 17, \$7000; Crescent, 17, \$340; Germania, 17, \$2491; Alice, 18, \$6569; Davenport, 18, \$266; Bauner, 16, \$7200; Germania, 20, \$2646; Hanauer, 20, \$4850; Overland, 20, \$1200.

The banks of Salt Lake City report the receipt for the week ending December 16th, inclusive, \$95,256.74 in bullion and \$25,271.36 in ore; total, \$120,528.04.

BOTANY.—Girls and boys will gladly accept one of Muller's pocket microscopes; X'mas gift.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 3.	WEEK ENDING Dec. 10.	WEEK ENDING Dec. 17.	WEEK ENDING Dec. 24.
Alpha.	60	40	55	40
Alta.	20	20	15	25
Andes.	25	25	20	15
Argentina.	1.30	1.45	1.30	1.00
Belcher.	1.30	1.45	1.30	1.00
Best & Belcher.	1.05	1.30	1.10	1.25
Bullion.	30	35	25	20
Bonanza King.	1.75	2.10	1.65	1.80
Bodie Con.	1.75	2.10	1.65	1.80
Benton.	1.05	1.10	1.05	1.05
Bodie Tunnel.	1.05	1.10	1.05	1.05
Bulwer.	1.05	1.10	1.05	1.05
California.	1.25	1.40	1.25	1.15
Challenge.	1.25	1.40	1.25	1.15
Chollar.	1.05	1.10	1.05	1.05
Cladonit.	1.05	1.10	1.05	1.05
Con. Imperial.	1.05	1.10	1.05	1.05
Con. Virginia.	1.25	1.40	1.25	1.15
Con. Pacific.	1.25	1.40	1.25	1.15
Crown Point.	1.05	1.10	1.05	1.05
Daly.	1.30	1.45	1.30	1.00
Eureka Con.	1.05	1.10	1.05	1.05
Eureka Tunnel.	2.00	2.50	2.00	1.50
Exchequer.	1.05	1.10	1.05	1.05
Grand Prize.	1.05	1.10	1.05	1.05
Hale & Norcross.	3.05	3.70	3.50	4.20
Holmes.	5.00	7.50	7.50	9.00
Independence.	1.05	1.10	1.05	1.05
Justice.	1.05	1.10	1.05	1.05
Martin White.	3.50	5.75	3.70	4.45
Mexico.	1.05	1.10	1.05	1.05
Mon.	1.05	1.10	1.05	1.05
North Belle Isle.	1.05	1.10	1.05	1.05
Ophir.	1.05	1.10	1.05	1.05
Overman.	1.05	1.10	1.05	1.05
Potosi.	1.05	1.10	1.05	1.05
Pinal Con.	1.05	1.10	1.05	1.05
Savage.	1.05	1.10	1.05	1.05
Seg. Belcher.	1.05	1.10	1.05	1.05
Sierra Nevada.	1.05	1.10	1.05	1.05
Silver Hill.	1.05	1.10	1.05	1.05
Silver King.	1.05	1.10	1.05	1.05
Scorpion.	1.05	1.10	1.05	1.05
Syndicate.	1.05	1.10	1.05	1.05
Toga.	1.05	1.10	1.05	1.05
Union Con.	1.05	1.10	1.05	1.05
Utah.	1.05	1.10	1.05	1.05
Yellow Jacket.	1.05	1.10	1.05	1.05

AN EXTRAORDINARY RAZOR

HAS BEEN INVENTED BY THE QUEEN'S OWN COMPANY, of England. The edge and body is so THIN and FLEXIBLE AS NEVER TO REQUIRE GRINDING and hardly ever setting. It glides over the face like a piece of velvet, and is a luxury. It is CREAMING A GREAT EXCITEMENT in Europe among the experts, who pronounce it PERFECT. Two dollars in buffalo handle; \$3 in ivory. Every razor, to be genuine, must bear on the reverse side, the name of NATHAN JOSEPH, 641 Clay street, San Francisco, the only place in the United States where they are obtained. Trade supplied; sent by mail 10c. extra, or C. O. D.



The California Perforating Screen Company.
All kinds of Quartz Screens, shot and brass for zinc, copper and brass for
FLOUR AND OTHER MILLS.
Quartz Mill Screens a Specialty.
147 Beale Street, San Francisco.

HALF SHARE IN GOLD MINE FOR SALE.

Three full claims; one claim developed; 400 feet shaft and tunnels. Mill test 34 tons gave 21 ounces gold, 3 ounces silver per ton; 100 tons gave \$20 gold per ton on ounces and \$23 in tailings; 14 tons gave \$7 per ton on plates. Custom mill within 6 miles of mine. For further particulars apply to
G. W. SPAWORTH,
Lang Station, Cal.

BADGES FOR ALL SOCIETIES,

Police, firemen, etc., presentation prizes or emblems, in gold, silver, or metal, sold at society prices by the agents of the Universal Badge Manufacturing Co., NATHAN JOSEPH & CO., 641 Clay St. Workmen and K. of P. badges in gold, \$1 each, sent C. O. D. Trade supplied

Dewey & Co.'s Scientific Press Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents.
No. 252 Market St. Elevator 12 Front St.
S. F. Telephone No. 658.

A. T. DEWEY. W. B. EYER. GEO. H. STRONG.

ASSESSMENT NOTICE.

Pine Tree Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Summit Mining District, Kern County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 23d day of December, 1885, an Assessment (No. 1) of 15 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 4 (second floor), 309 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 27th day of January, 1886, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 15th day of February, 1886, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. J. M. BUFFINGTON, Sec'y.

OFFICE—Room 4 (second floor), 309 California Street, San Francisco, Cal.

ASSESSMENT NOTICE.

Gould & Curry Silver Mining Co.

ASSESSMENT NO. 51.

Levied..... December 4, 1885
Due in Office..... January 5, 1886
Amount..... 25 Cents per Share
Sale Day..... Monday, February 1, 1886

ALFRED K. DURBROW, Secretary.

OFFICE—Room 63, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half-year ending December 31, 1885, the Board of Directors of the German Savings and Loan Society has declared a dividend at the rate of four and one-half (4 1/2) per cent per annum, on term deposits, and three and three-fourths (3 3/4) per cent per annum, on ordinary deposits, and payable on and after the 2d day of January, 1886. By order. GEO. LITTLE, Secretary.

DIVIDEND NOTICE.

Sap Francisco Savings Union,
532 California St., cor. Webb.

For the half-year ending December 31, 1885, a dividend has been declared at the rate of four and one-half (4 1/2) per cent per annum, on term deposits, and three and three-fourths (3 3/4) per cent per annum, on ordinary deposits, free from taxes, payable on and after January 2, 1886.
LOVELL WHITE, Cashier.

A Golden Opportunity in Montana.

FOR SALE.

20,000 TONS OF SEDIMENT from the tailings of a Gold Mill. Money in a metallic state; will average, gold, \$9.00; silver, \$7.00. Also 5000 feet of placer ground, which paid to ground sluice in 1886. Also 2 water rights. Apply to

BRAND & O'KEEFE,

Gloster Mine, Lewis & Clark Co., Mont.

TATUM & BOWEN,

25, 27, 29 and 31 MAIN STREET, SAN FRANCISCO.

91 and 93 FRONT ST., PORTLAND, OREGON

Manufacturers of

MINING MACHINERY, ENGINES, BOILERS, Etc.

We are manufacturing from Special Designs of the most experienced and successful Practical and Scientific Experts, Complete Plants for all descriptions of Mining Operations, as follows:

CONCENTRATING MACHINERY—Best and Cheapest, Cornish Rolls, all Steel Wearing Parts, Most Practical Styles of Two, Three and Four Compartment Double and Single Jigs, Sizing Screens, Patent Hydraulic Separators, Tables and Concentrators.

STAMP MILLS for Reduction of Gold and Silver Ores, whether free milling or base. Most useful and substantial styles of Single and Double Discharge Mortars, Wet or Dry Crushing.

STEEL SHOES AND DIES, Tappets and Cams, cheapest and best Blake Improved Rock Crushers and Automatic Ore Feeders, Superior Amalgamating Pans with wood or iron sides.

PANS FOR TREATING GOLD ONLY, Settlers, Clean-Up Pans, Retorts, Furnaces, Dump Cars, Hoisting Machinery, Cages, Landing Dogs, etc.

CORLISS, MEYER'S CUT-OFF AND BALL'S PATENT VALVE Engines of extra strength and durability.

STEEL BOILERS of Two Sheets only, Steel Economic Boilers, combining with the safety, durability and economy of the Stationary Boiler, the convenience and portability of the Portable. It occupies but little space, and is the best and cheapest boiler ever made.

WE ALSO MANUFACTURE SAW MILL MACHINERY.

We are also Sole Agents for the Gordon and Maxwell Steam Pumping Machinery, and carry a full stock of all kinds of Mill Supplies, including the

Albany Lubricating Compound and Oils.



1850. 1885.
RANKIN, BRAYTON & CO.,
BUILDERS OF...
MINING MACHINERY.

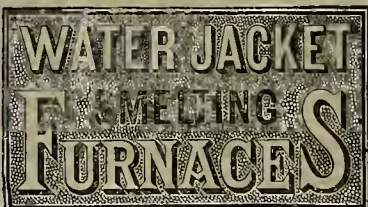
San Francisco: 127 First Street. Chicago: 100 N. Clinton. New York: 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 35 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish from SAN FRANCISCO or CHICAGO, the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

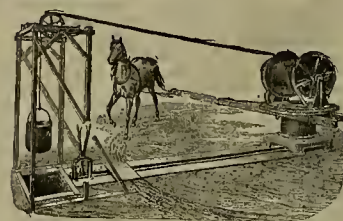
WATER JACKET SMELTING FURNACES

For COPPER and ARGENTIFEROUS LEAD ores of NEW and ORIGINAL DESIGNS, covered by LETTERS PATENT. No other Furnace CAN COMPARE with these for DURABILITY, and in CAPACITY for uninterrupted work. MORE THAN 150 of them are now RUNNING in various parts of THIS COUNTRY, as well as many in FOREIGN COUNTRIES, giving results NEVER BEFORE ATTAINED as regards CONTINUOUS running, ECONOMY of fuel, AMOUNT and QUALITY of BULLION produced. These CLAIMS have been PROVEN BY RESULTS in ANY NUMBER OF INSTANCES, and the GREAT SUPERIORITY of this SYSTEM of smelting ores DEMONSTRATED BEYOND QUESTION. COMPLETE PLANTS furnished to order of any CAPACITY, with ALL IMPROVEMENTS that experience has DEMONSTRATED as VALUABLE in this class of work.



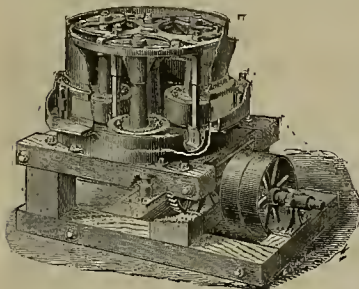
Beyond question the cheapest and most effective machine of the kind now in use adapted to all grades and classes of ores.

This machine has been THOROUGHLY TESTED for the past TWO YEARS, under a GREAT VARIETY OF CONDITIONS, giving most EXTRAORDINARY results FAR IN ADVANCE of anything EVER BEFORE REALIZED. A recent COMPETITIVE TEST at the Carlisle Mine in Mexico, showed an ADVANTAGE OF OVER 30 PER CENT in favor of THE DUNCAN. The amount SAVED OVER THE TRUE being sufficient to PAY THE ENTIRE COST of the machines EVERY MONTH OF THE YEAR. One of its MOST VALUABLE features is as an AMALGAMATOR. It saves all THE AMALGAM GOLD and SILVER that ESCAPES the BATTERIES, PANS or SETTLERS, making the machine worth MORE than ITS COST for THIS PURPOSE ALONE.



Baker's Mining Horse Power.

Possessing all the requirements of a first-class hoist and affording means for the continuous operation of a Pump or Blower, without interfering with a hoisting apparatus. It is made entirely of iron, no piece weighs over 300 pounds. At the ordinary speed of a horse, a 1,000-pound bucket of ore may be raised 120 feet per minute. The hoisting-drum is under the complete control of the man of the shaft, and is capable of carrying 500 feet of five-eighths steel rope. SEND FOR CIRCULAR.

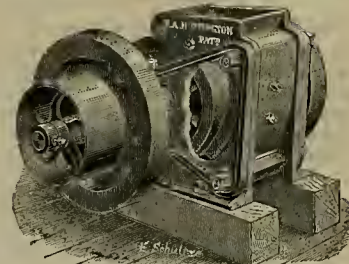


Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,
MANUFACTURER OF
Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,
Mining Machinery of Every Description,
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER.

WILLIAM H. TAYLOR, President.

R. S. MOORE, Superintendent.

L. R. MEAD, Secretary.

THE RISDON IRON AND LOCOMOTIVE WORKS.

Location of Works: S. E. Corner Beale and Howard Streets, San Francisco, Cal.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 1-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve, Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 60,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEY—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulley; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

San Francisco Cordage Factory.
Established 1856.

Constantly on hand a full assortment of Manila Rope, Sisa Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notices.

TUBBS & CO.

611 and 613 Front St., San Francisco.

INVENTORS, TAKE NOTICE!

L. PETERSON, MODEL MAKER,

8 Market St., N. E. cor. Front (up stairs), San Francisco. Experimental machinery and all kinds of models, Tin, Copper, and Brasswork.

THE GLOBE IRON WORKS CO.

Manufacturers and Repairers of all kinds of

MACHINERY AND CASTINGS

MINING, HOISTING, SAW MILL AND HYDRAULIC PLANTS
LOCCING, PORTABLE, STATIONARY, MARINE
AND LOCOMOTIVE ENGINES,

AC'TS DYER CANNON BALL QUARTZ MILL

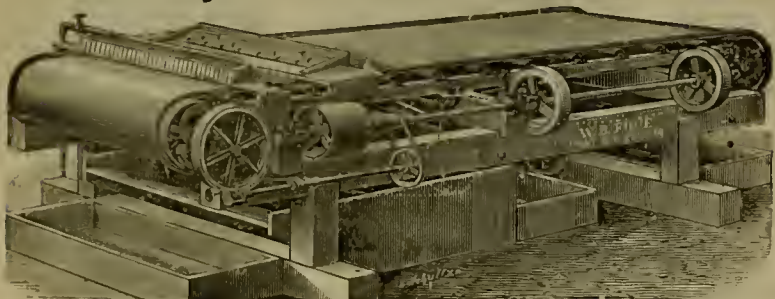
222 & 224 FREMONT STREET, SAN FRANCISCO.

RICHARD C. REMMEY, Agent,
Philadelphia Chemical Stoneware Manufactory,
1100 East Cumberland St., PHILADELPHIA, PA.



Manufacturer of all kinds of Chemical Stoneware—FOR—Manufacturing Chemists. Also Chemical Brick for Glover Tower.

\$1,000 CHALLENGE!



**THE FRUE ORE CONCENTRATOR,
OR VANNING MACHINE.**

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS.
(\$575 00), F. O. B.

OVER 1,000 ARE NOW IN USE. Saves from 40 to 100 per cent more than any other Concentrator. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at the Fulton Iron Works, No. 230 Fremont Street, San Francisco.

As the result of a suit East against an End-Shake Machine (the Embrey), similar to the Triumph, the Frue Vanning Machine Company owns the Embrey patent, and can put in the market an End-Shake Machine of earlier patent that will do as good work as the Triumph, and superior in construction and durability. There will be no risk of suit for infringement.

The Frue Vanning Machine Company warn the public that they claim and will prove the Triumph machine to be an infringement on patents owned by them.

Protected by patents May 4, 1869, Dec. 22 1874, Sept. 2, 1879, April 27, 1880, March 22, 1881, Feb. 20, 1883, Sept. 18, 1883. Patents applied for.

N. B.—We are and have been ready at any time to make a competitive trial against the Triumph, or any other Concentrator for stakes of \$1,000.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,

Room 7—No. 109 California Street,

SAN FRANCISCO, CAL.



SEND FOR CIRCULAR.

IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAMATING PLATES FOR SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

Warranted the Best Made, Durable and Satisfactory. Full weight of silver and best quality of plating guaranteed.

BEST SOFT LAKE SUPERIOR COPPER USED.

Old Mining Plates Bought, Replated, or Gold Separated. 3000 Orders filled. References first class. Prices the very lowest. Have received every Medal awarded on the Pacific Coast for Mining Plates.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS, 653 & 655 Mission St., San Francisco.

E. G. DENNISTON, Proprietor.

These Plates can also be procured of JOHN TAYLOR & CO., Dealers in Assayers' and Mining Material, 112 to 118 Pine St.

NOTICE.—Mining men are cautioned against purchasing inferior quality of Silver-Plated Mining Plates now being manufactured in this city. There has been a general complaint by purchasers that these plates proved defective in plating and short in weight of silver, assays showing great deficiency in silver guaranteed. Thin, light plating looks the same as heavy, but has no durability. Good plates can be furnished at same price these poor plates cost.

WE CARRY IN STORE, DENVER:

Boston Belting Co.'s Rubber Belting, Abendroth & Root's Spiral Pipe, Iron Wheel-barrows, Ore Cars, and Buckets, Hoisting Engines, Etc., Etc.

FRASER & CHALMERS, MINING MACHINERY, ENGINES AND BOILERS.

MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.

PUMPING

ENGINES

—AND—

MACHINERY,

CORNISH

PUMPS.



GENERAL OFFICE AND WORKS:

Fulton and Union Streets, Chicago, Ill.

NEW YORK OFFICE:

Room 43, No. 2 Wall Street.

WAREHOUSE AND BRANCH OFFICE:

No. 248 Eighteenth Street, Denver, Colorado.

MEXICO OFFICE:

No. 11 Calle de Juarez, Chihuahua, Mexico.

WE KEEP IN STORE, DENVER:

Blake Crushers, Baker Blowers, Blake Steam Pumps, Hazard Wire Rope, Allison Artesian Well Casing, Eclipse Blowers, Frue Vanners.

HOISTING

ENGINES,

HALLIDIE'S

WIRE ROPE

TRAMWAYS.

MACHINE TOOLS, PRESSES AND DIES, PUNCHING and SHEARING MACHINERY.

F. A. ROBBINS,

...MANUFACTURER OF...

Canners' and Soap-Makers' Presses and Dies, 20-inch Engine Lathes, 12-inch Shapers.

Punching and Shearing Machinery for Hydraulic Pipes.

SHAFTING, HANGERS, AND PULLEYS.

Gear Cutting a Specialty.

221 and 223 First St., San Francisco.

GOLD MEDAL AWARDED

—AT—

Mechanics' Fair, 1883 & 1884

FOR THE BEST

Automatic Cut-Off Engine.

SILVER MEDAL AWARDED

For Best Slide Valve Engine

and Boiler Combined.

W. H. OHMEN,

WORKS:

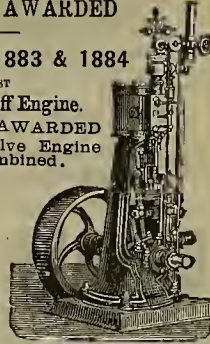
22 Fremont Street,

SAN FRANCISCO.

AUTOMATIC

ENGINES

A Specialty.



N. W. SPAULDING

SAW COMPANY

Manufacturers of

SPAULDING'S

Inserted Tooth

AND

CHISEL BIT

CIRCULAR

Saws.

SAW MILLS AND MACHINERY.

Of all kinds made to order. Send for Descriptive Catalogue.

17 and 19 Fremont St., San Francisco.

PATENTS. Thousands of Inventors throughout

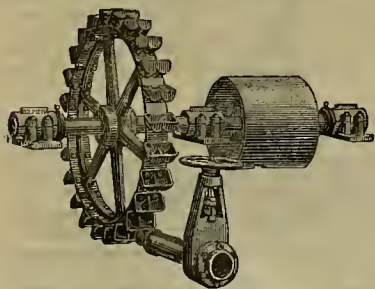
the Pacific Coast can and will willingly

attest to the promptness, reliability and success of

Dewey & Co's U. S. and Foreign Patent Agency, No. 252

Market St. Elevator, 12 Front St., S. F.

PELTON'S WATER WHEEL.



THIS WAS ONE OF THE FOUR WHEELS TESTED by the Idaho Company at Grass Valley, Cal., and gave 90 2 per cent, distancing all competitors. Send for Circulars and guaranteed estimates.

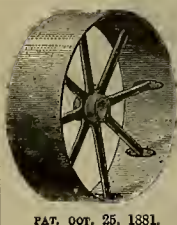
L. A. PELTON,

Nevada City, Nevada Co., Cal.

AGENTS—PARKE & LACY, 21 and 23 Fremont Street San Francisco, Cal.

California Inventors

Should consult DEWEY & CO., AMERICAN AND FOREIGN PATENT SOLICITORS, for obtaining Patents and Caveats. Established in 1860. Their long experience as Journalists and large practice as Patent attorneys enables them to offer Pacific Coast Inventors far better service than they can obtain elsewhere. Send for free circulars of information. Office of the MINING AND SCIENTIFIC PRESS and PACIFIC RURAL PRESS, No. 252 Market St., S. F. Elevator, 12 Front St.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

Send for Circular and Price List.

Nos. 129 and 131 Fremont Street

SAN FRANCISCO, CAL.



Chicago Prices Beaten!

ESTABLISHED 1860.

S. F. PIONEER SCREEN WORKS,

221 & 223 First St., cor. Tehama, S. F.

J. W. QUICK, Prop'r.

Sheet Metals of all kinds perforated for Flour and Rice Mills, Grain and Malt Driers, Furnaces, Chess, Cement and Smut Mills, Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Inventor and manufacturer of the celebrated Slot Cut and Slot Punched Screens. Mining Screens a Specialty, from 1 to 15 (fine). Orders Promptly Executed.

For Mining Share Market, Bullion Shipments, Etc., see page 425.

Metallurgy and Ores.

C. H. AARON,
ASSAYER AND METALLURGIST,
NOGALES, ARIZONA,
Will attend to business in connection with mines in Sonora or Arizona.

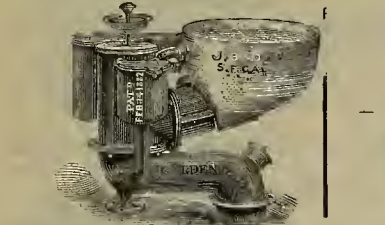
JOHN TAYLOR & CO.,
IMPORTERS AND DEALERS IN
Assayers' Materials,
MINE AND MILL SUPPLIES,
CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, ETC.
114-118 Pine Street, - San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.
Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.
Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes will be sent free upon application. Agents for Plumbago Crucible Co., London, England.
JOHN TAYLOR & CO.

J. KUSTEL. H. KUSTEL.
METALLURGICAL WORKS,
318 Pine St. (Basement),
Corner of Leidesdorff Street, - SAN FRANCISCO
Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
Practical Instruction given in Treating Ores by improved processes.
G. KUSTEL & CO.,
Mining Engineers and Metallurgists.

WM. D. JOHNSTON,
ASSAYER AND ANALYTICAL CHEMIST.
113 Leidesdorff Street,
Bet. California and Sacramento Sts., SAN FRANCISCO
ASSAYING TAUGHT.
Personal attention insures Correct Returns.

THE GOLDEN GATE
PLUG CLOSET.



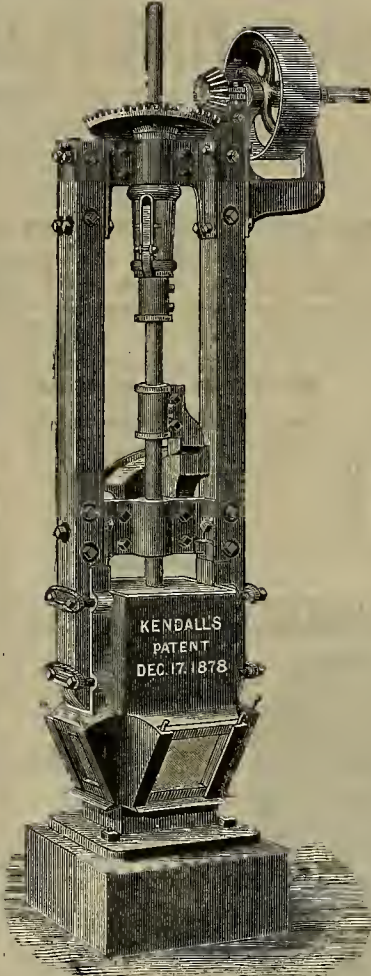
The only secure-locking device to keep sewer gas entirely away from dwelling houses.
JOSEPH BUDDE,
Manufacturer, 126 First Street,
Between Mission and Howard, S. F., Cal.
All kinds of Water Closets, Slop and Waste Hoppers always on hand.
Write for Information.

CATARRH HOLBROOK'S
ELECTRIC
CATARRH AND
ASTHMA CURE
A wonderful medicine. Instantaneous and lasting in its effects. Convenient of application. One bottle will cure any case. Ask your druggist for it, and if he does not keep it, order from the undersigned, who will forward it, post-paid, to any address, on receipt of \$1.00. If not found as represented the money will be refunded.
Pacific Electric Co.
Sole Proprietors
330 Sutter Street
San Francisco, Cal.
CURED

W. S. Smith
ENGINEER AND DRAUGHTSMAN.
Drawings, Specifications and estimates furnished. Machinery of all kinds constructed. Engines tested. Inventions perfected. Blue Prints. 258 Market St., S. F.
W. S. Smith
BUSINESS COLLEGE,
24 Post St. S. F.
Send for Circular.

SAN FRANCISCO TOOL CO.,
WORKS: First and Stevenson Sts., - - - San Francisco, Cal.
MANUFACTURE ALL KINDS OF
MAC NE TOOLS,
INCLUDING ENGINE LATHES, DRILLING MACHINES, Etc.

Pumps for Dredging, Reclamation, and Irrigation.
Pit, Vertical, Bulkhead, Turbine, Centrifugal and Low Lift Pumps.
HORIZONTAL, SINGLE-ACTING, and AUTOMATIC STEAM ENGINES.
CAST IRON SECTIONAL BOILERS.
Boiler Furnaces, Water Valves, Water and Steam Fittings, Hydraulic Jacks, etc., etc.
SEND FOR CIRCULAR. SEND FOR CIRCULAR.



L. C. MARSHUTZ. T. G. CANTRELL.
NATIONAL
IRON WORKS,
N. W. Cor. Main and Howard Sts.,
San Francisco.
MANUFACTURERS OF...
Stationary and Compound
Engines,
FLOUR, SUGAR, SAW and QUARTZ
MILL MACHINERY.
AMALGAMATING MACHINES.
CASTINGS and FORGINGS
Of Every Description.
All Work Tested and Guaranteed!
Improved Portable Hoisting Engines
SOLE MANUFACTURERS OF...
KENDALL'S PATENT
QUARTZ MILLS.
Having renewed our contract on more advantageous terms with Mr. S. Kendall for the manufacture of his Patent Quartz Mill, we are now enabled to offer these mills at GREATLY REDUCED PRICES. Having made and sold these mills for the past five years, we know their merits, and know that they have given perfect satisfaction to purchasers, as numbers of commendatory testimonials prove. We feel confident, therefore, that at the prices we are now prepared to offer them, there is placed within the reach of all a light, cheap, and durable mill that will do all that claimed for it and give entire satisfaction.
MARSHUTZ & CANTRELL.
Send for Circulars and Price List.

NATIONAL
SURGICAL INSTITUTE
For Crippled and Deformed Persons.
Is the largest institution of the kind on the continent. The Medical and Surgical Staff comprises the best talent in the country. There have been more cases of human deformities successfully treated than by any similar Institution. More than 50,000 cases have been successfully treated. Diseases which are made a specialty: Curvature of the Spine, Hip Disease, and all Diseases of the Joints, Crooked Limbs, Club Feet, Piles, Fistula, Nasal Catarrh and Paralysis.
Send for Circulars and References to the Western Division, 319 Bush St., San Francisco

The most Complete Compound
manufactured in America.
Far and away ahead of anything in market. A great California invention.
Fire-Proof, Water-Proof, Acid and Alkali-Proof.
PARAFFINE PAINT CO. Sole Manufacturers and Patentees,
No. 310 California Street, San Francisco.
DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

Metallurgy and Ores.
SELBY
SMELTING and LEAD CO.,
416 Montgomery St., San Francisco.
GOLD AND SILVER REFINERY
And Assay Office.
Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.
MANUFACTURERS OF...
BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.
ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

Nevada Metallurgical Works.
NO. 28 STEVENSON STREET,
Near First and Market Streets, S. F.
C. A. LUCKHARDT, Manager. ESTABLISHED
Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations of Mines; Plans and Reports furnished.
C. A. LUCKHARDT & CO.,
(Formerly Huhn & Luckhardt),
Mining Engineers and Metallurgists

Pacific Reduction and Metallurgical Works.
SALAZAR & KUSTEL
Location of Works: Melroe, Alameda Co., Cal.
OFFICE: 318 Pine St., San Francisco.
Gold and silver ores of every description, from \$40 upward per ton; Jewelers' sweepings and scrapings bought or worked for the owners at a fixed rate per ton. Rebellious ores especially solicited. Ores worked and practical working tests made by any process, to wit: Amalgamation in battery and copperplates for free gold ores. Amalgamation in pans for silver and gold ores, with or without roasting. Leaching of silver ores. Chlorination of gold sulphurets. Assaying, Chemical Analyses of Ores, Metals and other substances.

METALLURGICAL WORKS,
STRONG & CO., 10 Stevenson Street, S. F.
ORES SAMPLED, TESTED, ASSAYED.
THOMAS PRICE,
Chemical Laboratory, Assay Office,
BULLION ROOMS & ORE FLOORS,
624 SACRAMENTO STREET,
SAN FRANCISCO, CALIFORNIA.

CALIFORNIA
HAND ROCK DRILL
FOR—
Drifting and Sinking.
Buy the best and latest improved Hand Rock Drill; can be run by hand, steam, compressed air, or water power. Machine made entirely of crucible steel; light, compact and durable. Strikes 300 blows per minute with 7-lb. hammer. A perfect reproduction of hand drilling; will drill one inch per minute in the hardest rock, using one-quarter the number of drills required by hand labor.
Machines on exhibition at No. 32 First St., San Francisco.
Send for circulars.
C. O. BARLOW, General Manager.

American Exchange Hotel,
SANSOME STREET,
Opposite Wells, Fargo & Co.'s Express, one door from Bank of California, SAN FRANCISCO.
This Hotel is in the very center of the business portion of the city. The traveling public will find this to be the most convenient as well as the most comfortable and respectable Family Hotel in the city.
Board and Room, \$1.00, \$1.25 and \$1.50 PER DAY, ACCORDING TO ROOM.
Hot and Cold Baths Free. None but most obliging white labor employed. Free Coach to and from the Hotel.
MONTGOMERY BROS., Proprietors.



HERCULES SLAYING THE GIANTS.

HERCULES POWDER

Derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

HERCULES POWDER will break more rock, is stronger, safer and better than any other explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

No. 1 (XX) is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

PATENTED IN THE UNITED STATES PATENT OFFICE

THE CALIFORNIA POWDER WORKS,

MANUFACTURERS OF

Sporting, Cannon, Mining, Blasting and HERCULES Powder.
ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.

JOHN F. IOHSE, SEC'Y.

Office, No. 230 California Street, - - - San Francisco, Cal.



THE CONSUMERS' COMPANY.

VULCAN B B AND AJAX.

The Best LOW GRADE EXPLOSIVES in the Market.

SUPERIOR TO BLACK OR JUDSON POWDER.

Vulcan Nos. 1, 2 and 3,

The Best NITRO-GLYCERINE POWDERS Manufactured.

SPECIAL INDUCEMENTS IN PRICES.

AJAX and VULCAN B B POWDERS are Unequaled for Bank Blasting and Railroad Work.

Caps and Fuse of all Grades at Bottom Rates.

VULCAN POWDER CO.,

118 California Street, San Francisco, Cal.

THE GIANT POWDER COMPANY

Manufactures Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

BANDMANN, NIELSEN & CO.,

CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO, CAL.

**THE HOME SCHOOL,
FOR YOUNG LADIES,**
1825 Telegraph Ave., Oakland, Cal.

(Founded in 1872 by the late Miss H. N. Field.) Gives thorough instruction in foundation studies. Admits special students. Prepares for College. Has a resident French Teacher. The Next Term will begin on Wednesday, Jan. 6, 1886. Address

MISS L. TRACY.

**Dr. Willard's Duplex Galvanic Belts,
And Electric Truss.**

Vital Baths—cure Consumption, Inanition, and wasting of vital powers. Electric Powder—cures Neuralgia. New Discovery—cures affections of Lungs and Brain from Giant Powder smoke. Electric Cure for Catarrh and Asthma. Hair Tonic and Dressing—cures diseases of scalp, and prevents gray hair and baldness. Galvanic Tooth Powder—only one made. DR. EMORY L. WILLARD contracts to cure rupture, or no pay. 523 Kearny Street, Room 17.

ANNOUNCEMENT.

The Clayton Air Compressor Works, of Brooklyn, have opened an office at No. 43 Dey Street, New York, for the sale of the Clayton Improved Air Compressors, Rock Drills, Mine Pumps, Hoisting Engines, Rock Crushers, Blasting Batteries, Wire, Fuse, and Mining Machinery in General. For Catalogue—August 1885—estimates and general information call upon or address, Clayton Air Compressor Works, Office, 43 Dey Street, New York.

[From the Engineering & Mining Journal, Aug. 8, 1885.] The Clayton Air Compressor Works have issued a New Illustrated Catalogue and Price List. Every Mine Manager and Engineer should have a copy for reference, for none can afford to be without the information there given concerning the unsurpassed Clayton Air Compressors and other Machinery.

THE PACIFIC COAST

ELECTRICAL CONSTRUCTION CO.

OFFERS FOR SALE

**Keith's Dynamo-Electric Machines,
FOR ELECTRIC LIGHT AND POWER.**

OFFICE—40 NEVADA BLOCK.

WORKS AT UNION IRON WORKS.

San Francisco, Cal.

The Power of Waterfalls can be Transmitted any Distance for use over or underground in any quantity. Electric Railways for Mines, Towns, and Branches.

Dynamos, Electric Motors, Storage Batteries, Arc Lamps, Incandescent Lamps, and all Appliances for Light, Power, and Metallurgy by means of Electricity. THE BEST LIGHT FOR MILLS AND MINES.

SEND FOR CIRCULARS GIVING FULL INFORMATION.

Pacific Machinery Depot.

H. P. GREGORY & CO.,

Nos. 2 and 4 California Street,

San Francisco, Cal.

IMPORTERS AND DEALERS IN ALL CLASSES OF

MACHINERY

SOLE AGENTS FOR

J. A. Fay & Co.'s Woodworking Machinery.

Frank & Co.'s Woodworking Machinery.

New Haven M'fg Co.'s Machinists' Tools.

Bement & Son's Machinists' Tools.

Bickford's Power Drills.

Blake's Improved Steam Pumps.

Perry's Centrifugal Pumps.

Perin Band Saw Blades.

Sturtevant Blowers and Exhausts.

Shimer Matcher Heads.

Brainard Milling Machines.

Turbine Water Wheels.

Bradley Cushioned Hammers.

Massey's Steam Hammers.

Schlenker's Bolt Cutters.

Holloway Fire Extinguishers.

Williamson Bros' Hoisting Engines.

Atlas Engine Works Engines and Boilers.

Payne's Vertical and Horizontal Engines.

Otto Silent Gas Engines.

Clapp & Jones' Steam Fire Engines.

Pickering Engine Governors.

Judson Engine Governors.

Tanite Co.'s Emery Wheels and Machinery.

Nathan and Dreyfus Oilers.

Korting Injectors and Ejectors.

Disston's Circular Saws.

New York Belting and Packing Company's

Rubber Goods.

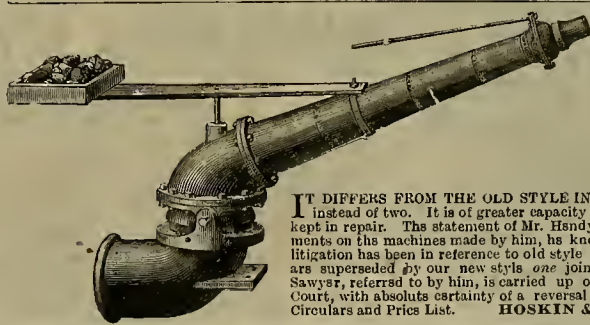
Lane and Bodley Saw mills.

H. W. Johns' Asbestos Packing, Paint, etc.

ENGINES and BOILERS

FROM 2 TO 100 H. P., ALWAYS IN STOCK.

A Full Line of MILL SUPPLIES AND LUBRICATING OILS.

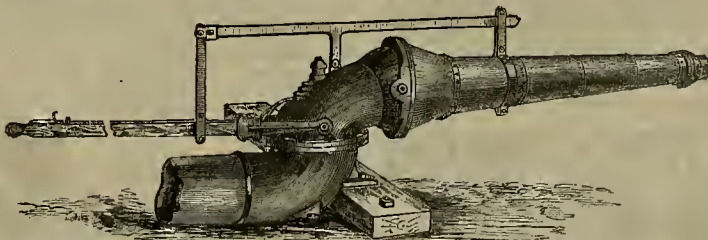


This cut represents our

**IMPROVED
HYDRAULIC
MACHINE.**

IT DIFFERS FROM THE OLD STYLE IN HAVING ONLY ONE JOINT instead of two. It is of greater capacity and more easily worked and kept in repair. The statement of Mr. Hendy that all styles are infringements on this machine made by him, he knows to be utterly false. All litigation has been in reference to old style two jointed machines, which are superseded by our new style one jointed. The decision of Judge Sawyer, referred to by him, is carried up on appeal to U. S. Supreme Court, with absolute certainty of a reversal in our favor. Send for Circulars and Price List. HOSKIN & CO., Marysville, Cal.

IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the IMPROVED FORM OF HYDRAULIC GIANTS, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under the decision of Judge Sawyer of the U. S. Circuit Court in the matter of Hendy and Fisher vs. R. Hoskin et al.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco, Cal.

Iron and Machine Works.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

uring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, between N and O Streets,
SACRAMENTO, CAL.

Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folcom, S. F.

California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rubber Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED. V. KINGWELL.

THOMAS THOMPSON THORNTON THOMPSON

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

California Machine Works,

WM. H. BIRCH,

Engineer and Machinist,

119 Beale Street, San Francisco.

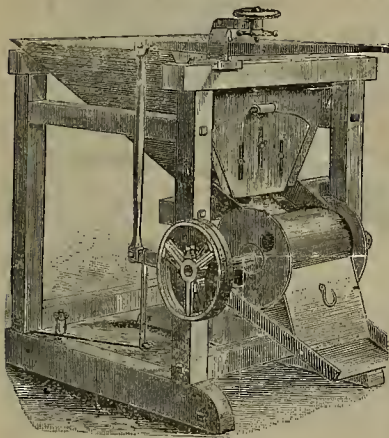
— BUILDER OF —

Steam Engines, Flour Mill,
Mining, Saw Mill and
Dredging MachinesBrodie Rock Crushers,
Steam Power, Hydraulic,
Side Walk and Hand-Power
ELEVATORS.Manufacturers of B. E. Henrickson's Patent Automatic Safety Catches for Elevators. All kinds of machinery made and repaired. **ORDERS SOLICITED.**

THE ORIGINAL

Roller Ore Feeder.

(PATENTED JUNE 24, 1873.)



This form of Ore Feeder is well adapted for its peculiar work.

Manufacturers of the Celebrated "Challenge" Ore Feeders for any character of ores; also "Stanford Improved" Ore Feeders and Tullock's Ore Feeders for dry ores.

Prices furnished upon application to

JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont St., San Francisco.

DEWEY & CO
PATENT
SOLICITORS.
252, MARKET ST. S. F.
ELEVATOR 12, FRONT ST. S. F.

HOOD'S FOUNDRY COKE.

Consumers are respectfully informed that owing to inferior brands of Coke having been sold in this and other countries under the name of "Patent Coke," the Glamorgan Coal Co. (Limited), Cardiff, in May, 1884, abandoned the title of "Patent Foundry Coke," substituting that of "Hood's Foundry Coke."

This Coke is exclusively used by the Selby Smelting and Lead Co., Union Iron Works, Professor Thomas Price, and other consumers here. Large quantities are regularly forwarded to Copper Smelters in Arizona and New Mexico, and also to consumers in Nevada and Salt Lake.

The undersigned are the SOLE IMPORTERS of the above Coke, which is for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

FULTON IRON WORKS,

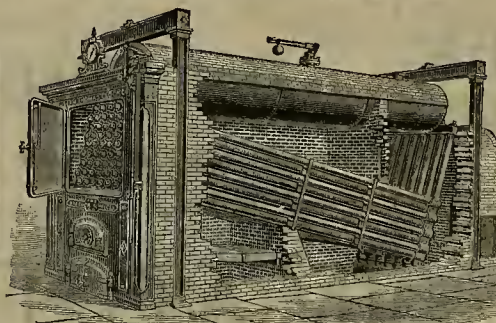
HINCKLEY, SPIERS & HAYES, Proprietors.

[ESTABLISHED IN 1855.]

Office, 220 Fremont St.,

MANUFACTURERS OF

San Francisco.



BABCOCK & WILCOX BOILERS.

ENGINES AND BOILERS

OF ALL KINDS,

Either for use on Steamboats or for use on Land.

Water Pipe, Pump or Air Columns, Fish
Tanks for Salt on Canneries

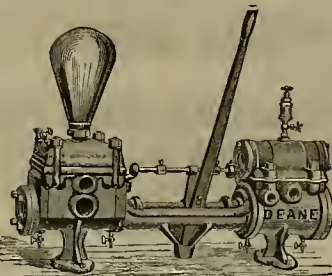
OF EVERY DESCRIPTION.

Boiler Repairs promptly attended to and at very moderate rates.

AGENTS FOR THE PACIFIC COAST FOR THE

Deane Steam Pump.

SPECIALTIES:

Corliss Engines, Babcock and Wilcox Boilers,
Tustin Ore Pulverizers.

DEANE STEAM PUMP.

PACIFIC ROLLING MILL CO.,

.....MANUFACTURERS OF.....

Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

— ALSO —

HOMOGENEOUS STEEL, SOFT and DUCTILE,

SUPERIOR TO IRON FOR

LOCOMOTIVE AND MARINE FORGINGS.

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shapes Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.

Orders will have prompt attention. Send for Catalogues. Address:

PACIFIC ROLLING MILL CO., 202 Market St., San Francisco.

FRASER & CHALMERS.



CHICAGO, ILL.

U. S. A.

General Office:
Fulton and Union Sts.
CHICAGO, ILL.

NEW YORK OFFICE,

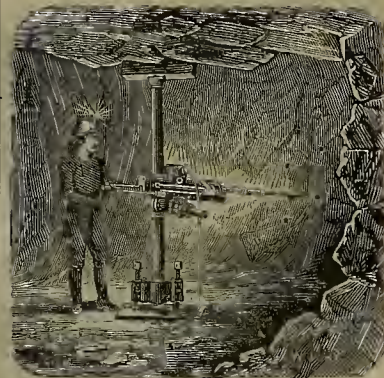
ROOM 43,

NO. 2 WALL ST.

PERFORATED METALS FOR

REVOLVING and SHAKING-SCREENS,

JIGS & STAMP-BATTERIES.

Denver
Office:
No. 248
18th Street,
Colo.Mexico
Office:
No. 11
Calle
de Juarez,
Chihuahua,
Mexico.

INGERSOLL ROCK DRILLS

....AND....

AIR COMPRESSORS.

The Latest Improved Ingersoll Rock Drill, with Large Ports, will do 20 per cent more work than the Old Ingersoll.

MINING MACHINERY.

For Catalogues, Estimates, etc., address:

BERRY & PLACE MACHINE CO.,

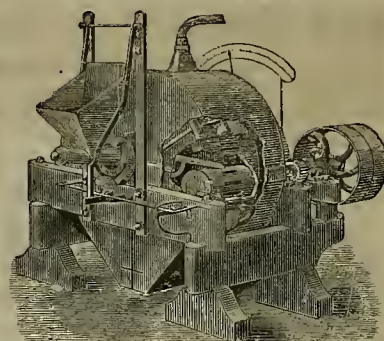
PARKE & LACY, Proprietors,

12 California Street, San Francisco, Cal.

Tustin's Pulverizer

WORKS ORE WET OR DRY

FULTON IRON WORKS, S. F.

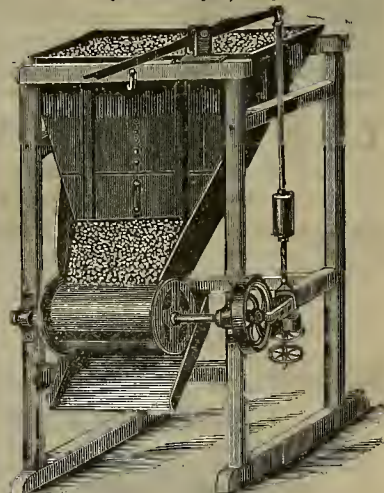


MANUFACTURED BY

HINCKLEY, SPIERS & HAYES,

THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar or repairs.

Golden State and Miners' Iron Works.

Sole Manufacturers,

237 First Street, SAN FRANCISCO, CAL.

BADGES FOR ALL SOCIETIES,

Police, firemen, etc., presentation prizes or charms, in gold, silver, or metal, sold at society prices by the agents of the Universal Badge Manufacturing Co., NATHAN JOSEPH & CO., 641 Clay St. Workmen and K. of P. badges in gold, \$1 each, sent C. O. D. Trade supplied.

SALT LAKE CITY, UTAH.

SAN FRANCISCO, CAL.

PORTLAND, OREGON.



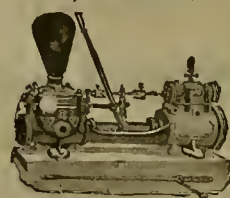
Putnam Planer.

PARKE & LACY.

.....IMPORTERS OF AND DEALERS IN.....

MACHINERY AND GENERAL SUPPLIES,

Nos. 21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

Knowles Steam Pump
The Standard.

Mining Machinery, Steam Pumps, Wood and Iron Working Machinery

ENGINES and BOILERS.

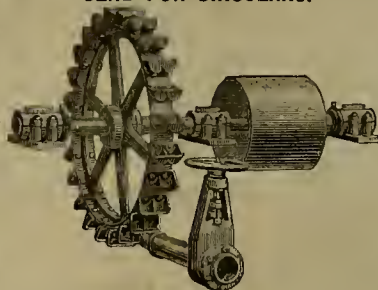
SOLE AGENTS FOR

SEND FOR CIRCULARS.

SOLE AGENTS FOR



Burleigh Rock Drills and Air Compressors
Putnam Machine Tools,
National Bolt Cutters and Headers,
New York Safety and Haskins Vertical
Engines,
Phoenix Engines and Boilers,
Kendall & Roberts' Hoisting Engines,
Knowles Steam Pumps for any service,
Valley Machine Company's Bucket Plunger
Pump,
Heald & Sisco's Centrifugal Pumps,
Jessop & Son's English Cast Steel,
Hazard Manufacturing Co.'s Wire Rope.



PELTON
HURDY-GURDY WATER WHEEL.

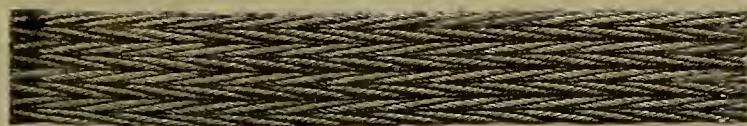
Witherby, Rugg & Richardson's and
H. B. Smith Machine Company's
Woodworking Machinery,
Novelty Iron Works' Shingle Machinery,
turt evant Blowers and Exhausters,
Waters' Governors,
Hancock Inspirators,
Harrington's Screw Hoisting Machines
Lefel Double Turbine Water Wheel,
Pelton's Hurdy-Gurdy Water Wheel,
Babcock Fire Extinguishers and
Chemical Engines.



CALIFORNIA WIRE WORKS,

MANUFACTURERS OF

WIRE ROPE



Of all kinds, Flat and Round, any Sizes and
Lengths, made from only the Best Material
and in the most careful manner.

WIRE Of all kinds for Telegraph
and Telephone purposes, Bal-
ing Hay, and all purposes that wire can be put
to. Brass and Copper—Galvanized,
Annealed, Bright and Coppered Wire.

ASK
YOUR
DEALER
FOR



TRADE MARK.

Sole Licensees on the Pacific Coast for the manu-
facture of Barbed Wire, Two and Four Point
Wire and Flat Barbs.

Barbed Wire.

WIRE CLOTH. Brass, Copper, and Steel, all kinds, and meshes
from 1 to 10,000 to the square inch, for Quartz
Screens, Flour Mills, Gravel Screens, etc.

WIRE FENCING Of various designs, for Stores, Banks, Asy-
lums, Gardens, etc.

WIRE GUARDS For the protection of Windows, Skylights,
Prisons, etc., etc.

WIRE RAILINGS For House Fronts, Window Sills, Stores
Public Squares, etc.

WROUGHT IRON Railing, Fencing, Crestings, Entrance
Gates, and Ornamental Work.

Anything in Wire or Light Wrought Iron, Ornamental or Useful,

Go to the CALIFORNIA WIRE WORKS, 329 Market St., San Francisco, Cal.

GEO. W. PRESCOTT, President.
IRVING M. SCOTT, Gen'l Manager.

H. T. SCOTT, Vice-Pres't and Treas.

GEO. W. DICKIN, Manager.
J. O'B. GUNN, Secretary.

UNION IRON WORKS,

Office, Cor. Market & Fremont Sts., S. F. Location of Works, Potrero. P. O. Box 2128.

— BUILDERS OF —

STEAM, AIR, AND HYDRAULIC MACHINERY.

Agents of the Cameron Steam Pump.

Home Industry. All Work Tested and Guaranteed.

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,

BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,

STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE. CHEAPEST AND BEST IN USE.

UNION IRON WORKS,

Successors to PRESCOTT, SCOTT & CO.

SEND FOR LATE CIRCULARS

SEND FOR LATE CIRCULARS.

CHILLED CAR WHEELS.

Medal Awarded. Mechanics' Fair, 1882.

STEIGER & KERR, Occidental Foundry,

No. 137 FIRST STREET, SAN FRANCISCO, CAL.

IRON CASTINGS OF ALL DESCRIPTIONS.

JAS. LEFFEL'S TURBINE WATER WHEEL

"The Old Reliable,"

With Important Improvements, making it the

MOST PERFECT TURBINE NOW IN USE,

Comprising the Largest and the Smallest Wheels, under both the Highest and
Lowest head used in this country. Our new Illustrated Book sent free to those
owning water power. Those improving water power should not fail to write us for
New Prices before buying elsewhere. New Shops and New Machinery are provided
for making this Wheel. Address

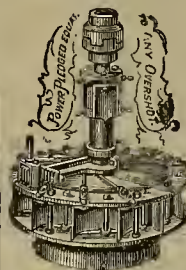
JAMES LEFFEL & CO.,

Springfield, Ohio, and 110 Liberty Street, New York, N. Y.

FRASER & CHALMERS, General Agents.

Chicago, Ill., and Denver, Colo.

PARKE & LACY, General Agents, 21 and 23 Fremont Street, San Francisco, Cal.



JENKINS PATENT VALVES.

Gate, Globe, Angle, Check and Safety.

Manufactured of BEST STEAM METAL. We claim the following advantages over
other Valves and Gauge Cocks now in use:

1. A perfectly tight Valve under any and all pressures of steam, oils or gases.
2. Sand or grit of any kind will not injure the seat.
3. You do not have to take the n off to repair them.
4. They can be repaired by any mechanic in a few minutes.
5. The elasticity of the Disc allows it to adapt itself to an imperfect surface.

In Valves having ground or metal seats, should sand or grit get upon the seat it is impos-
sible to make them tight except by regrinding, which is expensive if done by hand, and if don-
by machine soon wears out the valve, and in most cases they have to be dis- connected from
the pipes, often costing more than a new valve. The JENKINS Disc used in these Valves is
manufactured under our 1886 Patent, and will stand 200 lbs. steam. Sample orders solicited.
To avoid imposition, see that Valves are stamped "Jenkins Bros." For sale by

DUNHAM, CARRIGAN & CO., San Francisco, Cal.



DEWEY & CO. { 252 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front St.

